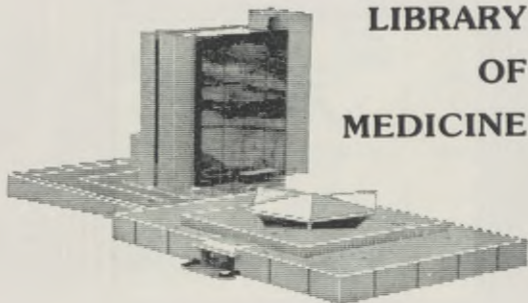


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CYCLOPÆDIA  
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OBSTETRICS AND GYNECOLOGY

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THE  
PATHOLOGY OF PREGNANCY

BEING VOLUME TWO OF  
A PRACTICAL TREATISE ON  
OBSTETRICS

BY  
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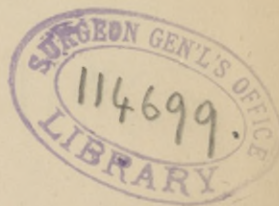
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## CONTENTS OF VOLUME II.

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### CHAPTER I.

Epidemic diseases; colic; cholera; intermittent fever; eruptive fevers; typhoid fever; sporadic diseases; pneumonia; pleurisy; tuberculosis; icterus; syphillis; lead poisoning; tobacco poison; hysteria; epilepsy; traumatism; goitre; erosions of the cervix, . . . . . pages 3-35

### CHAPTER II.

Lesions of the digestion, the respiration, the circulation; varices, ascites, edema, pernicious anemia: lesions of the secretions and of the excretions; ptyalism, retention of urine, cystitis; albuminuria; eclampsia; puerperal convulsions; neuralgias; paralyses; intellectual disorders; diseases of the skin; lesions of the pelvic joints; puerperal rheumatism, muscular and articular; chorea; diseases of the vulva and vagina; abdominal and uterine pains; displacements and distortions of the uterus, . . . . . pages 37-215

### CHAPTER III.

Diseases of the ovum, the decidua, placenta, amnion, . . . . . pages 216-283

### CHAPTER IV.

Diseases of the foetus; fevers; inflammatory affections of the various organs; disturbances in the circulatory system; diseases of the bones; congenital syphilis; death of the foetus and consecutive changes, . . . . . pages 284-310

### CHAPTER V.

Miscarriage; its causes, phenomena, prevention and treatment, . . . . . pages 311-349

### CHAPTER VI.

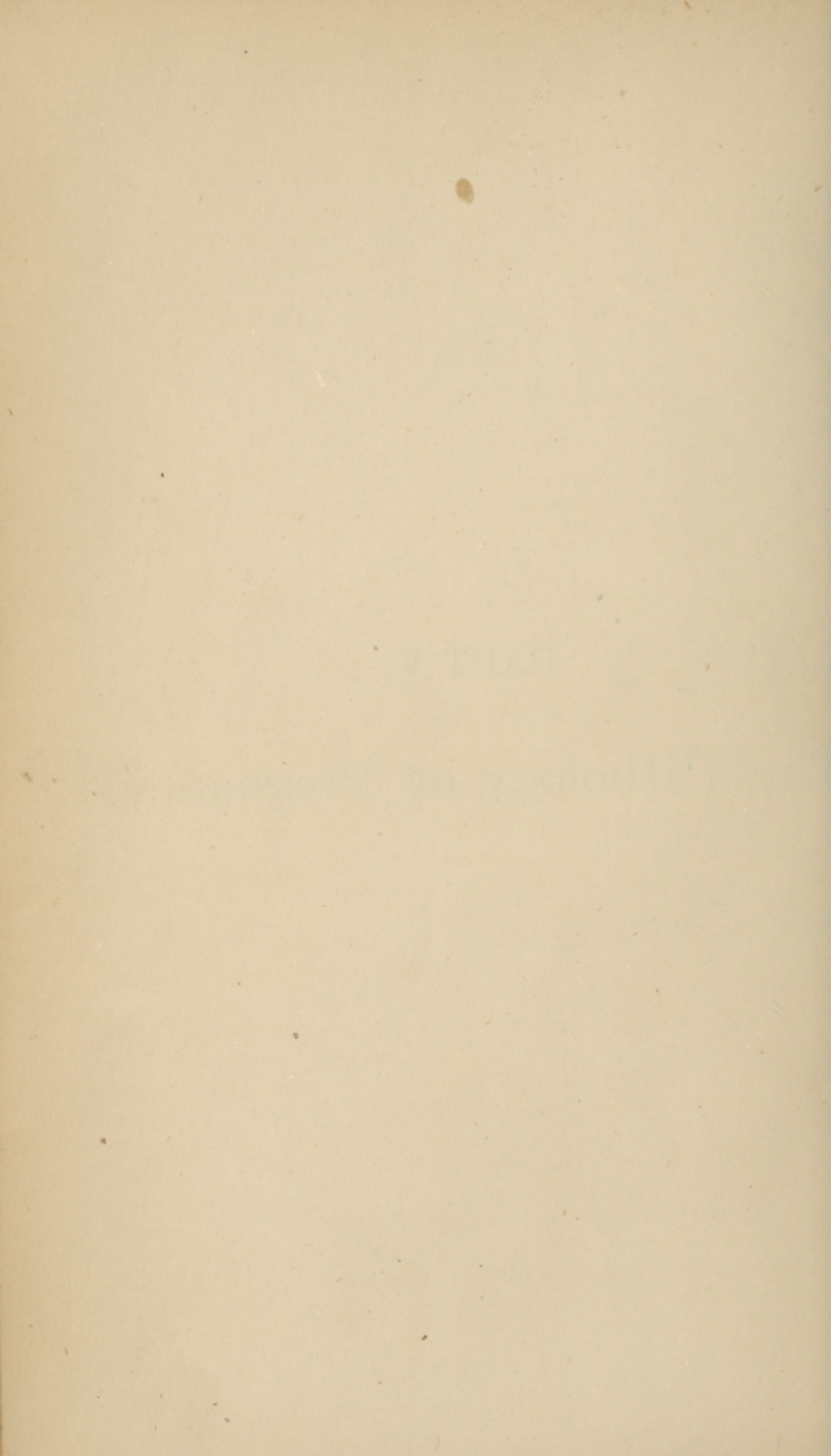
Extra-uterine pregnancy, . . . . . pages 350-381





PART V.

The Pathology of Pregnancy.





## CHAPTER I.

### DISEASES AFFECTING THE PREGNANT WOMAN, INDEPENDENTLY OF THE GRAVID STATE.

THE grávida may be affected by any disease whatsoever, as well medical as surgical. We will briefly pass these diseases in review, and note the reciprocal action which they and pregnancy have on one another. Pregnancy, indeed, does not protect women from any disease, absolutely, and epidemic diseases, whether essentially so, or sporadic, attack, without distinction, the gravid and the non-gravid.

#### EPIDEMIC DISEASES.

##### *Epidemic Colic (Grippe).*

Jacquemier, in 1837, found that this affection attacked nearly all the women in the Maternité. He did not, however, find, as Cazeaux did, that it was more fatal in them than in non-gravid women. Cazeaux, however, noted a large number of miscarriages, either the direct consequences of the disease, or of the violent cramps from which the women suffered.

##### *Cholera.*

*The Influence of Pregnancy on Cholera.*—Bouchut was the first to show that pregnancy has no influence on the appearance of cholera, in that it neither protects from, nor does it predispose to it, and that cholera follows its usual course without any modification, with its usual variations in character and severity. This does not apply to the influence of cholera upon pregnancy, the duration of which is usually shortened.

*Frequency.*—Among upwards of 3000 cases of cholera, reported by different observers, 139 occurred in pregnant females, of whom 55 died.

*Age.*—According to Henning, the greatest number of cases have occurred between the ages of twenty-one and thirty-five; this is also the period during which the mortality has been the most considerable. It also increases with the number of pregnancies.

*Time of Appearance.*—According to Dietl and Hennig, women are most liable to contract cholera during the latter half of pregnancy. Among 63 cases observed by Hennig, there were 33 deaths. The average duration of the disease was eight days, the majority of the deaths occurring on the third day. He states that the malady presents the usual four stages, *viz.*, the period of incubation, of diarrhœa and convulsions,

that of collapse, and that of reaction. The hemorrhages from the genital canal, noted in cases of pregnant females, have been attributed by Slavjansky to a special form of endometritis.

*The Influence of Cholera on Pregnancy.*—Bouchut noted the occurrence of abortion in one-half of the cases in which the patients survived the disease.

The following table gives statistics from various sources in regard to the progress of labor:

|                  |           |             | Recoveries. | Deaths. |    |
|------------------|-----------|-------------|-------------|---------|----|
| Bouchut, . . .   | 52 cases, | Miscarriage | 25          | 16      | 19 |
|                  |           | None        | 27          | 6       | 21 |
| Saint Romes, . . | 10 "      | Miscarriage | 4           | 1       | 3  |
|                  |           | None        | 6           |         | 6  |
| Bourgeois, . . . | 4 "       | Miscarriage | 3           |         | 3  |
|                  |           | None        | 1           | 1       |    |
| Gendrin, . . .   | 2 "       | Miscarriage | 1           |         | 1  |
|                  |           | None        | 1           |         | 1  |
| Drasche, . . .   | 25 "      | Miscarriage | 11          |         |    |
|                  |           | None        | 14          |         |    |
| Hennig, . . .    | 30 "      | Miscarriage | 27          | 18      | 9  |
|                  |           | None        | 12          | 2       | 10 |

Hennig, comparing the results of epidemics in Leipsic, Vienna and France, found that about fifty per cent. of the pregnant women miscarried, the average mortality being forty-eight per cent., while of those who were not confined, sixty-six per cent. died.

The prognosis for both child and mother is very grave; of 85 children 50 died. Authorities differ as to the cause of death, Bouchut attributing it to the mechanical pressure of the uterus, due to the strong contractions of the abdominal muscles, others to lack of nourishment on the part of the mother, or to asphyxia, while Cazeaux believes that the change in the constitution of the blood (through the removal of the serum) leads directly to its coagulation in the placental vessels, with a consequent arrest of the circulation. The prognosis for the mother is no more favorable, as the statistics before quoted prove. Devilliers proposes the induction of premature labor instead of waiting until it occurs spontaneously. At first sight the figures seem to justify this interference, but Cazeaux calls attention to the wide variations in the severity of cholera, so that in the case of those women who were reported to have died without aborting, it terminated fatally before this accident could occur. This author, as well as Baginsky, disapproves of inducing premature labor, but Baginsky advises that the labor be terminated if it has once begun. Unfortunately, the cholera does not allow time for interference before the child perishes.

*Has Cholera any Influence on Delivery?*—If Slavjansky has called attention to the hemorrhages during pregnancy, they do not appear to be any more frequent after delivery, because they have been noted only two or



three times among the cases observed. Might not their infrequency be explained by reference to the changes in the uterine circulation caused by the death of the fœtus? Drasche has reported two cases of eclampsia. As regards the sequelæ of labor, they do not seem to be influenced in any remarkable manner; however, Scanzoni appears to admit that women are more predisposed to puerperal fever. Hennig has reported two cases of peritonitis and parametritis; both were cured. The treatment is the same as that of cholera in the non-puerperal state.

#### *Intermittent Fever.*

Intermittent fever during pregnancy was described by the ancients, and Jacquemier quotes from Schurigius a case in which a woman, pregnant for the third time, was, in the second month of pregnancy, seized with a very obstinate quartan fever. In the last month, before and after the paroxysm, she felt the fœtus move, quiver, and clearly turn about from one side to the other. Finally, after a violent paroxysm, she was delivered of a girl, which was seized at the same hour as the mother with very violent attacks of fever, which continued during seven weeks. Hoffmann and Russel have reported similar cases. Bourgeois described a case of tertian fever, accompanied by convulsive movements of the fœtus corresponding to the maternal attacks, a fact derived from Stokes. Pitre Aubinais observed two cases of intermittent fever, which was transmitted to the children, so that they were born with enlarged spleens, and showed attacks of tertian ague, corresponding to the same days and even the same hours as in the mother. Frank and Joubert have seen similar cases.

Greuser believes that there are forms of intermittent fever that bear a certain causal relation to pregnancy. If that were true, they would persist after delivery, whether this occurs at term or prematurely, and would then disappear spontaneously, or would be very easily cured, while intermittents which occur in women advanced in their pregnancy rarely disappear before delivery under the administration of quinine or other remedies, and in all cases they show relapses. But, if the intermittent fever does stand in a causal relation to the pregnancy, the attacks recur regularly after delivery, just as before, without, on the whole, impeding the normal progress of the labor. He recommends the use of large doses of sulphate of quinine. Mendel affirms that it is impossible at the present day to admit this causal relation between intermittent fever and pregnancy, and considers it as rare. Griesinger insists that pregnant women, and especially those who are parturient, are perhaps less predisposed to intermittent fever than others, and cites the observations of Quadrat, who noticed at Prague only two cases among 8,639 pregnant or puerperal women, in spite of the prevalence of a severe epidemic. Among 37,183 women observed by various writers, only twenty cases were reported:



*Frequency of Intermittent.*

|                     |              |                                   |
|---------------------|--------------|-----------------------------------|
| Quadrat, . . .      | 8,639 cases. | 2 cases.                          |
| Grenser, . . .      | 7,389 "      | 1 case.                           |
| Mendel, . . .       | 9,142 "      | 4 after labor.                    |
| Credé, . . .        | 594 "        | 5 " "                             |
| Strong, . . .       | 2,936 "      | 2 { 1 pregnant.<br>1 after labor. |
| Brummerstädt, . . . | 816 "        | 1 after labor.                    |
| Busch, . . .        | 6,077 "      | A number during pregnancy.        |
| Mendel, . . .       | 1,115 "      | 2 during pregnancy.               |
| Busch, . . .        | 1,114 "      | 2 " "                             |
| Ritter, . . .       | 1,000 "      | Malaria, 14 cases in puerperium.  |
| Sachs, } . . .      |              | A number of cases.                |
| Hirsch, } . . .     |              |                                   |
| Hubbard, . . .      |              | 1 case.                           |
| Angé, . . .         |              | 1 "                               |

Ritter admits that pregnancy does not insure immunity, that the malarial cachexia does not predispose to abortion, and that the intermittent fever generally assumes an acute form. This acute type always disappears for a short time during the act of delivery, to reappear during the first three weeks of convalescence. It would seem as if the tendency of the latter condition was to arouse the acute form in women who were the subjects of the chronic. Finally, according to him, the course of the acute affection is not regular, and the remission is always incomplete. Mendel follows Ritter in believing that intermittent fever is rare, even in localities in which it is indigenous. Pregnancy and the puerperal condition seem to predispose to it. Although typical intermittent is rare, larval forms, especially neuralgic, are often noted. All these authorities agree on the subject of treatment; all recommend the use of sulphate of quinine in larger or smaller doses. Many writers have inveighed against the administration of quinine during pregnancy, because of the supposed danger of producing abortion, but Cazeaux and others deny that the drug is harmful, believing that the general disturbances caused by the attacks of intermittent are far more likely to cause the premature expulsion of the fœtus than the quinine. Many physicians, who have had a large practice in malarial districts, have never had cause to fear the action of quinine upon pregnant women. It is not only an innocuous remedy, but it is the surest preventive when abortion is rendered imminent by the occurrence of the fever. (Cazeaux.)

Spiegelberg affirms that intermittent fever is rare during the last months of pregnancy, and that it does not disturb its course. Intermittent, he thinks, when it is present in a chronic form, assumes its acute form, or a transient acuteness, during pregnancy. He believes strongly in full doses of sulphate of quinine, although this drug does not prevent the recurrences which appear during the first three months after delivery. The disease is temporarily arrested during delivery.

The fever which appears during pregnancy is characterized by the absence of intermissions, and by the presence, on the contrary, of a continued febrile condition, interrupted by irregular chills. The stage of apyrexia is never complete, and even in the most typical cases the intermittence is never regular in its rhythm. The dose of sulphate of quinine should be increased still more during convalescence. Playfair calls attention to the transmission from the mother to the fœtus; and the frequency with which hypertrophy of the spleen is found in young infants in malarial countries, leads him to infer that the intra-uterine affection must be common. He has often noted this fact in India, without, however, having been able to convince himself that the mothers had suffered from intermittent fever during their pregnancy.

Göth's researches differ in certain respects from the results obtained by Ritter. In the course of six years he observed 881 deliveries, in which 46 women were attacked by malaria during pregnancy, and during a period more or less extended subsequently; of these 46, only 27 went to full term, 19 being delivered prematurely.

|                |                |                |
|----------------|----------------|----------------|
| 1 at 4 months. | 2 at 5 months. | 2 at 6 months. |
| 5 at 7 " "     | 9 at 8 " "     |                |

In 41.3 per cent. of the cases, then, there was an interruption of the pregnancy. The inference from these statistics, moreover, is that the danger increases with the advancement of the pregnancy, premature delivery being more frequent than abortions. He agrees with Kaminski and Runge in attributing the death of the fœtus to the elevation of temperature in the mother (106° F. and above) during the prolonged attack, and attaches less importance to the maternal anæmia consecutive to the disease, and to the direct infection of the fœtus by the malarial poison. Göth observed that pregnant women, after the second or third attack, complained of lumbar pains, and that slight uterine contractions could be detected, and the mortality of children who are born under these conditions is much higher than that of other countries. They weigh at least eleven ounces less than others. As regards the labor, he has noted irregularity in the contractions, feeble pains, especially during the first stage, until the cervix is completely dilated; this stage is generally twice as long as in ordinary cases. This feebleness in the contractions, although less evident, is also present during the expulsive stage, because it was necessary to interfere more frequently in those cases (forceps, extraction of the placenta, etc.)

*The Influence of Labor on Malaria.*—This is shown in every instance by the arrest of the attacks (Ritter). Göth, on the contrary, has seen some cases in which the attacks were, it is true, reduced to the number of one or two, but they reappeared subsequently, and in the great majority of the cases the attacks recurred after delivery with the same regularity as



before. During convalescence women are predisposed to it. Ritter, Göth and Mendel have seen women affected after confinement who were free from malaria during pregnancy. Quinine acts in the same way after confinement. Göth does not favor maternal nursing in these cases; it may be allowed in light, but not in severe cases.

## ERUPTIVE FEVERS.

### *Small-pox.*

The eruptive fevers seem to acquire an unusual severity in pregnant females, and small-pox especially, according to most authors, produces abortion and subsequent death of the patients. All writers agree regarding the exceptional gravity of the prognosis of small-pox occurring in a pregnant woman. Cazeaux, however, has already made an important distinction between discrete and confluent small-pox; the first almost always terminating in a cure, even when the pregnancy is interrupted; the second, which is so serious in the non-pregnant state, assuming, during the period of gestation, a peculiarly grave form. Abortion and death would then be the rule, almost certainly. With Jobard, we think it necessary in this connection to distinguish the three forms of small-pox: 1st. Varioloid; 2d. Discrete variola; 3d. Confluent variola.

1st. *Varioloid*.—Even when confluent it is generally benign, and only rarely causes abortion. Mayer has, however, reported four abortions among 37 cases of varioloid. We, ourselves, have observed a case of confluent varioloid in a woman six months pregnant. The mother was cured, the pregnancy pursued its course, and the woman was delivered at term of a living child (the fifth) who did not present any pock-marks, and who was only more emaciated than this patient's other children.

2d. *Discrete Variola*.—Abortion is more frequent (Jobard noted four abortions in eight cases), but recovery of the mother is the rule.

3d. *Confluent Variola*.—Here, on the contrary, abortion is almost invariably the rule, and the death of the mother follows, in the great majority of the cases, during the days immediately succeeding abortion; the same result is far more likely to occur if the variola assumes the hæmorrhagic form.

This opinion is now held by all authors, but they still differ as to the period at which the abortion occurs. It is during the suppurative stage that this accident is especially seen to occur. But abortion does not always take place under the same conditions. Sometimes, in short, the fœtus is expelled dead, sometimes living, and the conditions are evidently all different, so that the causes of abortion may thus be multiplied. As soon as the condition of the maternal blood, the infectious germ of the disease, the exaggerated influence of the maternal temperature, or the infection of the fœtus by the mother, who transmits small-pox to it, cause the



death of this foetus, abortion will become inevitable; because this foetus is no longer anything but a foreign body, of which the womb will inevitably tend to relieve itself. But these are not the only causes, and we must take into account another phenomenon, which alone may explain the frequent abortion: it is uterine hemorrhage. Spiegelberg and others refer this to a hemorrhagic endometritis. Brouardel believes that the premature contractions of the uterus are due to an excess of carbonic acid in the blood.

Does pregnancy predispose women to contract the grave forms of the disease? With Jobard, we think not, and claim that it is by reason of the pregnancy itself, and of the abortion, that the disease assumes a form and a character exceptionally severe. Brouardel and others show that, in certain cases after abortion, small-pox may become hemorrhagic. Variola does not predispose to puerperal septicæmia; the latter is a serious complication, which hastens the fatal termination. Death generally occurs from the eleventh to the fourteenth day of the disease, often before, in hemorrhagic small-pox.

The prognosis is exceedingly grave, as Meyer shows in a series of tables, of which the following is a summary: Of 29 pregnant women, 5 or 17.2 per cent. died, 9 or 31 per cent. aborting; of 47, in another series, 18 or 38.2 per cent. died, 22 aborting. The mortality was greater in an epidemic occurring in the spring and summer.

As regards the foetus, three alternatives may present: 1st. The child may die in the mother's womb; 2d. It may be born alive, and then it is either in good condition and grows up, or it is born alive, but succumbs a few hours or days after birth; 3d. Finally, the child may be born with small-pox pustules.

1st. *The Child dies in the Mother's Womb.*—We believe with Spiegelberg and others, that in order to explain this death, great importance should be assigned to the maternal temperature, and that if hemorrhage plays a part, it is a secondary part, so to speak, compared with that of temperature.

2d. *The Child is born Alive and Survives.*—It is in cases of varioloid, and discrete small-pox especially, that the foetus escapes the danger. But, if a certain number are born well, the majority, as we have observed, are usually born feeble and emaciated, which accounts for their mortality during the days immediately following birth. It is a curious fact that these infants quite frequently resist vaccine. Burkhardt, of Bâle, re-vaccinated 28 pregnant women, with the following result: In 4 women at the end of their pregnancy, vaccination was successful; in 4 children it was unsuccessful, one child resisting it for six months. Vaccination seems in these cases, then, to affect both mother and child. Hence the necessity of re-vaccinating all pregnant women. If vaccine can act thus on the

foetus through the mother, so much the more reason should there be why small-pox should be transmitted in the same manner.

3d. Certain infants are born with evident marks of variola, either in the shape of fully-developed pustules, or cicatrices. Many cases are on record in which children were born with small-pox, while the mothers remained uninfected; in one instance the child was apparently infected at the time of fecundation, the mother remaining well. These cases, it must be acknowledged, are really exceptions, and small-pox in the foetus is rare. It is only when the mother is infected at the end of gestation that this has been verified; and then the foetus comes into the world either during the period of invasion (Gariel), or more commonly towards the end of the eruptive stage, or at the time of the suppurative fever (Chaigneau (Noblet de Rennes, Legrand). Before the ninth month cases become more and more rare, while towards the sixth and fifth month they are almost exceptional. Male infants seem to be more predisposed to it than females.

If the pustules in the foetus present a striking resemblance to those of the adult, they have not the same distribution. Aside from the fact that the small-pox is usually discrete, the pustules are scattered in an irregular manner, and are not most numerous on the face. Nevertheless, in some cases the variola has been confluent. The pustules contain, as a rule, a yellowish and slightly opaque, but rarely purulent, fluid. However, true suppuration has been noted. Mother and child may be attacked simultaneously; the small-pox then pursues a parallel course in the two subjects. More commonly, however, this does not occur, and the small-pox is more advanced in the mother than in the foetus. Children have been attacked three months after the mother. Sometimes the period of invasion seems to be indicated by a peculiar malaise, an extreme agitation of the foetus, followed by the cessation of active movements.

The treatment consists in re-vaccinating all pregnant women, because the cases reported by Burckhardt, although too few to permit the drawing of a positive conclusion, prove, at least, the harmlessness of vaccination, as regards both mother and child.

#### *Scarlet Fever.*

Scarlet fever, although not absolutely rare among the complications of labor, appears on the contrary to be the exception during pregnancy, to judge from the small number of observations reported by authors. Cazeaux never saw a case; Bourgeois, however, mentions an epidemic observed in Vienna in 1801. Scarlatina assumes a grave, malignant type, and terminates in abortion in the case of every woman, in death in the majority. All the descriptions of writers have reference to scarlet fever occurring after delivery. A single observation of Bourgeois seems, how-



ever, to have related to a case of scarlet fever which occurred during the latter days of pregnancy, the woman dying five days after delivery.

#### *Measles.*

Measles is of rare occurrence during pregnancy, for only twenty or twenty-five cases at the most can be collected among different authorities. According to Levet, it equals in gravity the other eruptive fevers, and is almost always accompanied by abortions and premature delivery. Grisolle and Cazeaux, on the other hand, observed two cases in which the pregnancy pursued its course. Bourgeois agrees with Levet. Among fifteen cases observed by him, he noted eight abortions or premature births; of the eight children, five were non-viable (born before seven months), three at the seventh or eighth month. In women who were only between the second and fifth month of pregnancy, the disease pursued its usual course, but it became more severe as the pregnancy was more advanced. The premonitory symptoms of abortion appeared towards the end of the disease; as a rule, delivery did not occur until from one to three days later, and sometimes the disease had terminated.

When women were attacked with the disease at the end of pregnancy, premature delivery took place at the outset, accompanied by fever and serious symptoms. The foetus was dead-born, or perished within a few hours or days after birth. The disease pursued its course and the women slowly recovered. In rare instances the children were born with measles. Bourgeois saw one case, the infant being born fifteen days before full term and living only three days. Gautier collected eleven cases, in six of which the children presented the morbillous eruption.

Measles occurring during pregnancy, therefore, may predispose to the death of the foetus and to abortion; it does not endanger the mother. The prognosis during the puerperal state is less grave.

#### *Erysipelas.*

Erysipelas, like the other eruptive fevers, may attack pregnant females, and pregnancy does not seem to offer any protection from it. Facial erysipelas, especially, has been observed several times, and if pregnancy does not seem to influence the course of the affection, the case is not the same as regards the influence of erysipelas upon pregnancy. The latter is often interrupted, either by abortion or by premature delivery, and the foetus may be directly affected by the rise of temperature in the mother. The mother, as in cases of small-pox, may die or be cured; everything depends on the severity of the disease. However, erysipelas seems to be less serious than variola, and may be placed on the same level as measles. We have only seen one case: the woman, who was attacked at about the fourth month of pregnancy, presented until term (when she was delivered of a living child) a series of erysipelatous eruptions of the face, which reap-



peared month after month, and were remarkable by reason of the insignificance of the febrile manifestations, although the eruption was well marked.

*Typhoid Fever.*

While Rokitansky and Niemeyer believe that pregnancy insures a sort of immunity from typhoid fever, others regard this opinion as being too positive, and, while agreeing in the belief that typhoid is more common after delivery than it is during pregnancy, they prove, by numerous observations (283), that typhoid may not only attack pregnant women, but that it does not always present the same form—that the disease may assume the abdominal, exanthematic or recurrent type. These three varieties, moreover, do not seem to manifest either the same frequency, or the same severity, the exanthematic and recurrent forms having been most often observed. Typhoid fever may attack women at any period of pregnancy; however, it occurs more frequently during the first than during the last months. But the three types of the disease do not seem to possess the same gravity, and while the abdominal variety is most severe, the exanthematic and recurrent would seem to be less dangerous to women. This danger also, according to Spiegelberg, depends, perhaps, less upon the form of the disease than it does upon the period of the pregnancy at which it occurs, and upon the abortion which it produces, since the latter is inevitably followed by more severe hemorrhages during the early than during the later months, when the consequences are simply those of a premature delivery. In 322 cases the fœtus was expelled prematurely in 182.

|                      | Cases. | Miscarriages. | Prem. Labor. | Pregnancy to term. |
|----------------------|--------|---------------|--------------|--------------------|
| Bourgeois, . . . . . | 37     | 12            | 10           | 15                 |
| Forget, . . . . .    | 4      | 2             |              | 2                  |
| Grisolle, . . . . .  | 1      | 1             |              |                    |
| Mauriceau, . . . . . | 3      | 3             |              |                    |
| Piorry . . . . .     | 2      | 1             | 1            |                    |
| Wallichs, . . . . .  | 2      | 1             | 1            |                    |
| Bartels, . . . . .   | 1      |               |              | 1                  |
| Kaminsky, . . . . .  | 87     | 54            |              | 33                 |
| Murchison, . . . . . | 14     | 8             | 1            | 5                  |
| Weber, . . . . .     | 63     | 23            |              | 40                 |
| Duguyot, . . . . .   | 62     | 40            |              | 22                 |
| Zuelzer, . . . . .   | 32     | 22            |              | 10                 |
| Lehnerdt, . . . . .  | 14     | 2             |              | 12                 |
|                      | 322    | 182           |              | 140                |

According to Zuelzer and Wardell, exanthematic typhoid is the least serious of all, its influence on pregnancy being almost *nil*.

*Prognosis.*—This is extremely grave for the child, since not only does abortion cause its death, but in cases of premature delivery the fœtus is

often dead-born, or, if it is born alive, it frequently perishes during the days succeeding its birth, either from congenital asthenia, or with symptoms of typhoid fever.

What is the true cause of the death of the fœtus? All authors agree in attributing it to the elevation of the mother's temperature. Kaminsky has shown that, as soon as the maternal temperature rises to  $104^{\circ}$ , the fœtal heart-beat is observed to become accelerated in proportion to the height of the mother's temperature, and, in addition, the fœtus executes irregular movements at  $107^{\circ}$  to  $107.5^{\circ}$ . Fœtal death is inevitable, but the danger begins at  $104^{\circ}$ . According to Kaminsky, it is the elevation of the maternal temperature, not the typhoid infection, which alone causes the death of the fœtus; its expulsion may be delayed for a longer or shorter time afterwards, even as late as the beginning of the mother's convalescence.

The prognosis as regards the mother is more favorable, and, like Spiegelberg, Fiedler believes that its gravity depends much more upon the abortion and consequent hemorrhage than upon the disease itself. The influence of pregnancy on typhoid fever seems to be obscure.

#### SPORADIC AFFECTIONS.

##### *Pneumonia.*

We have seen, in studying the changes induced in the body by pregnancy, that Kuchenmeister and others have proved that the pulmonary capacity is not lessened during this condition—that if the thorax is not so deep, this diminution in depth is compensated for by the increase in breadth of the base of the chest, and that after delivery the chest resumes its usual shape. Pulmonary diseases during pregnancy react seriously upon the woman's health, and may all be observed; but, aside from pulmonary congestions, œdema, and hemorrhage, it is the acute affection, pneumonia, which, according to all authorities, deserves special attention, both on account of the gravity which it impresses upon the pregnancy, and its influence on gestation.

*Etiology and Frequency.*—Pneumonia during pregnancy, as well as in the non-pregnant stage, is due to a chill, and consequently it may occur without distinction at any period of this pregnancy; only pregnant women, according to Ricau and Devilliers, are predisposed to it by reason of the changes which pregnancy causes in the composition of the blood, especially the excess of fibrin. Statistics presented by authorities correspond in fact to every period of pregnancy, and the important fact deduced from these observations is that pneumonia almost certainly causes abortion, and that a considerable number of women die. Bourgeois observed twelve cases, with eight abortions and as many deaths; Grisolle reports only one recovery out of fifteen cases, six women being delivered at term,



while the other nine miscarried. Wernich thinks that cardiac failure is the principal danger in cases of pneumonia during pregnancy. The weakened action of the right ventricle leads to stasis of the pulmonary circulation, and consequent emptying of the left ventricle. If the pneumonia is extensive, as the *vis a tergo* becomes diminished on one side (the left ventricle), while the obstruction increases on the other (the emptying of the right ventricle becoming less and less complete), the blood stasis in the veins of the general system constantly increases—hence the danger. Considering next the influence of pneumonia upon pregnancy, and of pregnancy upon pneumonia, he presents the following conclusions:

1st. The more advanced the pregnancy, the more rapidly does pneumonia cause premature delivery. 2d. The more advanced the pregnancy, the more unfavorable is the emptying of the uterus. 3d. The more advanced the pregnancy, the more likely is the pneumonia to terminate fatally. From a comparison of the statistics, it would seem that pneumonia affects pregnancy less than the exanthemata and typhoid fever, and on the contrary approaches cholera in its influence:

|                      |           |                  |
|----------------------|-----------|------------------|
| Small-pox, . . . . . | 31 cases. | 27 miscarriages. |
| Typhoid, . . . . .   | 38 “      | 22 “             |
| Cholera, . . . . .   | 52 “      | 25 “             |
| Measles, . . . . .   | 15 “      | 8 “              |
| Pneumonia, . . . . . | 43 “      | 21 “             |

*The Influence of Pregnancy on Pneumonia.*—Pneumonia during pregnancy seems to attack more often the right than the left side, which is also the rule in the non-parous, but pregnancy causes an especial aggravation of the symptoms; the fever is marked, the temperature high, the skin hot and dry, the pulse rapid and vibrating. But the principal phenomenon is the disturbance of the respiration, which, according to Ricau, depends upon two sets of causes, one of which (pathological) is due to the pneumonia, the other (physiological) depends upon the pregnancy.

A. *Causes due to Pneumonia.*—1st. The pulmonary alveoli being the seat of an exudation which prevents the air from entering them, the respiratory surface is diminished and the circulation in the inflamed portion is retarded; 2d. Hyperæmia and collateral œdema are produced in the non-inflamed portion—two conditions which directly contract the area of hæmatisation (Jaccoud); 3d. The pain in the side compels the patient to make very shallow respirations—hence a permanent diminution of the thoracic cavity; 4th. Fever, in consequence of increased combustion, leads to a greater consumption of oxygen, and an increased production of carbonic acid, at the expense of the system; this is one of the most potent causes of dyspnœa (Niemeyer.)

B. *Causes due to Pregnancy.*—Pregnancy, in its turn, acts in two ways: on the one hand by increasing the size of the uterus, which, after the sixth month, crowds up the intestines, the stomach and the spleen, and



limits, in consequence, the contractions of the diaphragm; on the other hand, by the changes which it induces in the blood, the red discs being diminished in size, and, since these are the oxygen-carriers, the supply of this gas in the economy will be lessened, while, again, if the pulmonary lesion is very extensive, there will be disturbances of the circulation.

*Statistics of 43 Cases of Pneumonia in Pregnancy.*

|  |   |                |                                  |
|--|---|----------------|----------------------------------|
| Before 180th day of pregnancy, 28 cases. | { | Recoveries, 23 | { With miscarriage, 6 cases.     |
|  |   |                | { Without, 17 cases.             |
|  | { | Deaths, 5      | { With miscarriage, 5 cases.     |
|  |   |                | { Without, 0.                    |
| After 180th day of pregnancy, 15 cases.  | { | Recoveries, 8. | { With premature labor, 5 cases. |
|  |   |                | { Without, 3 cases.              |
|  | { | Deaths, 7.     | { With premature labor, 5 cases. |
|  |   |                | { Without, 2 cases.              |

The pneumonia, however, may be slight or severe. In the former instance, if uterine contraction is absent or can be arrested, resolution takes place rapidly. If, on the contrary, the pneumonia is severe, it always causes abortion. But, while in the first case abortion is usually followed by relief, in the second the pulmonary lesions are aggravated, extend over both lungs, and death ensues in from two to six days.

What is the actual cause of the expulsion and death of the fœtus? Violent straining, due to coughing, shock, the accumulation of carbonic acid in the blood (which, as Brown-Séquard has shown, incites uterine contractions), and heart-failure have been suggested by various authorities. We believe in the influence of all these factors, but there is one which, in our opinion, is more powerful than all the rest; here, as in variola and typhoid fever, it is the elevation of the maternal temperature, an elevation which, by causing the death of the fœtus, transforms it into a foreign body, of which the uterus seeks to rid itself.

*Prognosis.*—We must consider this from both the child's and the mother's standpoint.

1st. *The Fœtus.*—We have seen that pregnancy is often interrupted, and that, in consequence, the life of the child is often compromised. The prognosis, then, is exceedingly grave, perhaps a little less so during the last three months, but always very serious; and in some cases we can witness, as it were, the death-struggle of the fœtus. The active movements become disturbed, irregular or spasmodic, then they are seen to grow gradually weaker, and finally to disappear entirely. The same phenomena appear in the cardiac beats; they are first accelerated, then diminish, become feeble, and finally cease.

2d. *The Mother*.—Without being nearly as grave for the mother as it is for the fœtus, the prognosis in her case is none the less extremely serious; it is sufficient to refer to the statistics presented by authorities. Grisolle reports a mortality of 92.8 per cent., Ricau, 35.8. Bourgeois, 75. Wernich, 21.1, and Chatelain, 39. As regards the effect of the expulsion of the fœtus, it does not seem to be favorable to the mother; thus, out of 82 women who miscarried, 58 died, while only 16 deaths occurred among 74 women, who did not abort. Several writers, on the contrary, affirm that abortion is followed by the resolution of the pneumonia, and hence the advice to induce premature labor. Wernich, Hegar, Martin, Gusserow, and other German authorities, are positively opposed to this measure, on the ground that the sudden change of pressure within the thoracic cavity, resulting from the rapid emptying of the uterus, must inevitably produce fatal pulmonary œdema.

We believe that artificial abortion should not be entirely rejected, but that it should be reserved for special cases. In the face of such a grave complication of pregnancy as pneumonia, we think that, when all methods of treatment have failed, and the life of the mother is seriously threatened, we have no right to deny her a possible chance of being saved, as shown by the cases cited by Thirion and Aran. Moreover, all writers agree in affirming that the emptying of the uterus lessens, at least for the time being, the pulmonary congestion and dyspnœa, and consequently affords a decided relief to the patient. Although this relief may be only temporary, it is, nevertheless, of benefit to the woman, and, as the child is almost inevitably doomed through the presence of the disease alone, our course should be governed entirely by the mother's interests. Unfortunately, a serious and weighty objection has been presented to those who favor an operation; it is, that the induction of abortion and premature labor always requires a length of time, which may vary from twelve to thirty-six hours, and even longer, during which interval the disease may make rapid strides and destroy the patients. This objection, we think, loses much of its force if we adopt Barnes's method,—dilate the cervix by dilators of gradually increasing size, and, when the dilatation is complete, terminate the labor as rapidly as possible, without injury to the woman. As for abortion, we believe that it should be produced still more rarely, and then by rupturing the membranes. The induction of abortion and premature labor are, in our opinion, most clearly indicated in cases of double pneumonia, and when pneumonia occurs in a woman already affected with cardiac disease, or in a rachitic subject—in short, in a woman whose respiratory condition was already bad before the occurrence of the pneumonia.

Chatelain, who favors the induction of abortion in bad cases of pneumonia, unites with Grisolle in advising venesection; this is also the German method. As for emetics, he reserves these until the uterus begins to contract, when the hope of saving both mother and child is removed.



He believes, with Grisolle, Young, Parker, and Gantillon, that tartar emetic provokes uterine contractions. As long as there is no evidence of delivery, he prefers sulphuret of mercury, either alone or in combination with digitalis, which, in his opinion, is the remedy *par excellence*. Ricau, on the contrary, does not employ venesection, or does not recommend it unless pneumonia is complicated by organic disease of the heart in a pregnant female. He employs tartar emetic and digitalis, giving the former in emetic doses, and reserves premature delivery as a last resource.

### *Pleurisy.*

Pleurisy seems to be situated more frequently on the right than on the left side. It is a curious fact that, while pneumonia is one of the most serious complications of pregnancy, pleurisy (except in exceptionally severe cases) does not appear to affect either the course of pregnancy or the life of the mother. It was actually interrupted only twice in eighteen cases collected by us, the two women who miscarried being in the last month of pregnancy. (Leopold, Budin). Besides, pleurisy may assume either of the classical types, the course of the disease apparently being influenced principally by this variability in its form. The acute, or sero-fibrinous variety, is, according to Leopold, the most favorable, although the exudative (whether more or less extensive) is the most common. Pneumonia is a rare disease during pregnancy, but pleurisy is still more infrequent, since we have been able to collect only eighteen cases.

As in ordinary pleurisy, the symptoms are the pleuritic "stitch," the flatness, cough, dyspnoea, accompanied with pain, fever, the compression of the lung, which diminishes the area of hematosis, the compensatory congestion and œdema of the healthy lung (in the pregnant woman, especially during the later months, the disturbance of respiration referable to pregnancy itself is added to the pleuritic dyspnoea), and the displacement of the heart. As a rule, then, pleurisy in the gravid woman is benign, and it is only in exceptional cases that it tends to become purulent (contrary to its course after delivery), because it usually runs its course in from thirty-five to forty days. But this is not always the case, as proved by the facts recorded by Leopold and Baratgin, for it may sometimes assume such a grave character that thoracentesis becomes necessary. The pregnancy generally pursues its course, but when abortion and premature delivery take place, these have not seemed to exert any special influence upon the progress of the effusion; there was not only no increased effusion, but, on the contrary, the dyspnoea and accompanying malaise disappeared rapidly, almost immediately, in spite of the presence of the exudation. Emptying of the uterus, therefore, seems in itself to relieve the oppression by freeing the thorax; this is especially true when the pregnancy is quite advanced. Pleurisy, in fact, apparently pursues its usual course, and neither influences nor is much affected by pregnancy.

The prognosis is generally, but not always, favorable for both mother and child.

*Treatment.*—Grisolle advocates a most thorough and vigorous antiphlogistic treatment. Fischl, Leopold and Baratgin confine themselves to the use of wet cups and opiates, combined with digitalis, employing large blisters, diuretics, mild purgatives, milk, and a more or less restricted diet, as soon as the fever diminishes. But, if there is considerable effusion, intense dyspnoea, and threatened asphyxia, with marked cardiac displacement, are we justified in resorting to thoracentesis? It was employed twice by Duguet, and once by Vendrant and Verneuil; no accident resulted in these three cases, and the mothers recovered more or less speedily. Others have observed satisfactory results from thoracentesis; pregnancy does not seem to contra-indicate it.

#### *Pulmonary Tuberculosis—Phthisis.*

The most recent and exhaustive work on pulmonary tuberculosis is the thesis of Gaulard (1880). According to him, anæmia is the rule in pregnancy. He accepts entirely Peter's idea concerning the pulmonary congestion of pregnancy, and states that four opinions are still held by scientists regarding the relations between phthisis and pregnancy, *viz.*: 1st. Pregnancy checks the development of phthisis, or arrests its course after it has already begun, 2d. Pregnancy accelerates the progress of tuberculosis; 3d. Pregnancy really aggravates the disease, but the latter undergoes marked amelioration during the early months; 4th. Sometimes pregnancy interrupts, and seems to arrest the course of the disease—sometimes, on the contrary, it aggravates and hastens it. Each of these views has its eminent supporters and defenders.

1st. Pregnancy checks the development of phthisis, or arrests its course after it has already begun. But after delivery tuberculosis resumes its course, and the temporary amelioration established during pregnancy is followed by a relapse which often carries off the patient in a short time. This opinion, advanced by Cullen, Borden, Sims, and others, is based on the theory that the growing uterus diverts a part of the blood from the lungs to nourish the fœtus, hence the immunity during pregnancy. The hemorrhage accompanying delivery insures amelioration afterward; but this is only temporary, because, as this diversion ceases after delivery, the pulmonary congestion begins anew, and all the phthisical symptoms reappear, and become rapidly aggravated. Gaulard calls attention, in connection with this theory, to the fact that pregnant females enjoy no immunity from diseases, and that all authorities insist that pregnancy influences, more or less injuriously, every acute or chronic affection. There is, then, no reason why pregnancy, which exerts such a particular disturbing effect upon a lung that is the seat of pneumonia, should, on the other hand, affect favorably a lung strewn with gray nodules, or attacked with



tubercular pneumonia. If, as the supporters of this idea believe, pregnancy produces a salutary derivation of blood from the lung of a tuberculous woman, why should it produce such a result only in tuberculosis? Now, this derivation does not exist, for the researches of Peter have shown conclusively that pregnancy unquestionably causes pulmonary congestion, and the antagonism between rickets and tuberculosis (admitted by Gubler, Beylard and Trousseau) is not certain. As regards the influence of delivery and the puerperium upon the progress of phthisis, Lebert thinks that it is even more fatal than that of pregnancy, while Gaulard, though admitting that phthisical females are generally delivered easily and rapidly, nevertheless attributes to these conditions considerable influence, because of the exertion demanded by the woman, exertion which increases her weakness and induces attacks of pulmonary congestion. Now, it is evident that these violent and repeated congestions act unfavorably upon tuberculosis, at any stage of its advance; they may even lead to the rupture of vessels and consequent hæmoptysis, and, as Fernet says, "even granting that hæmoptysis can not cause tubercle, can it not lead to the development of a chronic inflammation of the lung? and, supposing this inflammatory process to become caseous, may it not involve the destruction of the organ and all the phenomena of pulmonary consumption?"

The puerperal state also aggravates pulmonary tuberculosis, and Lebert attributes this injurious influence to traumatism, to the feebleness and exhaustion of the woman, to loss of blood, and to the lochial discharge. Every debilitating agent favors the production and development of tubercles; the puerperium exerts such an influence, and this applies more particularly to lactation. On this point all authorities agree. But, in addition to this enfeebling influence of the puerperal condition, does it not act directly upon the respiratory apparatus? If during pregnancy the lungs are relieved of a considerable amount of blood, which is diverted to the uterus, after delivery there is a sudden change in these relations, which leads to congestion, hemorrhage, and acute exacerbation of existing inflammations. According to Spiegelberg, the sudden lowering of the pressure in the aorta after delivery causes a corresponding elevation in the venous pressure, which is still further increased by the closure of the uterine sinuses. After labor, the diaphragm can sink lower and the blood flows into the lungs more freely.

2d. Pregnancy not only does offer no resistance to the development of phthisis, but, on the contrary, it hastens and aggravates the course of tuberculosis. This opinion is based on numerous observations, in the course of which tuberculosis existing before conception was sometimes seen to advance more rapidly solely by reason of the pregnancy, while, again, a tuberculosis previously latent may develop during gestation and as a result of its influence. Thus Gaulard reported thirty-two cases in which the disease existed before conception, in twenty-five of which the

patient's condition was aggravated, and collected eighty-four in which it developed during pregnancy and was evidently aggravated by the same. Caresme noted the appearance of tuberculosis in twelve patients after confinement, two of whom subsequently gave birth to other children.

3d. *Mixed Opinion.*—Pregnancy aggravates the course of the disease but the latter undergoes a marked amelioration during the early months. This view is held by Gardien, Capuron, Pidoux and Peter.

4th. Finally, there exists a fourth view, still more eclectic in its character, according to which pregnancy sometimes interrupts and seems to arrest the progress of the disease, sometimes hastens it. This is supported by Portal, Andral, and others.

The ages of the patients have ranged from eighteen and a half to thirty-nine and a half years, and the interval elapsing between the initial symptoms, from the end of gestation, has varied from a few days to twenty-one months.

Pregnancy, accordingly, exercises a marked influence upon phthisis, and this influence will be so much the more injurious if this afferent cause is combined with other predisposing ones, such as heredity, malnutrition, bad hygiene, exposure to cold, hard labor, scrofula, pre-existing pleurisy, repeated pregnancies, etc. Lebert has presented the following statistics showing the duration of the disease. Death occurred in 12 per cent. within three months, in 20 per cent. within six months, in 44 per cent. between six months and a year, and in 24 per cent. between one and six years. According to the same writer the influence of pregnancy upon tuberculosis is most marked between the ages of twenty and thirty. He draws the following conclusions:

1st. Latent tuberculosis in young girls most often appears after marriage as a result of pregnancy, either the first or a subsequent one.

2d. In exceptional cases, the health in tuberculous women is not affected even by repeated pregnancies; in some instances the children are feeble, a certain proportion dying early.

3d. Advanced phthisis usually prevents conception; incipient phthisis does not prevent it, and the pregnancy goes on to full term.

4th. Abortion, pregnancy, and the puerperal state, determine the development of phthisis in at least three-fourths of the cases.

5th. Children born of a phthisical mother are generally feeble; they often become first scrofulous, then tuberculous.

*The Influence of Phthisis on the Product of Conception.*—This is much less pronounced, though in many instances it is undoubted. Bourgeois noted 96 living children among 124 tuberculous mothers; 36 infants continued in good health, 60 became scrofulous, and 22 died of tuberculosis before their seventh year. Ortega observed 95 women, in whom pulmonary phthisis developed before, during, or after gestation. The disease advanced steadily in every instance. Although there was sometimes an



amelioration during gestation, it nearly always made rapid strides after delivery.

From these 95 women there were 185 pregnancies. 95 went to term; 28 premature labors; 9 miscarriages; 18 women did not cough before pregnancy. In 20, the disease appeared in the first half of pregnancy; in 11, at term; in 6, before the 9th month; in 2, during lactation; in 10, 4 weeks after delivery; in 2, 15 weeks after delivery.

#### *Icterus.*

Icterus may present itself in the pregnant woman under two forms, the sporadic and the epidemic, or the benign and the innocent, and it is evident that it may, according to the conditions, exercise a more or less marked influence upon the product of conception. Icterus results from an exaggeration of the physiological hyperæmia of the liver. But in addition to the simple form there is a malignant type peculiar to pregnant females, in which death is caused by an accumulation in the blood of the components of the bile which the diseased liver can not eliminate. Others say that the form of icterus observed in gravid women differs neither in its etiology nor in its development from that which attends other pathological conditions. Authorities differ widely in their explanations. Pouchet attributes the icterus to compression of the hepatic vessels by the growing uterus, Meunier to a similar pressure by the distended colon. Schroeder and others regard the grave form as identical with Frerich's acute yellow atrophy. It is generally conceded that the toxic phenomena are due to the presence of bile salts in the blood, and especially to the noxious influence of the latter upon the nervous system.

But it is the epidemic form of icterus that exercises the most marked influence upon pregnancy. Among 68 women thus affected 42 miscarried, 30 of whom died. Abortion usually takes place from three to five days after the beginning of the disease, and not only does this fail to bring relief, but, on the contrary, the most serious accidents generally occur subsequently; and the reported epidemics of icterus, which have never been confined exclusively to pregnant women, assume with them, as a rule, an exceptional severity.

The grave variety of icterus presents the phenomena so well described by Lavoix. The coloration is more or less intense, the urine contains bile or the products of albuminoid decomposition, such as leucin and tyrosin, and finally albumin and blood. There are multiple hemorrhages (especially gastro-intestinal), petechiæ and nervous symptoms, characterized particularly by coma or stupor. Its onset is nearly always insidious, being often preceded, as in the cases observed by David and Frerichs, by an acute gastric catarrh; the yellow tinge develops slowly and constantly, accompanied with vomiting of mucus, anorexia, constipation, cephalalgia, a general feeling of weariness and depression, but without fever; at other

times the disease begins with a rigor, followed by intense febrile reaction, which quickly subsides when the jaundice appears, with or without fever, but attended with severe gastric symptoms, constipation, marked sordes, nausea and vomiting, which, although occasional at first, may become incessant, the vomited matter consisting at first of food, then of glairy mucus, liquid fæces, and bile. There is excessive thirst, great pain in the epigastrium, the liver and spleen become enlarged and very tender. This condition continues for several days, then follows the ataxic stage, during which abortion takes place, although this, according to Lavoix, does not affect the progress of the disease. He accordingly disagrees with most authors, who claim that abortion occurs first, the ataxic symptoms appearing subsequently. However that may be, this period of ataxia, convulsions, or delirium, is characterized by extreme agitation, associated with disorderly, involuntary, and spasmodic movements. There is intense cephalalgia, delirium with subsultus tendinum, disturbances of vision, dilated pupils, while at the same time there may be high fever or almost none. The urine is scanty, reddish or bloody, often containing albumin, and depositing from four to nine per cent. of solid residue, consisting principally of leucin, tyrosin and gelatinous extractions, with traces of uric acid (not urea), and slight traces only of ammonium. Then comes the stage of coma, sometimes interrupted by convulsive phenomena, but generally very brief, and soon ending in death. Hemorrhages, although they occur, are comparatively rare, being generally confined to those which accompany abortion and delivery. The pulse in simple or benign icterus remains below the normal, while in the grave form it ranges from 80 to 120 several times during the same day. Grave icterus in the pregnant female generally terminates fatally within five or six days, sometimes sooner. In some cases the disease progresses so rapidly that there is no time for abortion to take place (Wuillez); but death is not the inevitable consequence of grave icterus, and there are a certain number of cases in which a cure took place in spite of the extreme severity of the disease. When the patient die, we find, on autopsy, fatty degeneration of the hepatic cells, the kidneys, heart, muscular system, but the liver is rather increased in size than diminished (Lavoix), and it is generally softened. The mucous membrane of the bile ducts is necrosed. The abdominal cavity contains a yellowish or reddish, semi-purulent exudation, sometimes in large amount; the spleen is normal or softened, the peritoneum is covered with ecchymotic spots, the lungs are congested, œdematous, and filled with yellowish fluid. The pericardium contains a certain amount of yellowish serum, and there are numerous sub-pericardial ecchymoses. The heart is small, flabby, soft, fatty, and pale, containing within the right ventricle adhesive blood, or a few soft, spongy, blackish clots. The meninges present a slight, often insignificant congestion. The autopsy in the case of the fœtus shows nothing striking.



We should then, it is evident, always be very reserved in our prognosis, even when the icterus appears in a mild form, and we consider Béhier altogether too positive in his opinion that icterus, occurring during the last days of pregnancy, is of a benign character, and that, without being quite neglected, it is to be considered as of merely secondary importance.

We are not concerned here with icterus which occurs after labor; it may be said, however, that it is very grave, because we may, with Hervieux, regard it in a great majority of cases as symptomatic of puerperal poisoning, and as one of the consequences of puerperal peritonitis.

*Treatment.*—There can be no question, it is evident, as to the induction of abortion or even of premature labor, in the presence of the disastrous results that follow abortion in cases of icterus. We should limit ourselves, then, to exclusively medical treatment. To relieve the hepatic pains by leeches and cupping, to oppose the condition of sordes by ipecac, the constipation by purgatives, the vomiting by ice and acid drinks, Vichy and Seltzer water and alkaline baths—in a word, we adapt our medicine to the symptoms, treating them as they appear, by appropriate remedies. Lavoix advises, as a prophylactic, tincture of aconite and quinine; Cazeaux change of residence.

### *Syphilis.*

All authors agree in admitting the influence of syphilis on pregnancy, and of pregnancy on syphilis; but there is a particular factor which imparts to this mutual influence special forms—the age of the syphilis.

1st. Sometimes a woman is pregnant when she contracts syphilis, and the infection can then occur either at the beginning, during the first months after conception, or during the latter months.

2d. Sometimes a woman becomes pregnant at the same time that she contract syphilis. The infecting coitus has also been fruitful.

3d. Pregnancy occurs in a woman who is healthy and in good condition, and who has never presented, nor does she then present, any evidence, old or recent, of syphilis, but whose husband has possessed, or still possesses, a syphilitic diathesis.

4th. Pregnancy occurs in a woman affected by syphilis at a time more or less remote; it was not treated, and the woman presents or does not present traces of it.

In the first place, What are the evidences of syphilis most often met with in the pregnant female? According to all the authors who have studied the disease, these are especially the primary and secondary manifestations. The tertiary, on the contrary, are rare. These manifestations are greatly influenced in their course and in their character by gestation. This influence of pregnancy is manifested in two ways, either locally or generally, and both chancres and syphilides are subject to the disturbing

circulatory effects which exist in the pregnant woman, and which result either in passive or active congestion. According to Fournier, pregnancy complicates the pox by adding to it its own anæmia, its depressing influence, its neuralgic tendency, disorders of nutrition, etc. As regards the local manifestations, syphilis predisposes to the development of mucous syphilides, which assume great importance. The induration is slightly marked, being a simple hardened scale—parchment chancre; but, while in the non-pregnant woman the duration of the chancre does not generally exceed from four to five weeks (rarely more, often less), in the pregnant female the mean duration of the chancre is about two months and twenty days.

According to Fournier, mucous papules are not only very common, but they develop in pregnant women a remarkable exuberance, assume rapidly the budding, vegetating, or hypertrophic variety, and often form actual tumors, which invade and distort the entire vulva. Moreover, they are always more rebellious than usual, and disappear more slowly. Syphilitic ulcers are quite frequent in pregnant women; they are livid, of a violet color, excavated, and are rendered still deeper by the vascular turgescence of the parts. They usually persist for a longer or a shorter period and often tend to progress. It is sometimes extremely difficult to cause them to cicatrize before delivery. While the duration of syphilides, in the non-pregnant state, varies from two to two and one-half months, it varies from three to three and one-half during pregnancy. Guérin, who agrees with Fournier on this point, affirms that during pregnancy the mucous patches increase in number, and grow in spite of general and local treatment as long as the pregnancy continues; or, that if they disappear for a short time, they have a great tendency to return, not only on the genitals but also on the fauces, tongue, and lips. Their persistence, according to him, proves that treatment is not as effective as it is in the non-pregnant condition.

*The Influence of Syphilis on Pregnancy.*—Although the influence of syphilis on pregnancy is unquestioned, it is, however, not absolute, and varies with the conditions according to which syphilis appears in women. The important feature is the frequency of abortion and premature delivery. Among 657 syphilitic females, 231 miscarried, while 426 were delivered at term of living and dead children. But, as we have seen, four cases may be presented, and we must consider here:

The father alone is syphilitic. The mother has never presented, nor does she now present, any manifestations of syphilis. The idea of direct transmission from the father to the fœtus, without participation on the part of the mother, which was opposed for some time, has been defended by Trousseau, Diday, Bourgeois and many others. It remains to-day incontestible, and we have observed numerous cases.

As regards maternal syphilis we have seen that: 1st. The woman may



be affected before conception; 2d. Syphilis and pregnancy may begin simultaneously; 3d. Syphilis may have been contracted after conception, at a period of pregnancy more or less advanced.

1st. *Syphilis existing before Conception.*—A syphilitic woman who becomes pregnant is far more predisposed to abortion than a pregnant woman who subsequently becomes syphilitic. This is especially observed in cases of repeated abortion, and it is now a classical fact that all accoucheurs, both in France and abroad, with a few exceptions (happily rare), advise that, when successive abortions are observed in the same woman without apparent cause, she should be put on antisyphilitic treatment, and that, too, not only when no specific manifestation is present, but even when she has never shown any.

When the pregnancy advances to term, the child may; 1st. Be born healthy and in good condition, and may remain so (this is exceptional); 2d. It may be healthy when born, but may, during the first three months after birth, rarely later, show symptoms of syphilis (quite frequent); 3d. It may show symptoms of syphilis from its birth, and may then either succumb quickly (the rule), or may be cured by appropriate treatment (the exception); 4th. Although apparently healthy when born, it may die within a few days, either by reason of its feeble condition in consequence of premature delivery (often), or from convulsions (when delivered at term.)

2d. *Syphilis and Conception are concomitant.*—Here, too, abortion is the rule, or at least delivery is often premature, and in consequence of the rigid treatment to which the mother is subjected the child may, in exceptional cases, be born healthy (or without evident traces of syphilis), and then, as in the former instance, may either be cured or may succumb.

3d. *Syphilis is contracted after the fourth or fifth Month of Pregnancy.*—In this case the danger is less. Abortion does not take place, but delivery is often premature, and when the foetus reaches full term it may frequently be born healthy; or it may be apparently healthy when born, but may present syphilitic manifestations within two or three months after birth.

4th. *Finally, the Woman contracts Syphilis only at the Termination of Pregnancy.*—Then the danger is almost *nil*; pregnancy is concluded in the ordinary manner at term by the birth of a living, healthy child. It is during the secondary stage, that is, from the fourth month to the second year of this period, that maternal syphilis seems to predispose most to abortion. But, as we know, syphilis may be active at the end of three, four, five, six years, or even longer. Those women are most prone to abort who are affected with severe forms of the disease—those who, to use Fournier's expression, are affected "*rudement et visceralement*;" but, abortion may occur in all forms of the disease, even the lightest, and is often the sole expression of the diathesis. "There are a certain number of women," says Fournier, "who abort exclusively because of syphilis,

without, at the same time, presenting or having presented, for a period more or less remote, any appreciable specific symptoms." In his opinion, then, even latent syphilis is still capable of causing abortion. We share this conviction fully.

We see, therefore, that syphilis is one of the diseases that deserves the greatest attention on the part of the accoucheur, and we realize the full importance of treatment in the interest of the mother as well as the child. Some writers (happily few) have nevertheless insisted that these ravages should be attributed, not to the pox, but to its antidote, mercury. Such a view could not be too strongly opposed, and all obstetricians agree with all the syphilographers in advising mercurial treatment during pregnancy, not only in the case of women who are actually affected by syphilis, or who show evidences of it, but in every instance in which the father has had syphilis, and where there have been repeated abortions without any known cause.

#### LEAD-POISONING.

Constantin Paul was the first to point out the influence of lead-poisoning on gestation. He has shown, in short, that plumbism manifests itself not only by its classical effects, but also by the death of the fœtus, or the premature death of the child, no matter whether the father or mother was exposed to the poison. Three accidents may occur in women thus affected: 1st. Metrorrhagia, more or less profuse, is observed in women who have had amenorrhœa for several months, with every evidence of possible pregnancy; 2d. Abortion from the third to the sixth month; 3d. Premature delivery, in which the child is born dead or moribund.

Moreover, during the first three years of infant life the mortality is above the average. Constantin Paul describes four classes, *viz.*: 1st. Women who have had more or less severe manifestations of plumbism, and whose pregnancies have varied greatly from normal. Out of fifteen pregnancies occurring in four women, there were ten abortions, only one child being born alive; 2d. Women who have had normal deliveries before being exposed to the influence of lead, and who afterwards observed its effects upon the product of conception. Thirty-six cases of pregnancy were noted under this head; twenty-nine children were dead born, and only two were living at the end of a year; 3d. Women who cease to work in lead. One case was observed. A lead-worker who had aborted five times, gave up her occupation, and at her next confinement was delivered of a healthy child. 4th. Women who work in lead, and who give up their occupation, but resume it later. Two women, after working in lead, stopped for three or four years, during which time they had three living children; on returning to their old work-shop they had repeated miscarriages.



*Influence of the Father.*—The fatal influence of lead is felt equally as much when the father has handled lead. Of seven women who married men working in lead: 1. 7 labors at term, 1 miscarriage; 2. 2 pregnancies, 1 miscarriage, 1 premature labor; 3. 2 miscarriages, 3 labors at term; 4. 4 pregnancies—3 miscarriages, 1 at term; 5. 3 pregnancies—1 miscarriage, 2 at term; 6. 12 pregnancies—1 miscarriage, 10 children died in 3 years; 7. 5 pregnancies—2 miscarriages, all the children died shortly.

If, then, lead-poisoning does not prevent fecundation and influence menstruation, its action upon the fœtus is incontestable, as the following observations prove:

Seventy-three children were born dead in one hundred and twenty-three pregnancies. Miscarriages, 4; premature labors—1 at 7, 3 at 8 months—4; dead children, 5; children dying in first year, 20; second year, 8; third year, 7; later, 1; living children, 14; living children beyond 3 years, 10; metrorrhagia dependent on miscarriages, 15.

#### THE INFLUENCE OF TOBACCO ON PREGNANCY.

In connection with the fatal influence which lead exerts upon conception, that of *nicotine* must be mentioned. The researches of Decaisne, Sarré, and others, show that miscarriages are very frequent among women employed in tobacco manufactories, and that such children as are born alive, are poor, wasted, and short-lived. Kostial observed among 506 new-born infants, 181 deaths during the first year; 104 died from cerebral affections attended with convulsions. The majority of the deaths occur during the ages of two to four months—that is to say, during the period when the mothers resume their labor, and nurse their infants with milk saturated with nicotine. Jacquemart noted forty-five cases of abortion and premature delivery among 100 cases of pregnancy in tobacco-workers, fifteen children died shortly after birth, and the mortality of such of the survivors as were nursed by their mother was ten per cent. higher than among those who were brought up on the bottle.

#### HYSTERIA—EPILEPSY.

We consider these two affections together, although they are quite different, because there is a form that serves, as it were, as a bond of union between them—hystero-epilepsy.

*The Influence of Pregnancy on Hysteria and Epilepsy.*—Authors differ widely regarding the influence of pregnancy on hysteria. While many advise marriage and pregnancy, and think that the hysterical attacks are relieved by gestation; others, on the contrary, believe that not only does pregnancy fail to relieve hysteria, but that the attacks at the beginning become more severe and frequent. They nearly always disappear, it is true, during the latter months. Briquet again affirms, that pregnancy has sometimes a favorable, sometimes an unfavorable action. “Hysteri-

cal manifestations," according to him, "depend far more upon moral causes and upon the condition of the women at the time, than upon anything else."

As regards epilepsy, there is pretty much the same divergence of opinion. Fernel has seen epilepsy develop during pregnancy and disappear after delivery; Tissot regards epilepsy as frequent during pregnancy, and sometimes the latter condition seems to diminish the frequency of the attacks, sometimes to increase them. We believe that, on the whole, the latter opinion should be accepted. Sometimes pregnancy modifies epilepsy by postponing the attacks and rendering them much less severe; sometimes, on the other hand, pregnancy exerts a disastrous influence.

*The Influence of Hysteria and Epilepsy on Pregnancy.*—This seems to be almost *nil*, and we have, ourselves, seen in two cases out of three, pregnancy go on to term, while in the third, abortion did not occur, notwithstanding the fact that the attacks were so severe as to cause the death of the patient.

#### TRAUMATISM DURING PREGNANCY.

1. *The Influence of Traumatism on Pregnancy.*—Guéniot shows that in 1876 the total number of observations amounted to 245, since which time many others have been added. The following points are to be noted: 1st. There is no fixed law regarding the innocuous influence of traumatism on pregnancy. These consequences are entirely different, according to the feeble or increased irritability of the uterus, the healthy or diseased state of the fœtus, or the freedom of the mother from certain morbid conditions; 2d. These results vary, but to a less extent according as the injury does, or does not, affect directly the genital tract, as the hemorrhage at the time is slight or profuse, and as it is, or is not, complicated by an inflammatory process of some intensity. Thus, when a perfectly healthy pregnant female is injured (whatever may be the character or severity of the lesion), the pregnancy is not usually affected. There are three exceptions to this rule, *viz.*: A. If the lesion is situated in the genital tract, or ano-perineal region, the course of pregnancy is often interrupted, and the injurious effect seems to depend rather on the duration or repetition of the traumatic action than on its degree of intensity; B. Again, whatever may be the seat of the lesion, if it causes in a very short time a considerable loss of blood, the pregnancy is seriously threatened, and the woman's life is more or less compromised; C. Finally, if the wound is subsequently complicated by inflammation (erysipelas, phlegmon, lymphangitis, etc.), it can, through this cause, interrupt the pregnancy; 3d. When pregnancy is complicated by a pathological condition (abnormal irritability of the uterus, disease or hypertrophy of the ovum, albuminuria, etc.), the wound, however slight it may be, and wherever it may be situated, generally leads to the premature expulsion of the product of



conception. In this instance the true cause of the trouble, which is attributed to pregnancy, really lies in the organic or functional affection that complicates the latter condition, and not in the injury, which simply acts as an adjuvant or secondary cause; 4th. Nevertheless, in view of the extreme difficulty, and often impossibility, which the surgeon encounters in diagnosing some of these morbid conditions (uterine irritability, disease of the ovum, etc.), it is well to be very circumspect in performing operations during pregnancy. If the surgical lesion will involve the genital tract, the pregnant condition offers, save in cases of necessity, a formal contra-indication to the operation.

2. *The Influence of Pregnancy on Traumatism.*—If we consider the facts thus far published, pregnancy, in the great majority of cases, does not exert any injurious influence upon traumatism. Thus, contusions and wounds, even dislocations and fractures, are not followed by any higher mortality in pregnant women than in other individuals; moreover, the cure of such injuries takes place in the usual manner and within the period that is common to each variety of lesion. The following exceptions, however, are included under this rule: A. When the injury affects the genital tract, it may be rendered milder or complicated in its course, or its termination may be delayed, by the existence of pregnancy; B. This holds true even after the third month of gestation, provided that the injury affects the lower limbs or a region in which vascular changes have taken place. The ordinary complications in A and B are hemorrhage, lymphangitis, erysipelas, gangrene and atonic ulceration; C. As regards fractures in particular, although cases of non-union during pregnancy are very exceptional, this condition can not always be exonerated from exercising a certain influence in retarding the formation or the solidity of the callus; D. In complicated pregnancy (above all, where the complication tends to produce premature expulsion of the ovum), wounds, by leading to abortion, sometimes acquire indirectly a gravity quite unusual, because the woman is then exposed to the different accidents that regularly accompany delivery—metrorrhagia, metro-peritonitis, etc.

3. Contrary to the received opinion, the puerperal state opposes, as a rule, neither the regular healing of wounds nor the union of fractures, provided that these injuries occur simultaneously with pregnancy or delivery. The exceptions to this rule must be ascribed either to the particular region affected (the genital tract), to the fever that sometimes ushers in the flow of milk, or, above all, to a general or local morbid tendency in the woman. Wounds occurring after parturition seem to present a special gravity, which would seem to be related to the disturbance referable to the physiological involution of the organs. Hence the indication to defer until three or four months after delivery all operations not urgent, which may involve the genital tract or the lower limbs. It follows that surgical lesions during pregnancy are far from being so serious

as we suppose, and that in the case of a tumor, which is developing rapidly and is threatening life, we should resort to extirpation rather than to the induction of premature labor.

[In connection with this subject, we append the statistics collected by Mann, of Buffalo, and which appear in a paper published in Vol. 7, of Am. Gyn. Trans.

| Nature of Operation.                  | Number. | Abortions. | Deaths. |
|---------------------------------------|---------|------------|---------|
| Venereal warts of vulva, . . . . .    | 19      | 3          |         |
| “ “ “ vagina, . . . . .               | 3       |            |         |
| Elephantiasis vulvæ, . . . . .        | 2       |            |         |
| Sarcoma “ . . . . .                   | 1       |            |         |
| Lipoma “ . . . . .                    | 1       |            |         |
| Cyst “ . . . . .                      | 1       |            |         |
| Abscess vulvo-vag. glands, . . . . .  | 5       | 1          | 1       |
| Unruptured hymen, . . . . .           | 1       |            |         |
| Polypus vaginæ, . . . . .             | 4       | 1          | 1       |
| Cyst “ . . . . .                      | 1       |            |         |
| Abscess “ . . . . .                   | 1       |            |         |
| Stenosis “ . . . . .                  | 1       |            |         |
| Ant. Elytrorrhaphy, . . . . .         | 1       |            |         |
| Vesico-vag. fist., . . . . .          | 5       | 2          |         |
| Ureth. caruncle, . . . . .            | 1       |            |         |
| Dilat. of ureth. for stone, . . . . . | 5       |            |         |
| Cystotomy, . . . . .                  | 2       |            |         |
| Recto-vag. fistula, . . . . .         | 2       |            |         |
| Stricture of rectum, . . . . .        | 1       | 1          |         |
| Fissure in Ano, . . . . .             | 3       | 2          |         |
| Fistula in Ano, . . . . .             | 1       | 1          | 1       |
| Ruptured perineum, . . . . .          | 7       | 1          |         |
| Polyp of cervix (small), . . . . .    | 3       | 1          |         |
| “ “ “ (large), . . . . .              | 7       | 3          | 1       |
| Lacerated cervix, . . . . .           | 6       | 2          |         |
| Cancer “ . . . . .                    | 6       | 2          |         |
|                                       | 90      | 20         | 4       |

The whole paper is of interest, and our readers are referred to it for more detailed information in regard to these operations.—Ed.]

#### GOÏTRE.

*The Influence of Goître on Pregnancy.*—Of all the writers who have called attention to the greater frequency of goître in woman than in man, Jeans-Louis Petit was the first to note its influence on the puerperal state. Tarnier says, that hypertrophy of the thyroid gland is generally inconsiderable, causes no trouble during pregnancy, and after delivery resumes nearly its original size. Goître does not seem to us to be quite as rare as is generally supposed, and although the number of observations is limited, it does not usually lead to any serious accidents. However, this is not always true, and it may in some instances assume an



exceptional gravity. Ollivier, who affirms that goître usually appears from the third to the fourth month of pregnancy, recognizes several distinct forms, *viz.*:

1st. *Subacute and Transient Goître.*—It develops slowly, and only in exceptional cases assumes a considerable size, being often unrecognized during the first pregnancy. No pulsation is present, the health is not affected, and the enlargement often disappears almost entirely after delivery.

2d. *Acute and Grave Goître.*—This form develops rapidly, and gives rise to attacks of suffocation. Tarnier reports a case in which death occurred from asphyxia; Bailly one that terminated fatally in spite of tracheotomy. Suppuration sometimes occurs, the condition being a true thyroiditis.

3d. *Chronic Goître.*—Sometimes the enlargement appears during pregnancy, and remains stationary after delivery, or even undergoes a slight increase in size at each successive pregnancy; sometimes, the acute form becomes chronic, or the goître is only recognized after delivery. Finally, chronic goître in the gravid woman may pursue its course until a more or less advanced stage of pregnancy, when it rapidly enlarges, so as to compress the trachea, and cause suffocation.

Pastriot divides goîtres from an anatomical standpoint into three varieties, the vascular, parenchymatous, and cystic. In the vascular there is congestion and apoplexy of the thyroid gland. During the straining that attends delivery, the dilated vessels rupture, leading to hemorrhage at some point in the goître, and effusion of blood between the lobules. In the second form, there is a true hypertrophy of the fibrous tissue, the enlargement being due, not to the thyroid gland itself, but to a gelatinous fluid which fills the surrounding cellular tissue (cellular goître.) Larrey, again, has described an emphysematous goître, which he thinks is independent of the thyroid gland, being due solely to emphysema. In the cystic variety, as described by Pastriot, there is a cavity containing a material (generally fluid, sometimes solid), which has formed in the midst of the normal gland elements. Porcher admits the existence of two forms, simple hypertrophy of the thyroid, and glandular or vesicular goître, also the fibro-cellular, colloid, and vascular varieties. He believes that menstruation, as well as pregnancy, affects the development of the swelling.

*Diagnosis and Prognosis.*—The enlargement usually begins gradually, or else it appears suddenly during the efforts of parturition. Although at first of small size, it increases in size with each pregnancy, and then either disappears after delivery, remains stationary, or continues to develop, and is attended with evidences of compression, either of the recurrent laryngeal nerves, or of the trachea itself, change in the voice, dyspnoea, dysphagia, suffocation, etc.

*Treatment.*—As goître is generally benign during pregnancy, we should

resort to general measures and internal treatment. Forbid the patient to nurse, and give iodine. Pastriot advises parenchymatous injections of the pure tincture of iodine, the iodized tincture of Richter (iodide of potassium, 15 grains, tincture of iodine, 300 grains, distilled water, 600 grains), or a saturated solution of iodide of potassium. But one question remains for consideration. If an acute or chronic goitre threatens the life of the patient, shall we perform tracheotomy, or induce labor? The facts, as thus far collected, do not favor either proceeding, but we believe that we have no right to reject them. In the presence of a patient with threatening asphyxia, the first indication is to remove the cause, the compression of the trachea, and the disturbance of respiration due to pregnancy. If there is suppuration, make a free incision into the thyroid abscess. Some months ago, Tillaux reported to the Academy a case of extirpation of the thyroid body, because of an enlargement which threatened the life of the patient. Are we justified in performing this operation during pregnancy? In spite of the success which attended the operation in the hand of that skillful surgeon, we should not venture to resort to it.

#### ULCERATIONS OF THE CERVIX DURING PREGNANCY.

Ulcerations of the cervix have been noted by all physicians who have examined the patients with the speculum. These may assume the four forms described by Robert, *viz.*: superficial erosions or excoriations, granular or nodular, fungoid, and callous (cicatricial?) erosions. These different forms may be presented by simple or specific erosions, although the cicatricial variety has only been observed in pregnant women.

[Throughout this section we substitute the word erosion for ulceration, as being more scientific and in accord with recent pathological terminology. Aside from lupus and chancre, it is questionable if a true ulcer is ever found on the cervix. Further, many of the instances which the author calls ulceration are in reality simply the eroded everted mucous membrane of the lacerated cervix. A glance at Figs. 1 to 7 prove this.—Ed.]

If, says Cazeaux, we examine the cervix at the end of pregnancy, we find it, as a rule, of a deep reddish or violet color (like wine-lees), but with this difference in the primipara and multipara: In the former there are rarely any traces of erosion, but we commonly see around the os externum fleshy nodules, varying in size from a pin's head to a pea, which bleed at the slightest touch, while in the latter, the cervix is fissured, the canal presenting a series of fungoid projections, separated by clefts; on the surface of some of these projections are hypertrophied follicles, while others resemble flabby granulations, being deprived of epithelium and bleeding easily.

According to Gosselin, Cazeaux, and others, these erosions are rarely due to a pathological condition, but to the passive-congestion induced by



pregnancy. Other writers regard them as of great significance, and even as the principal cause of difficult labor and abortion. The latter influence is ascribed especially to that variety of cervical erosion which is characterized by a fungoid appearance, fissuring of the cervix and tendency to bleeding. Coffin and Richet believe that the majority of fungoid erosions exist be-



FIG. 1.—CERVIX OF A PRIMIPARA, 155 DAYS BEFORE DELIVERY. (*Nieberding.*)



FIG. 2.—CERVIX OF A PRIMIPARA, 41 DAYS BEFORE DELIVERY. (*Nieberding.*)



FIG. 3.—CERVIX OF A PRIMIPARA, 36 DAYS BEFORE DELIVERY. (*Nieberding.*)



FIG. 4.—CERVIX OF A I-PARA, 31 DAYS BEFORE DELIVERY. (*Nieberding.*)



FIG. 5.—CERVIX OF A II-PARA, 27 DAYS BEFORE DELIVERY. (*Nieberding.*)



FIG. 6.—CERVIX OF A I-PARA, 15 DAYS BEFORE DELIVERY. (*Nieberding.*)



FIG. 7.—CERVIX OF A PRIMIPARA, 4 DAYS BEFORE DELIVERY. (*Nieberding.*)

fore pregnancy, or date from a former delivery, and that they exercise an actual influence on the course of pregnancy, abortion being the usual consequence of their presence, especially when the cervical canal is extensively involved. Among 110 women in the latter half of pregnancy Lieven found more or less severe erosions in 32, 10 of whom were primiparæ; slight erosion 13; follicular 7; mucous polypi 1; papillary erosions 16; vegetations 1.

In most cases he found the mucous membrane at the edge of the os of a reddish hue, contrasted with the rest of the portio vaginalis, which is bluish, livid, deprived of epithelium in spots, and bleeds at the slightest touch (simple erosion). He often encountered cervices, on the red, eroded surfaces of which were innumerable small, florid projections, the size of a pin-head, distinguished by their bright color from the surrounding tissue (papillary erosions). He claims that there is no true ulceration, but a simple ectropion of the mucous membrane, due to the dilatation of the os during pregnancy with accompanying eversion of the mucous surface, the latter being sometimes so great that the natural folds are obliterated, and the mucosa assumes a uniform, smooth, glistening aspect. He endeavors to support his views regarding the non-identity of erosions and ulcerations by reference to the work of Ruge and Veit, who have shown that the latter condition is characterized by loss of epithelium, while in simple erosion the lesion is always covered by a new layer of pavement epithelium. These authors affirm that erosions are produced by extensive proliferation of the epithelium, accompanied by dilatation and hyperplasia of the glands, and the formation of papillæ covered with cylindrical epithelium, ectropion and erosion being in their opinion two distinct affections, which may, however, be associated, even while they remain distinct.

Among 28 primiparæ, Nieberding found ectropion in 21, the posterior lip being alone involved in 7. The os externum, instead of presenting its usual rounded form, appeared as an irregular cleft, from which radiated fissures in the form of a star, some of which were recent and bled readily. These, according to Birnbaum and himself, are due to the distension which affects the cervix, in common with the lower uterine segment, from the pressure of the foetal head. These were observed in 19 out of the 28 cases.

Lieven and Nieberding give the following figures:

|               |            |                         |                 |
|---------------|------------|-------------------------|-----------------|
| In 60 + paræ, | Lieven     | found the normal cervix | 11 times.       |
| “ 42 “        | Nieberding | “ “ “ “                 | 15 “            |
| “ IIparæ,     | Lieven     | “ “ “ “                 | in 26 per cent. |
| “ “ “         | Nieberding | “ “ “ “                 | “ 23 “ “        |
| “ IIIparæ,    | Lieven     | “ “ “ “                 | “ 50 “ “        |
| “ “ “         | Nieberding | “ “ “ “                 | “ 50 “ “        |

The latter refers to the view of Aran, Bennet, and others, that erosions and ulcerations are due to chronic inflammation of the cervix, and that they exercise an important influence upon pregnancy, delivery, and the puerperal state, and admits that they most frequently give rise to uncontrollable vomiting (Spiegelberg), hemorrhage, abortion, degeneration of the placenta, etc, etc. Scanzoni and Lieven have never observed such effects.

*Treatment.*—Whatever view we may accept, the practitioner is con-



fronted with the important questions—Shall we treat these lesions during pregnancy? and if we do, What form of caustic shall we use? The result is doubtful whether we employ nitrate of silver, caustic fluids, or iron. Miscarriage results too often from the treatment, and not from the disease itself. We adopt Cazeaux's conclusion: abstain from all treatment as long as the ulceration does not show a marked tendency to involve a great part of the cervix; then, if you do interfere, bear in mind that you run the risk of seriously disturbing the pregnancy.

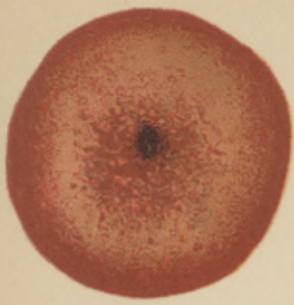
[Cazeaux's opinion, while true of lacerations, will not hold for erosions. In case of hemorrhage or profuse leucorrhœa from erosion, applications, far from being harmful, are positively beneficial. We have yet to see miscarriage induced by applications to an erosion, and we believe this to be the experience of other gynecologists and obstetricians.—Ed.]

## EXPLANATION OF PLATES V AND VI.

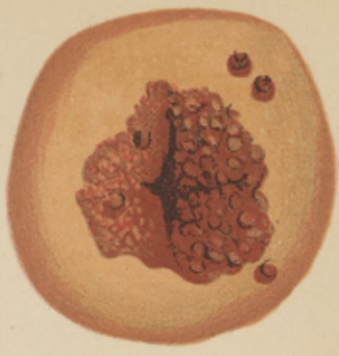
(FROM MUNDÉ.)

1. Catarrhal Erosion of Nulliparous Cervix.
2. Follicular Erosion of Parous Cervix, with Fissure.
3. Stellate Laceration, without Eversion.
4. Stellate Laceration with Eversion and Cystic Hyperplasia.
5. Eversion of Anterior Lip with Cystic Hyperplasia.
6. Patulous Os, without distinct External Fissure.
7. Right Laceration with Eversion.
8. Bilateral Laceration, first degree, with Eversion.
9. Bilateral Laceration, second degree, with Eversion.
10. Bilateral Laceration, third degree, with Eversion, Lips held apart by Tenacula.
11. Bilateral Laceration, third degree, with Eversion, mostly cicatrized, and not ulcerated. Both upper corners show fresh breaking down of cicatrix.
12. Large Cystic Hyperplasia of Anterior Lip, Simulating Epithelioma.

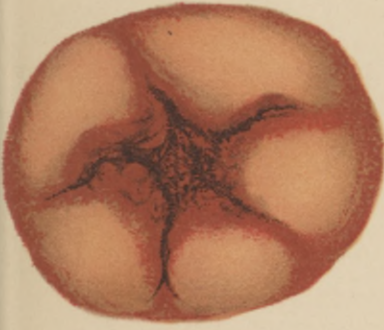




1.



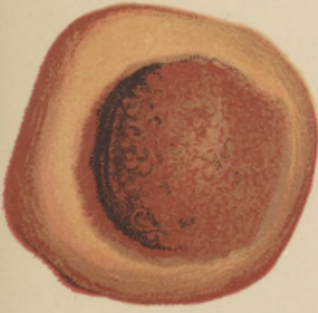
2.



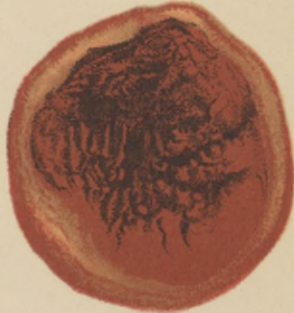
3.



4.



5.



6.

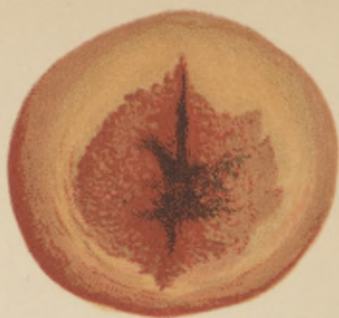
EROSIONS AND LACERATIONS OF CERVIX.







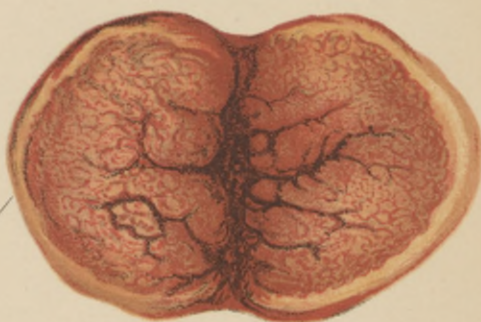
7.



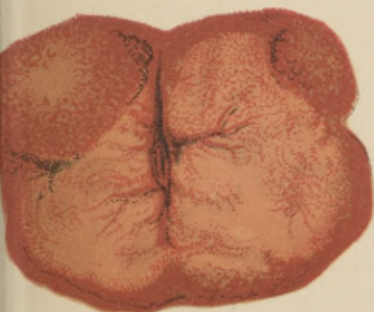
8.



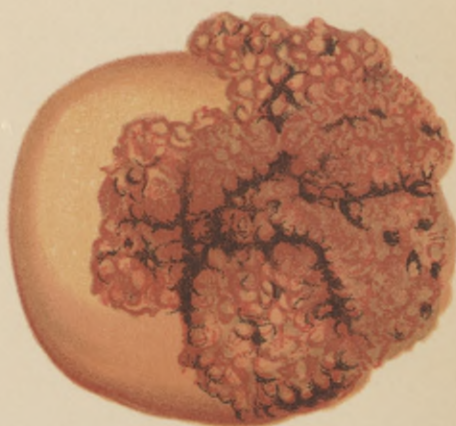
9.



10.



11.



12.

EROSIONS AND LACERATIONS OF CERVIX.





## CHAPTER II.

### DISEASES OF PREGNANCY.

PREGNANCY, as we have seen, produces in the entire economy important and profound modifications, which in their turn cause functional disturbances that find expression in a series of morbid conditions, constituting, properly speaking, the diseases of the pregnant woman. But these troubles do not appear simultaneously and invariably, and, while in some cases they constitute a true morbid condition, in others they pass, so to speak, unrecognized. From this point of view we can say, there are as many variations as there are women, or even pregnancies, because it is not rare to see certain females pass through one or two pregnancies in a condition of almost perfect health, while the succeeding one or more pregnancies are accompanied by profound malaise. Moreover, it is not uncommon to observe certain phenomena appear at the beginning of pregnancy, to disappear for a time, and then to reappear with renewed intensity. We shall, then, adopting the classification of Désormeaux and Cazeaux, review in turn the disturbances of digestion, of circulation, respiration, secretion, excretion, locomotion, and, finally, of the sensory and intellectual functions.

#### DISTURBANCES OF DIGESTION.

As Pajot says, the functions of the digestive apparatus may be exaggerated, diminished or perverted.

*Exaggeration.*—There are many women whose digestive functions are not only not disturbed by pregnancy, but, on the contrary, seem to be augmented. Their appetites increase, digestion is more active, the nutrition is improved, and, as the women themselves affirm, pregnancy seems to produce in them an unusual condition of health; but, it must be acknowledged that this is the exception, and that most often the digestive functions are either diminished or perverted.

*Anorexia.*—This degree is marked by loss of appetite and aversion for food, which may occur at the beginning of pregnancy, as well as during its progress or at its termination; it is usually most marked at the beginning. This aversion may amount to positive disgust, in which case the physician is often extremely embarrassed in the presence of the, so to speak, passive resistance of the patient to every sort of food. Food hot or cold, vegetables, fruits, nothing is acceptable, even fluids being rejected, so that it is very difficult to nourish the patients. We are only too fortunate if we

have to deal only with anorexia pure and simple, and if it does not reach the third stage.

*Aversion for Food.*—In this case we meet with numberless difficulties, which vary with each individual. A woman thus affected, who could, before, tolerate only red wine, now rejects it entirely; another, who only cared for meat of a white color, can not endure even the sight of it. A patient who could only eat meat that was well done, does not fancy it unless it is rare; another, who liked vegetables, regards them with horror, etc. Thus numerous are the difficulties which are sometimes encountered by the physician in the presence of a positive aversion for every sort of food. All treatment fails, as a rule, when directed towards this condition, which may persist for some time, but ordinarily yields spontaneously, as the pregnancy advances. This phenomenon, in fact, is usually produced during the first two or three months, and belongs among what are known as the sympathetic troubles of pregnancy. Sometimes, however, this condition evidently depends upon a dyspeptic state in the woman, and then it yields to slight purgatives, as rhubarb, magnesia, and some bitters, as quassia; but that which usually succeeds the best is alcohol in small doses. In other instances, digestion is painful or retarded, gas is formed in the stomach, there is distension of the abdomen, and drowsiness. We have found of value in these cases black coffee after meals, and especially small doses of alcoholics (brandy, Kirsch, champagne) mixed with Seltzer or other alkaline mineral waters, also pepsin.

#### DISTURBANCE AND PERVERSION OF THE DIGESTIVE FUNCTIONS.

The perversion consists in the existence of what is called pica, malacia, or the "longings" of pregnant women. These, again, present themselves under every form, being represented by the capricious appetite of women for the most absurd and disgusting things. We must, up to a certain limit, pay respect to these caprices of the stomach, so far, at least, as they are not directed towards injurious articles. Chalk, charcoal, ashes, decayed and acid fruit, "high" meat, are the usual objects desired. This longing is not seldom unaccompanied by other phenomena, such as gastralgia, cramps in the stomach, and acidity. Among the troubles to be mentioned is one that is frequent and is borne very ill by women—a sensation of heat, or burning, extending from the pharynx to the stomach, and constituting the pyrosis of pregnant women. Alone or accompanied by another phenomenon, which we shall study later (ptyalism), it generally persists for a long time and resists all treatment. However, good results have been obtained with alkaline mineral waters, bismuth, charcoal, ice, antispasmodics, etc.

#### VOMITING.

The most common digestive trouble is nausea and vomiting. Although



the latter is generally borne comparatively well by the patient, in some cases it becomes so severe as to be uncontrollable, and thus to seriously endanger life. Sometimes nausea alone is present, but this is rare. Vomiting is so common in pregnant women that, in the majority of cases, it is an almost certain sign of pregnancy.

a. *Simple Vomiting.*—Vomiting usually appears at the beginning of pregnancy, sometimes in the first days; at other times it does not occur until later, at the second, third, or fourth month. As a rule, it begins at the first month, continues until the fourth, and then disappears, until the end of pregnancy, when it sometimes reappears. Although regarded by most writers as due to the impression made upon the entire economy by the enlargement of the uterus, it has been regarded by others as characteristic of certain uterine lesions, especially erosions of the cervix (Bennett); but these erosions, although frequent, are not present in all women who vomit, and moreover, how do we explain its disappearance, at the end of a few months of pregnancy, and that too, spontaneously, often even suddenly? When it reappears at the end of pregnancy, it is usually attributed to a disturbance of the stomach, resulting from enlargement of the uterus. Vomiting usually occurs in the morning on changing the position from the horizontal to the vertical. The vomited matter consists of glairy mucus, fluids more or less watery, which, after a certain time, are accompanied by bile. Sometimes it is very easy, at others it is accompanied by severe straining, and continues thus every day, sometimes once, and again at frequent intervals. At other times the women do not vomit upon rising, but after each meal, the vomited matter consisting of food; or vomiting occurs during the meal, or three or four hours after, either from some unknown cause, or from fatigue, emotion, etc. In some cases it takes place easily and suddenly, in others, on the contrary, it is preceded for some time by a condition of nausea, more fatiguing perhaps than the vomiting itself. Sometimes it is painless, sometimes, on the other hand, it is accompanied by severe pains in the epigastrium and the entire abdomen. As a rule, women bear it very well, but sometimes, when it is repeated too often, it causes disturbance of nutrition, leading to marked emaciation, and a condition of weakness and general fatigue which is extremely annoying. Although it sometimes resists every method of treatment, it occasionally disappears suddenly, either in consequence of a lively emotion, as in a case cited by Cazeaux, or because the morbid reflex impulse is transferred to another organ. I once saw vomiting cease on the appearance of a slight diarrhoea, which lasted two days. It usually has no influence upon the course of the pregnancy, remains bearable, and causes the patients annoyance and malaise, rather than actual suffering. It is not the same in other cases (unhappily too frequent), in which it assumes the character of

b. *Uncontrollable Vomiting.*—We may, with Dubois and the majority

of writers, regard vomiting as uncontrollable "whenever it affects seriously the health of the woman, and resists the judicious use of a certain number of remedies." Uncontrollable vomiting is not extremely rare, because Dubois himself saw 20 fatal cases; Delbet had collected 62 cases in 1854, Guéniot 118 in 1863, and since then the number has greatly increased. We may, with Dubois and Guéniot, consider three stages.

*First Stage.*—The onset is rarely abrupt; more usually, the vomiting gradually becomes uncontrollable, succeeding insensibly to the ordinary vomiting at the outset of pregnancy; but this gradual transition is not always present, and we often see within a short time the vomiting assume an exceptionally grave character, and rapidly become uncontrollable. It usually begins during the early months of pregnancy, rarely in the latter half, judging at least by Guéniot's statistics, in which he notes the fact that, among 43 cases, 38 occurred before the third month. Uncontrollable vomiting does not present any well-marked characteristic at the outset; it usually announces itself by a condition of almost constant nausea, and by its violence, which becomes more and more alarming. It takes place not only in the morning and after meals, but in the interval, and without provocation, that is to say, it is almost incessant. It is caused by the smallest amount of food or drink; the vomited matter consists of glairy mucus, bile, or food, according as the stomach is full or empty; sometimes pure bile is vomited, or there may be streaks of blood. It is in some instances very painful, and is accompanied by violent straining, fatigue, and gastric pains, while in others there is not much disturbance; in other cases, there are slight remissions, of which we may take advantage to give the patient a little nourishment, or, on the other hand, in spite of its continuance, it is accompanied by caprices or vagaries on the part of the stomach, which make it possible for the patients to tolerate the most indigestible things. (Sandras.) The patients are then condemned to almost complete abstinence, which is shown by their anxious look, weariness, pain, and marked emaciation, accompanied by a complete change in their features and loss of strength—in short, a very pronounced moral and physical depression. It is sometimes complicated by pyalism and diarrhœa, which may either coincide or alternate. (Haighton.) This stage is characterized by the entire absence of fever, or if this is present, it is of short duration and slight intensity. A slight evening rise indicates the transition to the

*Second Stage.*—This stage succeeds the first insensibly, and almost without transition. It is marked especially by the aggravation of all the phenomena described in the first stage, but above all, by the fever, which becomes continuous, and more and more marked. The skin becomes hot and dry, except the extremities, which are cold, and are covered with clammy perspiration; vomiting is incessant, nothing, not even pure water



being retained. The throat and mouth become dry, sordes appear on the teeth, the tongue is dry and red, the breath fetid, there is excessive thirst, the urine becomes scanty, high colored, and offensive, and diarrhœa is regularly present. Guéniot describes, moreover, violent pains in the head, the pit of the stomach, and the hypochondriac regions; there is frightful emaciation, and such feebleness that attacks of fainting or syncope occur incessantly. In some cases (unhappily too rare), there still occur remissions, during which the patients can retain a little nourishment.

*Third Stage.*—It is a curious fact that the vomiting diminishes and even ceases entirely, while the fever increases still more, and characteristic cerebral and sensory disturbances appear, delirium, coma, and hallucinations. The attacks of fainting and syncope return on making the slightest movement, the fever continues, the pulse becomes feeble and almost insensible, varying from 120 to 140, and coma appears, to conclude the scene.

*Course and Duration.*—It is a remarkable fact that there are frequent, more or less complete, remissions, especially during the first and second stages. Among the complications Guéniot mentions ptyalism, diarrhœa, syncope, thrush, gangrene of the mouth, and pulmonary tuberculosis; as secondary complications, hysteria, epileptiform convulsions, albuminuria and eclampsia, atresia uteri, and cancer of the stomach are noted. The same writer reports 46 deaths among 118 cases, while Delbet mentions 30 fatal cases out of a total of 62.

*Pathological Anatomy.*—This affords only imperfect indications, because the autopsies are often completely negative, or reveal lesions of very diverse character. There has been found atrophy of the muscular system and of the adipose tissue, decrease in the size of the intestine, with occasionally slight softening and injection of the mucous membrane of the stomach. Various other non-characteristic lesions have been noted.

*Causes.*—Pregnancy must be mentioned as the essential predisposing cause, which acts through the organic and functional modifications that it impresses upon the uterus, as though by the more or less marked general stimulation of the nervous system; but, to this general predisposing cause we must add a nervous disposition, multiparity, inflammation of the uterine tissue or ovum, erosions, atresia, or hyperæsthesia of the os externum, and displacements of the uterus. Finally, in addition to these causes, which bear an intimate relation to pregnancy, vomiting occurs, due to some functional or organic gastric trouble.

*Diagnosis.*—It would seem at first sight as if the diagnosis ought to be extremely easy. However, Guéniot has rightly shown that it includes three very distinct factors, *viz.*: 1st. The diagnosis of pregnancy; 2d. The diagnosis of the adjuvant or determining cause of the vomiting; 3d. The differential diagnosis between obstinate vomiting due to pregnancy,

and that due to some other cause independent of gestation. Errors are most likely to be made in the last instance.

*Prognosis.*—This is exceedingly grave, above all after the beginning of the second stage, while in the third, death is almost inevitable. The death of the fœtus, or spontaneous abortion, is generally favorable, but it would be a mistake to infer that all danger has disappeared in consequence of such an event.

*Treatment.*—This consists in attention to diet and hygiene, in strictly medical as well as surgical and obstetrical treatment.

1. *Diet and Hygiene.*—Since uncontrollable vomiting rarely begins abruptly, and more usually succeeds the light form, we shall do well at the outset to establish a rigid diet, excluding heavy and indigestible food, all forms of stimulants, especially alcoholic, and recommending the use of white meats, jellies, milk-diet, in short, easily-digested articles. The physician can not, however, lay down absolute rules, but must consider the caprices of the stomach. We must vary the diet as much as possible, and, if the stomach succeeds in tolerating any fluid or solid article of nourishment, we must not spoil our chances of success by insisting on a prolonged use of it, but should combine it with others. Increase the nourishment, very gradually, since relapses are frequent. If they occur, try something else, varying the food constantly, as the main object is to gain time; vomiting often ceases spontaneously after an interval, as the pregnancy advances.

*Medical Treatment.*—The very multiplicity of the remedies suggested by different writers, proves their small value and uncertain action. The idea is to resort to rectal alimentation, but this is uncertain, because the enemata soon cause diarrhœa, a condition often associated, as we have seen, with uncontrollable vomiting. Raw meat is often repugnant, and prolonged rest on the back, sea voyages and walking, are not easily recommended to women in this condition. The oldest form of treatment is the antiphlogistic (venesection, leeches, etc.), but the results have been contradictory. Some physicians have applied leeches directly to the cervix uteri with success. Local revulsives, sinapisms, blisters, etc., as well as purgatives and emetics, have sometimes succeeded, sometimes failed; the same may be said of acids, alkalies, aromatics, and antispasmodics. Opium, especially, seems to have a decided action, whether given by the mouth or hypodermatically (the latter method being preferable), while applications of belladonna to the cervix have been successful. Hydrocyanic acid, tincture of iodine, iodide and bromide of potassium, oxalate of cerium (used by Simpson in 45-grain doses), tincture of nuxvomica, calomel in small doses, pepsin, cold, alcohol (especially Kirsch, brandy, and iced champagne), and ice internally and externally, may be mentioned as empirical remedies. Ether-spray, applied to the epigastrium



and along the spinal column, has recently been recommended, also electricity and subcutaneous injections of ether. All of the foregoing remedies have succeeded in some cases, but as a rule they have failed.

[Other remedies which we have found in certain cases of value, are: The hydrate of chloral, in grain doses repeated every few minutes, till 15 to 20 grains have been taken, and associated for a time with the recumbent position. The hydrochlorate of cocaine, in  $\frac{1}{8}$  grain doses, has twice given us good results, but in other instances failed. Very hot water sipped slowly will often answer.—Ed.]

There remains then,

3d. *Surgical Treatment.*—This consists in cauterization of the cervix uteri, a procedure originally suggested by Bennet, and used successfully by various authorities. Bennet confines the cauterization with nitrate of silver or iron to the region of the os externum, with the view of checking the vomiting without interrupting the pregnancy, while Giordano, on the contrary, aims at terminating it, and hence applies the caustic as high up as the os internum. Copeman has been successful in the employment of digital dilatation of the cervix. We have never obtained any results with this treatment unless it caused abortion. Moreau has cured patients by replacing the uterus when it was malposed. [Copeman's method is of greater utility than the reader would judge from the author's statement. Obstetricians in this country, who have resorted to it, report numerous successes, even in desperate cases. Either the finger or the steel-branched dilator may be used, a necessary precaution being to pass neither beyond the internal os. Where miscarriage results, the chances are it is because this precaution has been neglected. Of the advocates of this method in this country, we may mention Goodell, Mundé, Wylie. The latter claims for it precedence over all other methods.—Ed.]

4th. *Obstetrical Treatment.*—This consists in the induction of abortion, in preference to premature labor. If the child is viable (after the seventh month), we must act at once in the interests of both the mother and the child. Simmond (1813), was the first to practice this measure. Since then a large number of successful cases have been recorded, in fact two-thirds of the cures are obtained in this way. The determination of the proper time at which to interfere is one of the most delicate questions in our profession. Dubois affirms that interference is most proper during the second stage, when the following conditions are present: Incessant vomiting of all ingesta, even a small quantity of water, marked feebleless and emaciation, preventing the patient from making the slightest exertion, attacks of syncope, following the least movement or excitement, profound alteration of the features, marked continued fever, extreme acidity of the breath, and, finally, the failure of every applied remedy.

[In our opinion it is not good practice to wait for the appearance of the symptoms of the second stage before resorting to the induction of abortion, for then we simply add the additional shock of labor to a constitution already strained to the utmost by the vomiting. In case the usual remedies by the mouth, associated with rectal enemata of peptonized milk (and these will not induce diarrhœa if cold water enemata precede each nutrient enema), and also with dilatation, do not succeed in releasing the woman from the vomiting, which if it continues will kill her, then, before exhaustion sets in, miscarriage or premature labor should be induced. A consultation should always precede any operation of the kind.—Ed.]

Leven believes that we can prevent the development of uncontrollable vomiting, and that we can stop it after it has begun. The following are his views, which we are far from adopting in every respect: Dyspepsia, loss of appetite and vomiting begin with pregnancy. The woman craves the most indigestible articles, such as can only aggravate the existing dyspepsia, while she feels an aversion for solid nourishment (meat, fish, etc.), which the stomach requires in order to remain in health. The same may be said of her desire for stimulants. Physicians have habitually humored, rather than checked, these tendencies, thinking that the vomiting would cease spontaneously as the pregnancy advanced. On the contrary, the stomach, after having been injured by improper diet, becomes so irritable that it will not tolerate nourishing food, and the woman really dies of hunger. If the physician recognizes the condition as dyspepsia, and begins his treatment at the outset of pregnancy, the result will be different. For several days nothing should be given but liquid nourishment (not soups, which are irritating, but milk), while hot applications and sinapisms are used over the region of the stomach, phosphate of lime, or bismuth, being administered internally. Milk will be tolerated for a few weeks, when the stomach will gradually be able to retain solid food.

We can not accept these conclusions, because they do not explain why vomiting should suddenly cease after simple dilatation of the cervix.

#### CONSTIPATION.

Constipation is the rule in pregnant women, and sometimes resists every remedy employed to relieve it. It has been mentioned by all writers from the earliest times. While in the majority of cases it may give rise simply to anorexia, disturbances of digestion, and pains in the back and abdomen, in some instances it occasions more serious manifestations. Aside from the increased straining of the woman in her efforts to expel the hardened fœces, it may cause pelvic congestion, as shown



by a feeling of tension, weight, fullness, by the presence of hemorrhoids, etc.; it may even produce uterine contractions and abortion, as was noted by Hippocrates and other ancient writers. We must accordingly oppose it most carefully, by the use of proper diet, enemata, and mild purgatives.

#### DIARRHŒA.

This is not so rare as we may think. It sometimes alternates with constipation, or it may be the patient's habitual condition, and, though usually harmless, it may, in some instances, assume a grave character, resembling to some extent uncontrollable vomiting, which it may furthermore often complicate. Abortion and premature labor may occur in consequence. We have obtained excellent results in a case of obstinate diarrhœa, by giving night and morning a pill containing gr.  $\frac{1}{4}$  of nitrate of silver. An enema night and morning, containing fifteen or twenty drops of laudanum, is usually sufficient.

#### DISTURBANCES OF RESPIRATION.

We can not insist too strongly on the fact that during pregnancy there is a larger quantity of blood in circulation, and that as a result the pulmonary circulation is increased. It is not even necessary that a cardiac lesion should be present in order to cause capillary bronchitis and pulmonary hemorrhage which rapidly becomes dangerous. We have observed two cases in which unknown females were brought to the clinic in a condition of asphyxia or coma, similar to the coma which succeeds an attack of eclampsia. They perished, in spite of venesection, and an autopsy in both cases revealed the presence of pulmonary congestion and hemorrhage, without heart-disease. Peter's observations have shown that, aside from disease, the lungs in pregnancy are warmer than in the non-pregnant state, the increased heat being due directly to the greater supply of blood. It is not rare to witness a proof of the pulmonary congestion in the hæmoptysis which appears after delivery.

#### DISTURBANCES OF THE CIRCULATION.

*Influence of Pregnancy on Diseases of the Heart.*—By reference to the previous remarks concerning the modifications in the circulatory system produced by pregnancy, the reader will see that, aside from the hypertrophy of the uterine vessels, the changes in the circulation may consist in: 1st. Increase of the total quantity of the blood. 2d. Alteration of the constituent parts of the blood, as shown by the increase of water, white corpuscles, and by the diminution in the number of red discs, albumin, and iron, as well as the fibrin (at least early in pregnancy). There exists in the pregnant woman, therefore, a peculiar

condition, neither plethora nor anæmia, characterized by cardiac hypertrophy and murmurs, dyspnœa, oppression, and a tendency to congestion of the viscera, especially the lungs. Peter believes that the amount of blood increases during pregnancy, simply because of the existence of this condition, and the needs of the fœtus, so that the hemorrhage after delivery is physiologically necessary, in order to relieve the woman of the extra quantity of blood. Hypertrophy of the left side of the heart is a purely mechanical result of the increased work, caused by the high aortic tension, from the direct pressure of the uterus (Raynaud), or the additional fœtal circulation. This hypertrophy is only temporary, disappearing rapidly and completely after delivery. But it may persist in some instances, and become permanent, increasing with each subsequent pregnancy, and culminate in a true cardiac affection, which, in its turn, under the influence of pregnancy, becomes the starting-point for a group of symptoms, now known as the cardiac symptoms of pregnancy (*accidents gravidocardiaques*).

Pregnancy is only one of the causes which hasten the progress of heart-disease, the phenomena of which develop more or less rapidly during pregnancy and under its influence. This influence may be transient, when the valvular lesion or myocarditis is not aggravated, but repeated pregnancies do cause aggravation of them. Porak shows that on the whole, cardiac lesions, although not infrequent after delivery and during the puerperium, are rare during pregnancy. Opinions differ regarding the presence of cardiac hypertrophy in pregnancy, some authorities believing in the existence of hypertrophy, others in dilatation, while others affirm the co-existence of both conditions. Letulle arrives at the following conclusions: Physiological hypertrophy of the heart during pregnancy is not constant, the apparent enlargement of the organ being sometimes due to its elevation by the diaphragm. The presence of temporary dilatation is proved by the jugular reflux, cardiac and venous murmurs, and anæmia; some of these symptoms disappear after delivery. The dilatation is to be referred to the increased tension in the right ventricle, as well as to obstruction from pulmonary trouble; in this case, hypertrophy and dilatation may co-exist, when errors of diagnosis are easy, especially if the heart is elevated by the diaphragm. Porak found that the weight of the heart in women dying soon after delivery varied from 8 to 10.9 ounces, while Letulle states that the weight varies from 8 to 10 ounces, the normal organ varying from 6.9 to 7.2 ounces. Cohnstein found hypertrophy of the left ventricle in ten cases out of twenty, dilatation in eight, myocarditis in eight and aortic stenosis in five. We do not see how Porak can arrive at this conclusion. Idiopathic hypertrophy of the heart must be rare, but it is not so in regard to actual cardiac lesions, and the persistence of the hypertrophy after repeated pregnancies is intimately related to such



lesions. Degeneration of the myocardium, leading to rupture of the heart, has been observed, especially during the puerperal state.

*Endocardial Lesions.*—Endocarditis often occurs during pregnancy, and may be acute, sub-acute, or chronic. The acute form may be of the typhoid or pyæmic variety, and is marked by the presence of exuberant vegetations on the endocardium, resulting in emboli (due to coagulation or the detachment of bits of vegetations), the plugging of vessels and hemiplegia. However, acute endocarditis during pregnancy is rare.

*Sub-acute and Chronic Endocarditis.* This is comparatively frequent, and may succeed the acute form. Valvular lesions are many, and their location different, but the mitral valves are most commonly affected, either alone or in common with the others. Porak found mitral insufficiency in twenty-two cases, stenosis in thirteen, both conditions being present in twenty-two, making fifty-seven in all; the aortic valves were affected in thirteen cases, insufficiency being noted nine times and stenosis twice, both being present in two cases. In twenty-two other cases, the two valves were simultaneously involved. These lesions may be well borne by the women, but cardiac troubles may arise, presenting, according to Porak, four variations, *viz.*: 1st. There may be disturbance of the heart's innervation, leading to palpitation of a more or less irregular character, which increases with the progress of the pregnancy and is accompanied by dyspnœa, attacks of oppression, generally transient, but sometimes very violent and attended with vertigo, head-ache, precordial pains, but no physical signs pointing to the lungs. More usually the woman is disturbed and oppressed, but has no attacks except on making strong efforts or movements. She complains of short breath rather than palpitation and of syncope; in time the dyspnœa increases, so that the patient is obliged to remain in bed in a semi-recumbent attitude, every movement being followed by palpitation and syncope, and increasing the dyspnœa. Most often the condition is complicated by pulmonary congestion and œdema, which increases as the pregnancy advances, and may be accompanied by hæmoptysis, apoplexy, epistaxis, hæmatemesis, etc., troubles which assume an exceptional gravity. A third variety is asystole, which may be more or less marked, and may cause greater or less disturbances of the general circulation leading to ascites hydro-thorax secondary affections of the liver and kidneys, etc. Emboli may occur in a fourth variety, which, when carried to the liver, kidneys, lungs, or brain, will cause various symptoms. All the foregoing phenomena may be confounded, united, or may appear more or less simultaneously and perfectly, according to the accessory circumstances and causes. All heart-lesions do not present the same frequency and gravity. The mitral lesion is the most common; next to this, pulmonary congestion

and œdema. Affections of the aortic valves are much more rare, are generally better tolerated, and give rise to few symptoms; finally, lesions involving the right side of the heart are still more grave, since they lead very rapidly to asystole and its consequences.

As a rule, the cardiac troubles of pregnancy do not acquire the maximum intensity until after the first congestion. Though borne pretty well at first, they reappear with more intensity at each new pregnancy, until the storm breaks forth with its full fury and attains its height at the moment of delivery. After delivery a marked amelioration usually occurs; there is, at the same time, to use Peter's words, "a maternal and cardiac delivery." But at each new pregnancy there is an exacerbation, and the patients succumb to the cardiac cachexia. Death usually occurs during the puerperal state. Porak noted the following conditions in eighty-four cases of pregnant women suffering from cardiac troubles: The condition remained stationary in twenty-one, was aggravated during pregnancy in fifty-five, and during labor in eleven. Amelioration after delivery was noted in twenty-two cases, thirty-one women died, five before delivery, two during delivery, and twenty-five during the puerperium. We may say, then, without hesitation, that pregnancy hastens the course of cardiac diseases, and predisposes particularly to pulmonary congestion and embolism.

*The Influence of Cardiac Diseases on Pregnancy.*—Diseases of the heart show their influence on pregnancy, by causing metrorrhagia, premature delivery, and abortion, and by causing the death of the fœtus, either directly on account of the mother's affection, or in consequence of changes in the placenta.

I. *Metrorrhagia.*—Attacks of metrorrhagia may be produced at the usual time of the menstrual flow, and may thus give rise to the belief that menstruation persists during pregnancy, but they differ from it as regards both the amount and the quality of the blood, and the duration of the flow. Duroziez has reported several cases. Metrorrhagia may occur before the expulsion of the fœtus, but it is especially observed at the time of delivery; it accompanies premature delivery and abortion, and is usually referable to uterine inertia. The hemorrhage may be so excessive as to threaten the life of the woman.

II. *Abortion and Premature Labor.*—These are very frequent, and the children who are born at full term do not live long. According to Casanova, they do not occur except in the case of women in whom the valvular lesion has already been manifested by symptoms more or less marked, as dyspnoea and palpitations. They reappear with so much the more readiness, according as there have been previous pregnancies. He believes that, in more than half of the cases, the pregnancy is not com-



pleted, and that the child may be born in three conditions—dead, living, or expelled prematurely. According to Sée, the foetus perishes from asphyxia and inanition, because it no longer finds in the vitiated blood of the mother either the oxygen or the other materials necessary for its nutrition. It then becomes a foreign body, which is soon expelled from the uterine cavity.

*The Fœtus is born Dead.*—The most rational explanation of this is that of Brown-Séquard and Marty, which is as follows. Venous blood stimulates the nerve-centres and contractile tissues; oxygen furnishes the contractile force, carbonic acid sets it in motion. In this way is produced the contraction of the uterus, which is so useful throughout the entire course of pregnancy, in preventing stagnation of the blood in the uterine sinuses and plexuses. But, as soon as some cause disturbs the general circulation, and increases the embarrassment of the uterine circulation (cardiac or pulmonary disease), the uterine contractions become so strong as to exceed the physiological limit, producing either abortion, or premature delivery. Abortion results from congestion and hemorrhage into the placental tissue, separating the placenta, and extending within the uterus as in other organs. Duroziez noted 21 miscarriages among 41 women with heart disease, 5 were delivered at six months, and 37 of the children who were born alive, died before reaching five years. Among 220 cases collected by Courréjol and Porak, 128 were delivered at terms.

*Prognosis.*—Although the prognosis is evidently grave, both for the mother and for the child, generally speaking it varies according to the different lesions. All writers agree in regarding mitral lesions as far more serious than aortic; the latter, says Casanova, and especially stenosis, are not dangerous affections, but, on the contrary, they are well borne, and are compatible with long life, and if it were not for the continual fear of fatal syncope, or of premature weakening of the heart's contractions, the prognosis would be quite favorable. Others believe that the lesions become aggravated during the latter months of pregnancy, and undergo amelioration afterward. It is believed that aortic stenosis in particular, may exert a very injurious influence on pregnancy.

Aortic insufficiency is characterized by its long period of immunity, which depends upon the compensatory hypertrophy of the left ventricle. Sée thinks that the lesion is perfectly compatible with gestation, at least that there are no functional symptoms. This is not always the case, and sudden death may occur. Mitral lesions are unquestionably the most serious of all, although opinions differ with regard to stenosis. When the latter is combined with insufficiency the prognosis is much worse. Mitral lesions lead to dyspnoea, congestions, and pulmonary troubles. Lesions involving simultaneously different valves are the most grave; those of the right heart are secondary according to Berthiot, but Lee

cites a case in which a pregnant female with a pre-existing tri-cuspid lesion died during an attack of pulmonary congestion.

Porak has constructed a table, based on 92 cases of heart-disease, 35 of which terminated fatally. The mitral valve was affected in 54, the aortic in 13, and both valves in 22; the fœtus was expelled prematurely in all but 3 cases. He regards mitral stenosis as a very serious affection, often terminating fatally.

*Treatment.*—In view of the fatal influence mutually exerted by pregnancy and diseases of the heart, the first question which presents itself is, "Ought we to allow a young woman with heart-disease to marry?" In general we reply in the negative, especially if a mitral lesion is present; strictly speaking, perhaps, we may be less positive if the lesion is aortic, but, even then it is well to warn the family of the danger to which they would expose the girl, and Peter's opinion ought to be regarded as a rule which is almost absolute, *viz.*: Oppose marriage in a patient with heart-disease; if she is married, do not let her become a mother; if she is a mother, prevent her from nursing her child; and if such a patient become pregnant, let her avoid most carefully fatigue, emotion, and every cause which, by disturbing the pulmonary circulation, may render still graver the prognosis of the cardiac affection.

*Medical Treatment.*—This can not be laid down arbitrarily. Peter recommends venesection highly; this is undoubtedly useful in relieving congestion of cardiac origin. Digitalis certainly acts favorably in many cardiac affections, but it is not adapted to all. It is certain that it relieves palpitations and produces diuresis, but it does not affect palpitation of purely nervous origin, in which bromide of potassium combined with ether is of utility, and, where pain is present, local bleeding is attended with good results. Peter uses digitaline, but we prefer the tincture of digitalis, or the infusion of the leaves, in doses of three grains. The troubles arising from hæmatisis should be treated with venesection, sulphuret of mercury in doses of two and a half grains, ipecac, inhalations of volatile salts, compressed air, preparations of iron, calomel with squills and digitalis, turpentine, purgatives, diuretics, etc. Can we use chloroform during labor in the case of a pregnant woman with heart disease? This question has never been definitely settled. We know that nearly all surgeons regard affections of the heart as contra-indicating the use of this anæsthetic. Championnière administers chloroform to all of his operative cases without distinction.

*Obstetrical Treatment.*—If the woman does not present any serious troubles, the only thing to do is evidently to wait; but, if they become more serious, and the life of the woman seems to be in jeopardy, should we confine ourselves to purely expectant treatment, and merely combat the cardiac symptoms? Two cases may present themselves.



I. *Labor has Commenced.*—In this case, all accoucheurs agree with Pajot and Dubois whose ideas are quoted in Dubois's article. The ordinary and evident indication is to terminate the labor as rapidly as possible without injury to the mother, without injury, because we absolutely disapprove of forced delivery. The five cases mentioned by Porak in his article, do not appear to us to warrant a like management, and the bad results given by the general adoption of forced delivery do not appear much improved, according to the observations to which we refer—*i.e.*, one child really survived; for in the four other cases, twice the infant died, and twice its fate was not known. As for the mothers, the results seem a little more favorable, but still the observations are too incomplete to allow us to judge of the question.

II. *Labor has not Commenced.*—Ought labor to be induced, when we know the danger which threatens the life of the mother, and consequently that of the child? All authors agree on this subject, and all answer in the affirmative. We are in accord with this opinion. But ought abortion to be produced? In this case the child's life is sacrificed to prolong the life of the mother, a life very much endangered not only at present by actual dangers, but in the more or less remote future by some cardiac disease even. Besides, authorities are not agreed; some disapprove entirely of the production of abortion, others believe in producing an abortion, but under certain conditions.

We place ourselves among the latter. We do not forget, however, that producing abortion is a serious operation when viewed from a moral standpoint, and we only believe ourselves authorized to do so when all other therapeutic measures have been exhausted, and when the life of the mother is in serious and imminent peril by intense and persistent gravido-cardiac complications.

Finally, if the mother dies, and the child is viable, it is the duty of the accoucheur to perform the Cæsarean section without hesitation. Whatever be the chance for the child, no one has the right to deprive it of that one chance. We will return again to this subject in the chapter devoted to delivery *post mortem*.

#### VARICES.

Three situations are particularly the seat of varices in pregnant women. These places of election, so to speak, are the lower extremities, the genital organs, external and internal, the anus and the rectum. But these places are not the only ones invaded, they have been met with on the trunk, and finally they may extend into the bladder and urethra, thus: 1. Varices of the lower extremities; 2. Varices of the internal and

external genital organs; 3. Varices of the anus and rectum. 4. Varices of the trunk; 5. Varices of the urethra and bladder.

I. Varices of the lower extremities may be superficial or deep.

(a.) *Superficial Varices*.—Briquet distinguishes four varieties:

1st. *Simple Enlargement*.—The vessels have a greater calibre than usual, but they remain contractile and are not tortuous, their walls do not become thin, but always have a thickness proportionate to the calibre of the vessel.

2d. *Uniform Dilatation with Thickening*.—According to Verneuil, the calibre of the vessel is increased, its form remains cylindrical, but the underlying connective tissue alone being hypertrophied, there is not only thickening and lengthening, but tortuosity, and, on section, the vessels remain gaping, and their internal surface show some longitudinal folds and ridges.

3d. *Unequal Dilatation with Thickening and Thinning*.—The changes here are greater and involve all the coats. There is at the same time a multiplication and elongation of the flexures, but the middle coat is no longer regularly hypertrophied, but it is thick in certain places and thin in others; hence the swellings, the unequal dilatation forming true varicose swellings of various shapes and appearances. The valves in the veins being very much altered, the venous circulation is seriously modified.

4th. *Venosity*.—This is, according to Briquet, simply development of small veins which are very numerous, enlarged and branching indefinitely. They are very superficial, even sub-epidermic, and they may color the skin violet or bright red.

According to Cornil, "the varicose dilatations of less degree, and these are the most common, are produced by a new formation of connective tissues (bundles of fibres and cells), by the extension of the vasa-vasorum, which penetrate as far as the internal part of the middle layer, by the distension or sinuous state, the winding condition and the thickening, more or less considerable, of the walls of those vessels, and by extravasation of the coloring matter of the blood in the connective tissue of the walls of the veins.

The thickness of the middle layer, thus modified, is from two to ten times greater than in the normal state. In these sack-like or fusiform dilatations of the varicose veins, the wall is very thin, the internal surface is smooth, the dilatation is very irregular, and the periphery of the tumor is easily separated from the surrounding tissue. The dilatation on section shows that the middle fold has almost or entirely disappeared. The membrane which constitutes the dilated pouch is composed almost wholly of the connective tissue, modified by external tissues and by the internal tunic of the vein.



Varices, in a word, are the result of a chronic inflammation of the veins, characterized essentially by the multiplication of the elements of the connective tissues (bundles and cells), above all of the internal layer of the middle membrane, by the distension and extension of the net-work of the vasa-vasorum, and, secondarily, by the dilatation and by the calcareous degeneration of the walls of the changed vessels. The blood remains in the normal condition, and the veins seem covered in the midst of indurated tissue. Budin believes that this is due, not to a true induration, but to a simple infiltration of the surrounding tissues. He has said, with reason, that this induration, this thick lining, disappears almost immediately after confinement.

(b.) *Deep Varices.*—Verneuil acknowledges that the primary situation of varices lies in the deep veins, and above all, in the muscular and intramuscular veins of the calf. These deep vessels are at first the seat of dilatation, and of valvular insufficiency, and thus two modifications are transmitted to the other branches of the sub-aponeurotic tissue.

Superficial varices would be then only the consequence, only the manifestation of the deep varices.

*Symptoms.*—They differ according as we have to do with superficial or deep varices. They have a different appearance according to their situation and the degree of dilatation. Sometimes they are capillary varices, located on the feet, ankles or calves of the legs; sometimes they form blue or red spots analogous to *nævi*, scattered over different areas, running up on the thigh and connecting among themselves by long vesicles. In a condition more advanced, the dilated veins are longer; they form sometimes lozenge-shaped meshes, at other times isolated tortuosities, or finally there may be true bundles of dilated veins.

Ordinarily, the neighboring tissue is thickened, infiltrated, as in *œdema*; at other times, on the contrary, these veins seem separated from the finger by an extremely thin septum. When, on the other hand, there is a coagulum formed, the veins then take the form of a hard cord, knotty, and roll more or less under the finger.

Varices are most common in the external saphenous; they may extend down the leg on the posterior and inner surface of the calf. On the inner surface these varicose tumors may be of variable size, sometimes enormous, accompanied with *œdema*, weight, itching, dullness and even a sort of paralysis of the extremities. The first appearance may be in the first pregnancy, may be after several pregnancies. They may manifest themselves, during the first months or more slowly, and go on increasing with the pregnancy.

At other times they show themselves in one pregnancy and not in another. Finally, they may disappear, if not completely, at least in great part, after confinement. Labor, according to Budin, does not

modify them, it would have indeed the contrary effect. According to Cazin, the varices would be swollen and tumefied.

Verneuil has given a masterly description of the symptoms in cases of deep varices. "There is at first a feeling of fatigue in walking, an extreme heaviness of the affected extremity, accompanied by an appreciable numbness; next, frequent cramps of the calves, accompanied by prickling or itching. When the numbness and pain acquire a certain intensity, the limbs become weak and trembling and can scarcely support the weight of the body. The pain is limited, in general, to the back part of the leg, reaching its maximum in the calf. It is deeply seated, poorly circumscribed, and manifests itself often in the sole of the foot, and ceases at night, and, in the recumbent position, may come on gradually, or is of sudden onset.

"It appears again in resuming the vertical position or in walking. The involvement of the superficial varices does not, necessarily, increase the difficulty, and the extremities which offer only venosities are often the most painful. This pain may be referred, according to Verneuil, to the nearness of the dilated veins to the accompanying nerves. The limb, to the touch, appears doughy; when it is quiet and reduced in size it gives a spongy sensation, analogous, in some cases, to that of varicocele.

"In places one can make out indurations, nodosities, situated in the midst of soft tissue. These are due to phleboliths, to clots of blood, signs of circumscribed phlebitis, or of spontaneous coagulation. Often the varicose extremities are studded with brown patches, as pigment, various eruptions scattered over the surface of the skin (small boils, erythema, eczema, prurigo), and accompanied by itching, which often precedes the appearance of subcutaneous varices. The perspiration is increased in the affected limb; perhaps there is an increase even in the local temperature."

Authors are not agreed as to the frequency of varices, because, while Cazin has only met 78 cases in 1659 confinements, Lesguillon has reported 1 case in 20, and Budin has met them 100 times in 300 cases.

*Etiology.*—The following have been successively assigned as a cause: Weight, the number of pregnancies, occupation, the position of the uterus, temperature, pendulous abdomen, deformities of the pelvis, cardiac disease, pulmonary disease, and age of the woman. All these causes may operate in certain cases, but they are found as well in women who have no varicose veins.

Pressure of the uterus on the vascular trunks has also been assigned as a cause, but the development of varices is far from being in harmony with the development and inclination of the uterus.

Richard has proposed the following theory: "In consequence of the



development of the organs of gestation, the arteries increase in size, the veins develop equally, and seem to communicate more easily with the arteries. As a result, the veins of the pampiliform plexus dilate under the influence of intravenous pressure; consequently, the blood passes more rapidly and easily toward the dilated capillaries, and the longer the dilating force lasts, the longer will it tend to dilate the vessels.

“The increase of venous pressure in the veins forming the plexus which runs along the side of the uterus, will have for its effect increased tension in all the great vessels, which serve as an outlet to the veins of the uterine system, that is to say: 1st. Into the left renal vein; 2d. Into the inferior vena cava; 3d. Into the hypogastric vein, and, by the intermediate veins, into the common iliac vein. The blood of the venous system, situated below the vena cava inferior, finding before it a tension superior to its own, slackens its flow; thence, stasis in the hypogastric, femoral, popliteal, posterior tibial, the saphenous and their tributaries, and consequently the formation of varices.”

Budin rightly observes that with this theory it is difficult to explain the cases in which varices appear in the first months of pregnancy.

The increase in the mass of the blood, modifications in its composition, increase of vascular tension (Lesguillon), changes in the nervous system (Dubois, Barnes), weakening of the venous walls by the simple fact of pregnancy, are assigned as causes. All these causes may act, but it is difficult to say, as Budin avers, to which, in each particular case, any belong.

Varices in pregnant women may be complicated with œdema, but not so frequently as one might suppose. Lesguillon has only quoted one case in 47 women, and moreover œdema can exist without varices, varicose ulcers rarely (because Lesguillon gives 2 cases in 47 women); erysipelas and phlebitis, these are common. Everything then goes on as in limited phlegmon; but in some exceptional cases, this phlebitis may become the cause of purulent infection of emboli (Budín, Blôt). Lastly, varices may break, and these ruptures may be followed by serious and even fatal hemorrhages.

It is, in general, above the malleoli that they take place, and they may be spontaneous or they may be produced under the influence of a blow or shock. When they are arrested, they do not generally endanger the pregnancy.

Complications alone make the prognosis serious. In the treatment of simple varices one is limited to rest, and the employment of an elastic stocking, which has some advantages; if complications arise, these ought to be the guide for treatment. Ruge, Martin, Otto Albert, Spiegelberg, have advised a radical cure of varices during pregnancy, *i.e.*, in making subcutaneous injections repeated in different places, of fld. ex. ergot in

doses of two grains. Since, Budin justly observes, the varices should disappear ordinarily or be improved considerably at the end of the confinement, it is best then to try palliative methods, and contend against the complications with suitable treatment.

II. *Varices of the genital Organs.*—They may be formed on the vulva or even as far as the cervix; lastly, they may extend into the broad and round ligaments. Situated ordinarily between the labia majora and minora, often on the labia majora alone, they may be unilateral, extend as far as the clitoris to the mons veneris, invading more or less the vagina; form varicose tumors more or less long on the labia majora, the walls of the vagina (occasionally only on these walls), and extend, as Budin has shown, as far as the cervix, broad ligament, and even to the round ligament. Distorting more or less these parts, giving them a bluish, livid or tumefied aspect, they may break and produce hemorrhages more or less severe. The ruptures may be produced either during pregnancy or during confinement. During pregnancy, the rupture may be spontaneous or be the result of scratches, falls, shocks and blows on the vulva. During confinement, it is at the time of the birth of the child or soon after that the rupture takes place, and, if these varices are within the vagina, they may become the origin of thrombi, which we will study further on more in detail.

III. *Varices of the Anus and lower part of the Rectum.*—They give rise to hemorrhages, which are found so often during pregnancy, and, oddly enough, often after confinement.

It is the constipation so habitual in pregnant women, and the straining which they make in the act of defecation, which is in reality the true cause of these hemorrhoids. Not serious, in general, during pregnancy, they may be after confinement, filling up the anus, where they form, sometimes, an enormous pad, extremely painful. They may become the seat and focus of anal fistulæ (we have seen two cases), and during pregnancy of serious hemorrhage (we have seen an example of this).

IV. *Varices on the Trunk.*—In this case it is chiefly on the abdomen where they are found in greatest number. To the case reported by Petit and Budin, we can add one which occurred in our practice. The varices reached as high as the chest and even on one breast. Richard has reported one similar case (varices of the mammæ). Cazin finally has seen a case of varices on the buttocks.

V. *Varices of the Urethra and Bladder.*—Budin has reported some cases from Skene, Richet, Winckel and Bar.

#### SEROUS DIATHESIS—ASCITES—DROPSIES.

Among the morbid phenomena which are the result of disturbances of the circulating system, must be mentioned first the dropsies of pregnant



women, which have their seat in the cellular tissue, and may extend even to the great serous cavities. Stolz and his pupils Thierry, Lauth, Schindler, wished to make one morbid entity, and have classed all these phenomena under the name of serous diathesis, serious cachexia of pregnant women, and of the recently confined woman.

We believe, for our part, that they have gone too far in this matter, and that the dropsies which occur in pregnant women, and those lately confined, are only the manifestation of a general state, in which, it is true, the altered state of the blood is the chief cause, but which, apart from this altered blood state, may be produced by a group of causes independent of each other. In our opinion there is a great difference between dropsies which may occur during pregnancy, and those which manifest themselves after confinement, and we admit, completely, the division which Raymond has given of the puerperal state; minor and major puerperal state. For us, it is impossible to compare precisely the condition of a woman during pregnancy and that of a woman after confinement. During pregnancy, as Pajot has said, all tends to hypertrophy, afterward all to atrophy. And although the puerperal period, in our opinion, commences with conception, only to finish after confinement, according to all authorities the true puerperal state commences only after the confinement, or better still after the labor, and it impresses with a peculiar gravity all the affections, which, happily, rarely affect women during pregnancy. Besides, this is what is shown by the study of the works of Lauth, Thierry, and Thirion de Namur; because their observations referred almost always to those women recently confined. There may be a relation between dropsies which occur during pregnancy and those which occur after labor; this fact is unquestionable, but in this last case the puerperal period plays the chief part.

Assuredly we do not question the considerable influence in the production of these dropsies played by the altered state of the blood in pregnant women, so well studied to-day, both in quality and quantity; but the diminution of the albumin does not suffice to explain all the dropsies of pregnant women, and of those recently confined, and we do not believe that the cachexia, the serous diathesis of pregnant women or of those recently confined, can be considered as a true morbid entity. If it were so, all pregnant women would, in different degrees, present these dropsies, and they constitute, on the contrary, the exception, chiefly in their serious forms.

We cannot accept then, as absolutely true, the definition of Schindler: "The serous cachexia of pregnant and recently confined women, is produced by a general or partial dropsy of the cellular subcutaneous tissue, by extravasation into the serous cavities, or by the infiltration of the interstitial tissue of vital organs, all united to diminish the albumin of the blood during pregnancy."

The pupils of Stoltz themselves are not all agreed, because, while Thierry admits a serous diathesis, Lauth and Schindler admit serous cachexia. We refer to the thesis of Lauth for the history of the subject.

Scanzoni, who designated this condition under the name of serous cachexia, affirmed that "this state of the blood, common in pregnant women, gave rise to a serous exudation, often abundant in the serous cavities (pericardium, pleura, peritoneum), in the cellular tissue under the skin and sub-serous tissue (lower extremities, vulva and vagina), in the parenchyma of some organs (lung and brain, even to a transudation into the cavity of the amnion (hydramnion), and into the internal walls of the uterus (hydrorrhœa). This condition endangers the life of the mother and child. Its influence during pregnancy deserves the more attention, because to it is added the pressure exercised by the distended uterus on the neighboring organs.

"Thus, pulmonary œdema, effusion into the pleura and into the pericardium, become more serious, because of the obstacle which the uterus presents to the dilatation of the thorax. Thus the œdema of the lower extremities and the genitals is increased by the pressure on the pelvic vessels, often to such an extent that motion becomes impossible, and the distension of the skin is extremely painful."

Devilliers and Regnauld, who have especially studied dropsies of the cellular tissue, have divided them into two great classes. 1st. œdema or anasarca, which may be simple or involve the organs of respiration and circulation. 2d. œdema or anasarca with albuminuria.

#### SIMPLE ŒDEMA.

*Causes.*—The first chief cause consists in the changes of the blood, particularly if there is a local or general congestion, a febrile state, severe or slight. Age and child-bearing have no influence, but it is not the same with privation, fatigue, moral influences, living in unhealthy dwellings, dampness—in a word, all the causes which exert a depressing influence on the pregnant woman. Sometimes, however, one sees œdema in a woman in a robust condition.

But to these general causes are added influences which we call local and mechanical. Among them, the activity of a new life which stimulates the uterus, the determination of a considerable amount of blood which this new state exacts, are the powerful causes of the disturbance of the circulation. They may wonderfully modify the lower portions of the body and induce congestion or stasis, of which they may become the seat.

It is through the development of the uterus, whose influence is felt



in the last month of pregnancy; the inclination of the uterus, which explains sufficiently the preference of the infiltration to the limb on the corresponding side; the form, the direction of the foetal part, the form of the pelvic cavity and its unusual size, which allows communication more or less direct between the uterus and the blood vessels; the resistance of the abdominal wall; the development and height of the uterus, which impedes the expansion of the thorax; the large size of the foetus; the increased distension of the uterus by twin pregnancy, hydramnion, tumors of the foetus, tumors of the uterus or pelvis, abdominal tumors, prolonged standing in certain occupations; finally, predisposition in certain individuals to varices. Such are the main causes of simple œdema.

Prodhomme, together with Andral and Gavarret, Becquerel and Rodier, Regnauld and Devilliers, considered the alteration of the blood as the predisposing cause (diminution of albumin); but it must play, like these last, a great rôle in the influence of the mechanical obstacles to the circulation; the serous infiltration which complicates these conditions is only, according to him, the result of a local plethora. He tells us that the influence of the uterus on the neighboring organs is shown again by this fact, established by Depaul, that when the Cæsarean operation is performed, one almost always finds a varying quantity of serum in the peritoneal cavity. It is the same in supra-pubic œdema, which he has shown is present in case of twin pregnancy.

*Edema combined with Diseases of central Organs.*—Aside from simple œdemas, we find œdemas or anasarcas with affections of the central organs of the circulation and of respiration. In this condition, the organic causes of the disturbance of the circulation, and the consequent infiltration of serum, increases again all those conditions which the puerperal state in women develops. If dropsy does not exist before the pregnancy; it will develop almost certainly in its course, and if it had already shown itself beforehand, it will increase considerably more in simple œdema. This is the case, particularly where the serous cavities are invaded, and then we have ascites, pleurisy with effusion, pericarditis; at times even the dropsy will commence in these cavities. It is understood, moreover, that these are dropsies which induce serious complications for mother and child (symptoms of asphyxia, premature expulsion of the foetus, etc.).

*Edema complicated by Albuminuria.*—In this case, œdema is only an accompanying symptom, and it is the albuminuria which constitutes the disease.

*Symptoms and Course.*—It is in general during the last three months of pregnancy that œdema commences to show itself; however, when it is dependent on a general cause, it may commence with pregnancy, or

during the third or fourth month (Cazeaux); and while it shows itself most often during pregnancy, it may only appear after confinement. Its course may be acute or chronic, slow, and according to Lauth, Thierry, Schindler, there are three degrees.

1st. *Slow Chronic Form, First Degree.*—Nearly always, the swelling begins in the lower extremities. It is noticed, toward evening, that there is œdema about the malleoli, which disappears after rest and the horizontal position, to reappear when the woman remains up for a certain length of time. As the pregnancy advances, the infiltration extends, reaches the feet, legs, knees and thighs, and no longer disappears completely during the night. The skin becomes dull, pale, is now insensible to, and pits on, pressure. This increase in size of the lower extremities is accompanied by loss of motion more or less marked. Sometimes it is utterly impossible to stand, on account of the vague pains and weight, and finally, the œdema rising still higher, ends by involving the genital organs, and becomes a considerable inconvenience.

In the second degree, the œdema continues its ascent, involves in its turn the abdominal wall, forms above the pubes a tumor, quite a large cushion, then reaches the upper extremities, the face, eye-lids, involving thus all the cellular tissue under the skin, and giving to the woman a peculiar appearance. But while, according to Lauth, it remains still limited or nearly so in the cellular tissue under the skin, according to Schindler, the peritoneum is involved generally in its turn by an effusion more or less abundant. The œdema, carried to this extent, threatens the woman with serious complications. As evinced by the feeling of extreme tension, of general heaviness, they experience vague pains in all the limbs; the respiration becomes difficult, anxious, oppressed, and symptoms of asphyxia and syncope manifest themselves, and next appear disturbances of digestion and diarrhœa. The urine is diminished, of a deep red color, sometimes albuminous; the pulse is small, feeble, and soft. There is a cardiac bruit transmitted into the carotids; but wonderful as it may seem, fever is the exception. It is not rare in this case, in view of the condition of the woman, to see the pregnancy interrupted, and the patient confined prematurely and spontaneously, usually at the end of the eighth month. Carried to this extent, the œdema may disappear after confinement (Lasserre, Lauth), but, in certain cases, it is not so, and the dropsy continues to increase, and the disease passes into the third stage, that is to say, the effusion spreads into the great serous cavities of the abdomen, thorax, and skull, and death results quickly. We may add that these œdemas, so extensive, are most commonly complicated by albuminuria, and that eclampsia comes in its turn to add its deadly influence to the troubles experienced by the woman, already so severe.

The third degree is accompanied always, contrary to the first two, by



a true rise of temperature, is characterized by effusion in the serous cavities; it may originate only after confinements, or show itself already during pregnancy, and one may understand without difficulty the danger which it brings with it, both for the mother and child. Such is the common course of œdema, in pregnant women, but it is not always so.

*Second Form, Acute.*—In some cases it takes a course truly acute, and is then generally accompanied by some fever.

It is, moreover, in these grave cases that one meets with infiltration in the upper extremities and in the serous cavities. But as Prodhomme remarks, "while the effusion in the serous cavities generally only advances according as the infiltration rises from the lower to the upper parts, the visceral œdema, so to speak, more independent of the state of general infiltration, sometimes waits to form until the latter has attained a considerable degree, sometimes declares itself when the infiltration of the lower extremities is scarcely marked. Then they may appear rapidly, presenting in their progress the characters of the metastatic serous congestion which Lasserre has noted in the recently confined woman. It is then that we see arise pulmonary œdema, pleuritic pericardial effusions, serous effusion into the cranial cavity, cerebral œdema, and finally death."

Of all the serous cavities, that which is most often and first involved is the abdominal cavity, and ascites is one of the varieties comparatively frequent in the dropsies of pregnant women. Cazeaux claims that hydramnios, hydrorrhœa and ascites are only varieties of the intra-abdominal serous effusion. We cannot accept this opinion. Hydrorrhœa and hydramnios are special diseases, as we hope to show, and although it is true that hydramnios coincides often with ascites, there are a number of cases in which ascites exists alone, without the complication of hydramnios, showing thus the possible independence of these two dropsies. Œdema only arises secondarily, that is to say, when the disease has reached a certain stage; while ascites, except in case it depends upon some disease of the liver, never shows itself unless the œdema becomes general, or at least has taken a serious form or in some manner an acute. We will return to it in the study of hydrorrhœa and hydramnion in the chapter on the diseases of the ovum. We confine ourselves here to the study of ascites during pregnancy.

#### ASCITES.

The first symptoms of ascites manifest themselves sometimes during the first months of pregnancy, more often toward the fifth or sixth month, rarely later. It may be produced slowly, gradually, or, as we have seen in one case, rapidly. In this last case, moreover, the quantity of effusion

into the abdominal cavity may be considerable, and if the effusion appears early, there may be a marked disproportion between the size of the abdomen and what it should be at that period of gestation; and as, on the other hand, ascites is generally complicated by general œdema, there results a period of pain and suffering, which only goes on increasing as the disease advances.

The effusion goes on increasing more and more until the infiltration becomes general; the patient presents a puffy appearance which gives the face a pale, livid look. The abdominal walls are greatly stretched and œdematous, extremely painful, and preserve the impress of the finger. Cazeaux compares this appearance to that of elephantiasis. The umbilicus, enlarged at its base, forms a more or less prominent tumor, which can, according to Cazeaux, acquire the size of a hen's egg; but this tumor does not exist constantly, and, in one case, the umbilicus did not form such a tumor. All was limited to an enormous distension of the umbilical ring, and to a thinning of considerable of the skin in the neighborhood.

The lower extremities and the greatly swollen genital organs increase still more the woman's suffering, who can neither stand, sit nor keep the dorsal decubitus, on account of the dyspnœa and pain accompanying respiration.

If we try to palpate the abdomen, the extreme sensibility and the enormous distension of the abdominal walls render this almost useless. We make out easily dullness, but this dullness, contrary to that which occurs in ordinary ascites, is not displaced by the change of position of the patient.

The presence of the uterus changes, indeed, the ordinary conditions, and as Scarpa has pointed out, the dullness, slight or null (in the hypogastric and iliac region) is very pronounced and very superficial in the left hypochondriac region.

Fluctuation, very evident in certain cases, is difficult or even impossible to perceive in others, in consequence of the sensitiveness and distension of the abdominal wall. This is also the case even when ascites is complicated with hydramnion. The uterus is with difficulty made out through the walls of the abdomen. Its size can only be made out with much difficulty, the foetal parts are hard, if not impossible to feel, and, if the woman at this time perceives foetal movements, these are dull and obscure; often auscultation gives no results.

Depaul has nevertheless given two signs which enable us to recognize the uterus: first its abnormal mobility; this seems to us difficult to prove, but there is another sign, which is of great importance. It is this fact, mentioned by Depaul, which has been to us in one case a great help in making our diagnosis, that when the abdomen is palpated for a certain time its form is seen to change, become more globular, more prominent,



and at the same time forms under the hand a hard, globular mass, and one can with difficulty, it is true, but more or less clearly, appreciate its size and form. This mass is no other than the uterus, which hardens by the fact of its contraction. [The intermittent uterine contractions of Braxton-Hicks.—Ed.]

When the effusion is moderate, the woman only experiences a feeling of constraint, of general fatigue and of slight oppression, but when the effusion becomes great enough to greatly distend the abdomen, the pains become severe, depriving the woman of rest and sleep. And, moreover, as the effusion progresses rapidly, fever arises, but what is more prominent is dyspnoea, which may go on to complete orthopnoea, threatening the woman with asphyxia, syncope and serious complication from the side of the pulmonary cavity.

In this case premature labor often comes on, especially if the woman has passed the seventh month, but unfortunately it is not always so; and particularly in the case where ascites is large in amount after the fifth month, one is often obliged to interfere. At other times, at last, the spontaneous death of the child interrupts the course of the disease; the child becomes thus a foreign body, remaining more or less long in the uterine cavity before it is expelled. It is understood that the prognosis of ascites complicating pregnancy will be more serious as it makes its appearance at a period remote from full term, because its course is likely to be more rapid, and it will also be complicated with hydramnion. We will return again to this subject.

Aside from ascites, serous effusions have a variable influence on pregnancy; most often pregnancy follows its regular course; the effusions may disappear some days before confinement, or they may persist to that time. Pregnancy may be interrupted prematurely, or more rarely the patient may die before labor comes on. As for the child, it may be born strong and well developed, but it may also be born prematurely, or, finally, it may die during pregnancy. In general, delivery leads to a decided improvement almost immediately, and, at the end of some days, everything returns to its normal condition, but this is not always the case.

*Treatment.*—When the dropsy is slight, rest and simple purgatives will suffice in general, associated perhaps with tonics and iron in small doses. But when the dropsy is more pronounced, we advise, as in case of dropsy with albuminuria, a milk diet. In one case we obtained excellent results. The œdema was general, but without effusion into the serous cavities. Cazeaux rejects absolutely the use of venesection and advises laxatives, vapor baths, friction and diuretics. Not only do we not believe venesection injurious, but, in the presence of congestion in such cases, we believe that it is, on the contrary, perfectly justifiable to a moderate degree, *i. e.*, to relieve the vascular system of 3000 to 4000 grains of blood.

We are more conservative in regard to punctures, which a great many

authors advise us to make on the labia majora and the lower extremities, in cases in which the œdema is very marked. The vitality of the tissue is somewhat modified, and the punctures may become the point of origin of gangrene. We are inclined, in such cases, to make three or four on each extremity and far apart. With Cazeaux, we do not advise blistering and irritating the skin. It is especially in cases of pulmonary congestion and encephalitis that we would advise blood-letting.

Whenever the effusion has reached the visceral cavities, we advise, first and foremost, venesection, together with a milk diet, and, if these means fail, we advise paracentesis. The operation of thoracentesis, followed by success, without the interruption of pregnancy, as shown by Duguet in cases of acute pleurisy, ought to encourage us to perform the operation in cases of non-inflammatory effusion as in the passive effusion, so to speak, of serous cachexia, and we would not, for our part, hesitate to have recourse to it. But, as we have said, the serous effusion is most commonly in the peritoneal cavity, and, in view of imminent asphyxia, paracentesis should be resorted to.

As Cazeaux has remarked, the enlarged uterus makes it impossible to insert the trocar in the place usually selected in ascites. Scarpa also, in his paper on pregnancy complicated with ascites, advises that the puncture be made in the left hypochondriac region, between the upper border of the external oblique muscles and the borders of the false ribs, in order to avoid the uterus, the puncturing of which he does not consider as serious as Chambon seems to think, and he quotes, in regard to this point, the cases of Camper, Langius, Reiscard and de Nissi, in which abortion was simply produced.

In a case of ascites, Langstaff, as cited by Cazeaux, made an incision two inches below the umbilicus, to expose the peritoneum, which he pierced with a medium-sized trocar, but forcing it very slightly so as not to wound the uterus. After drawing off about ten pints of fluid, the uterus came in contact with the trocar, which gave such pain that it had to be withdrawn. A flexible sound or catheter, introduced between the uterus and the anterior surface of the peritoneum, withdrew the rest of the fluid. Eight hours after the operation, peritonitis, three days later abortion, recovery. Ollivier d'Angers, in a case in which the umbilicus projected considerably, opened this with a scalpel, a watery fluid poured out, and he withdrew at once twenty pounds of fluid. The discharge continued for twelve days; on the thirteenth the wound closed; twenty-eight days after the first puncture it had to be repeated, with the same result, and twelve days later natural labor set in, with the birth of a living, though feeble child; recovery.

When pregnancy is not far advanced paracentesis is the only resort, but when it is advanced to the eighth month, or further, should not the induction of premature labor be preferred? Cazeaux does not believe in



this, because he thought that paracentesis would offer sufficient relief, so that pregnancy would go to full term without difficulty.

We think Cazeaux too hopeful on this point. Paracentesis, itself, is not always harmless. It may (as the case of Langstaff proves) give rise to peritonitis, which, on the one hand, may induce premature labor, and, on the other, may seriously compromise the life of the mother and child. Why then should we not have recourse to the induction of premature labor? Still more should we do so if ascites is complicated by dropsy of the uterus *i.e.*, by hydramnion.

#### PERNICIOUS ANEMIA OF PREGNANCY.

It was not until 1871, when Gusserow published his first observations, that the pernicious anemia of pregnant and puerperal women was really demonstrated. It has been studied by different authors, but in reality it is a rare disease, as the small number of observations collected up to date proves. Batut has only been able to collect a dozen well-authenticated cases.

*Etiology.*—The abode of the woman, the manner of living and even the climate are said to be causes; but the real causes are pregnancy, and the functional disturbances which accompany the condition of child-bearing; also hemorrhages—in a word, all the causes which tend to depress the pregnant woman, which are summed up in the expression physiological distress.

*Symptoms.*—At the outset it is generally insidious; and it is only in consequence of excessive fatigue, of a departure from the usual manner of living, that the patient experiences a general weakness, which, increasing rapidly, confines her in bed. At other times, it is on account of some debilitating cause, abortion, uncontrollable vomiting, diarrhoea, that anemia declares itself, and this especially from the sixth or seventh month of pregnancy. Sometimes, as in the cases of pernicious anemia of Thierry, of Lauth, of Stoltz, it is only after labor that the disease appears, which is characterized by two great symptoms or phenomena, *i.e.*, the absence of albumin in the urine, and a considerable diminution of the solid constituents of the blood, and particularly of the hæmoglobin, which falls as low as 10 in 1000.

Then the face becomes colorless, slightly puffy, the tongue is dry but not coated, and fever soon appears, which is accompanied with a certain amount of emaciation, but always leaves the patient in a fair condition, which persists in spite of a certain amount of digestive trouble not slow in showing itself.

We are always impressed with the general feebleness of the patient, which renders all movement difficult and painful, and this is accompanied by headache, dizziness, vertigo and sleeplessness, more or less complete, and above all by violent palpitations and dyspnoea, with a tendency

to syncope on the least effort or exertion. The syncope increases in severity and duration according as the disease increases. It may even become fatal.

On auscultation, the heart presents a systolic souffle more or less strong, which is transmitted into the vessels of the neck. The seat of the souffle is not fixed; sometimes at the apex of the heart, sometimes it is perceptible over the whole cardiac area; as a rule it is heard at the base of the heart. As the disease advances, the souffle becomes dull, and, at the same time, the dyspnœa becomes worse, and there are disturbances of vision, the conjunctiva loses its color, and becomes extremely pale.

This condition is accompanied by dropsy, at first localized in the cellular tissue and lower extremities. It soon becomes general, and invades the serous cavities, pleura, pericardium, peritoneum, and always without albumin in the urine. Quinquaud has noticed some retinal hemorrhages, but they are rare.

The hemorrhages which frequently appear are epistaxis and bleeding from the gums; and, at the same time, patients are tormented by neuralgic pains, usually facial neuralgias.

As to the digestive tract we observe all sorts of possible troubles, pyrosis, nausea, vomiting, cramps, and complete anorexia. Then the patient becomes prostrated, more or less completely, the pulse is feeble, the heart slow and feeble, and she dies exhausted. In certain cases, in place of this rapid and progressive course, the anæmia becomes chronic, so to speak, with intermissions and remissions, more or less marked. These are deceitful because they inspire the hope of recovery which rarely comes.

*Pathological Anatomy.*—On autopsy nothing characteristic is found, for the lesions described by some authors are met with in other morbid conditions.

*Treatment.*—It consists, above all, in regulating the diet, but this is not easy to do, considering the difficulty of nourishing and sustaining the patient. Tonics, iron, etc., have been used. Oxygen has been recommended, and, finally, Gusserow has used transfusion, as also has Ferrand. It has failed in four cases. [In this pernicious anemia, arsenic frequently serves a better purpose than iron. Further, the bin-oxide of manganese, an excellent blood regenerator, might be tried.—Ed.]

Considering the severity of the disease, is one authorized to induce premature labor or abortion?

This question we answer in the affirmative; the interest of the mother precedes all other considerations. We should not interfere too soon or too late, and it is the condition of the mother alone which can indicate the proper time to interfere. This will not always save the patient, for, in a number of cases, the pernicious anemia began after confinement. We must look to the future to settle this grave question.



## LESIONS OF THE SECRETIONS AND THE EXCRETIONS.

*Ptyalism.*

Excessive salivation, or ptyalism, is not, in pregnant women, as rare or insignificant a symptom as Cazeaux seems to think. Besides the inconvenience and discomfort which it brings upon the pregnant woman, it weakens her considerably, interrupts assimilation, induces a certain amount of depression, which leads to emaciation and a tired feeling, sometimes very marked. It is true, the health of the woman is not, in general, seriously undermined; but ptyalism none the less merits the attention of the physician. Sometimes it may be accompanied by vomiting, sometimes, on the contrary, it may exist alone. Slight in some women, in others it becomes very abundant, even in the night, and deprives the patient of a certain amount of sleep. According to Cazeaux, it may be a temporary affair, in general of slight duration. The cases of serious and abundant salivation we have had do not allow us to share this opinion. In 7 cases the ptyalism began, so to speak, with pregnancy (3 times in the same woman), and persisted after the pregnancy, once 15 days, once 18 days, twice for 2 to 3 weeks, and 3 times in the same woman for 3 to 4 months after labor. Cazeaux himself has had similar cases.

Unfortunately, the means of treating the disease are of little avail. Astringent gargles, sugar, ice, have usually failed. That which has the most power, and still its power is limited, is the use of bitter substances, quassia, dry bitter orange peel, (of which the patient can keep a small piece always in the mouth,) brandy, used as a gargle several times a day. We have never, as Cazeaux, seen ptyalism cease toward the end of pregnancy, but have seen it, on the contrary, persist even to the end of that pregnancy, and appear again in the same woman in three successive pregnancies.

*Gingivitis of Pregnancy.*

This disease is characterized by a redness, a congestion of the gums on both maxillæ, a puffiness which covers a part of each tooth, and forms thus a pad, more often on the anterior of both maxillæ as far as the molar teeth. This pad of gums bleeds easily, the teeth become loose, shaky, and may, later on, fall out of their sockets. Then results a difficulty in mastication which becomes the more painful as the lesion is more pronounced.

Pinard in 73 women, of whom 43 were multiparæ and 32 primiparæ, found it 31 times in primiparæ and 14 times in multiparæ. Multiparæ are, then, more liable to this disease than primiparæ. Former pregnancies and bad general condition appear to play an important part in the course. Gingivitis, as a rule, continues through pregnancy and only disappears a month or two after confinement. It persists, sometimes, longer in women

who nurse. We have at present under observation a young woman in the seventh month of her pregnancy, who presents not only this gingivitis, but a true gingival tumor of the size of an almond, situated near the left canine tooth. The tumor is a bloody, fungoid tumor, which resists all treatment. Tincture of iodine, glycerol of tannin, chlorate of potash, recommended by Pinard, have failed; chromic acid alone relieved the patient, but did not produce a cure, which will probably occur after confinement. The following solution, chloral and alcohol equal parts, advised by Pinard, has failed completely.

#### *Excretion of Urine.*

The secretion of urine during pregnancy is the same as in the non-pregnant state. It is neither increased nor diminished. But it is not the same with the excretion, which suffers marked modifications. At times there is retention, sometimes incontinence, and finally an incessant desire to urinate, occurring at different periods of pregnancy. These troubles may be referred to various causes, and in regard to incontinence, in particular, it may be observed in two distinct conditions. Sometimes it may succeed, or, better, accompany retention—that is to say, an incontinence by distension; on the other hand, there may be no retention; but, in multiparæ in particular, the vesical sphincter has lost some of its tonicity, and in walking, coughing, laughing, lifting, such women eject a small amount of water, which the bladder, having lost its retentive power, is unable to hold. There may be a true inflammation of the bladder, cystitis, pains, malaise, frequent micturition.

It is the grouping of all these urinary troubles, (not included in albuminuria), which Monod and Terrillon have studied lately with great care, and both have shown that they are much more frequent than one would suppose. Thus Monod, on questioning 124 primiparæ or multiparæ, not only as regards the existence of the urinary trouble, but also as to the pain, the frequency, and the time of the appearance of the trouble, has found that in 4 cases the vesical symptoms have shown themselves at the beginning of pregnancy in 33 women out of 131 cases. Here are the observations taken of 124 women:

Women who did not suffer from urinary troubles in any period of pregnancy, 61.

Women having urinary symptoms, 63.

Women who had frequent micturition in the last two or three months, or rather in the last four months of pregnancy, 37.

Women having vesical symptoms during the first weeks, 26.

Of these 26 women, frequent desire to urinate only, 11; frequent and painful micturition and complicated by hæmaturia, 15. Among the 26 cases of urinary troubles at the beginning of pregnancy, 16 were primiparæ, 10 multiparæ. To these figures must be added seven cases of Monod,



and we have the following total of cases in which the urinary troubles began at the commencement of pregnancy: Number of women, 131; with urinary trouble, 33.

The causes of these troubles are, 1st. Mechanical. 2d. Inflammatory. They occur not only during pregnancy but more frequently after confinement. They are due to pressure exerted by the foetal head on the base of the bladder, and to obstetrical operations, and are the product of true inflammatory lesions, which may produce sloughs or fistulae. But during pregnancy there is one cause more important than all others, the pressure exerted by the gravid uterus, which causes retention, and all the sequelae more or less severe which accompany it.

Monod rightly distinguishes four cases; 1st. Retention during pregnancy; 2d. Cystitis beginning at the commencement of pregnancy; 3d. Cystitis after the puerperal period; 4th. Cystitis independent of the puerperal state, but dependent upon uterine influences.

1. *Retention during Pregnancy.*—The chief cause is retroversion of the gravid uterus. We only mention it here, and treat of it at length in a special chapter. We will say here, that it may become the cause of cystitis more or less severe, and can go on to the exfoliation of the vesical mucous membrane, (Wardell, Spencer Wells, Wittich, Philips, Whitehead-Haussman, Moldenhauer, Schatz, etc.). Finally, Playfair has reported a case in which retention was due to a mal-position of the foetus—transverse position.

2. *Cystitis.*—But there is another cause of urinary troubles which declares itself in the first weeks of conception, and which is independent of all the ordinary causes of vesical inflammation. This cause of urinary troubles, mentioned by Terrillon, Ollivier, Hervieux, Madame Puejac of Montpellier, is simple cystitis, which may be accompanied by slight frequent micturition or dysuria, or acute pain, or hæmaturia, or even by abortion, as in Ollivier's case.

Cystitis, according to Monod, may be the result of passive hyperæmia of the vessels which supply the bladder and uterus, accompanying those uterine congestions which occur at the beginning of pregnancy. It is not of special importance, except in regard to the conditions causing it.

Mons has already mentioned cystitis of the first month of pregnancy, which he, with Churchill, attributes to a vesical catarrh, produced by reflex irritation: after the second month it is to be attributed to irritation, to pressure of faecal matter, the result of constipation, and also to retroversion.

He acknowledges several varieties of cystitis, and mentions the fact that Tillaux, Parent, Richet have reported cases of varicose cystitis or hemorrhoids of the bladder. Aside from this kind of cystitis, he mentions two varieties which he calls post-puerperal cystitis. One is produced only by traumatism during confinement, the other is idiopathic, and may be

produced after abortion, after a normal labor, and may disappear almost immediately after confinement, or more slowly (six weeks according to Monod, Guéneau de Mussy, Hervieux, Olshausen, Kaltenbach, Voillemier, etc.). Finally, he mentions cystitis in women independent of the puerperal state, but not treated of here, and he arrives at the following conclusions:

1st. Urinary symptoms, in pregnant women, arise from two different causes, and to each are attached a distinct group of clinical symptoms. One, the pressure of the gravid uterus which produces retention, the other vesical congestion, which is explained by the vascular connection between the uterus and bladder, and which produces, in the latter organ, a predisposition to inflammation. 2d. An acute cystitis, which is manifested during the first weeks of gestation. 3d. Cystitis observed immediately after or in the first weeks following a normal labor, which is called post-*puerperal* cystitis on account of the time of its appearance. 4th. The anatomical relation and vascular connection between the uterus and the bladder accounts for the frequency with which urinary troubles accompany a great many diseases of the uterus, even under certain physiological modifications of this organ during menstruation or at the menopause, for example.

There are, then, certain inflammations of the bladder peculiar to women, and, contrary to the common opinion, cystitis is far from being rare.

Terrillon has reported a number of analogous cases, and the discussion of the subject (1880) in the Surgical Society, allowed several surgeons to increase the number of observations.

#### ALBUMINURIA.

Albuminuria, albuminuria of Piorry, Bright's disease, consists, Jaccoud says, in a disturbance of the renal secretion, characterized by the presence of albumin in the urine. Considered from the standpoint of pregnancy, it may, according to Dumas, be presented under two very different forms: "One, which is entirely and intimately dependent upon pregnancy itself, the other independent of it, for its primary cause; but which, by the fact of its being coincident with pregnancy, follows a definite course, and apart from its origin, develops under its influence as the preceding.

"Physiological pregnancy, by modifying the quality and quantity of the blood, is a predisposing general cause of albuminuria. But to produce the last, a cause must be added, and this may be due to a true pathological state of the blood, a morbid condition of the kidney, an accidental cause, or mechanical pressure exerted by the uterus, when it has acquired a sufficient size. The influence of labor may be similar to the mechanical pressure at the end of pregnancy; but it can only produce this effect when the predisposing cause has exercised its previous influence. Finally, a woman may become pregnant when she already has



albuminuria. In this case there is a double influence to consider, one exerted by the albuminuria on the pregnant woman, and the other the influence of pregnancy on albuminuria."

The conclusions of Dumas only confirm the opinion of Tarnier, who rightly admits that the albuminuria of pregnancy alone can no longer be regarded as a symptom of a single lesion, but that the passage of albumin in the urine depends, on the contrary, upon very different causes. We shall see in the section on pathogeny how many theories this question of albuminuria has raised. However it is, we can, with Dumas, state it as settled, that three conditions are necessary for the normal secretion of urine. 1st. A normal distribution of the generated fluid, or the mechanical integrity of the circulatory system; 2d. A normal condition of the blood; 3d. A normal filtration or anatomical and functional integrity of the kidney.

But these three conditions not being met with in pregnant women, hence the possibility of albuminuria. Moreover, albuminuria may have existed before pregnancy. Finally, albuminuria may show itself only during labor.

Hence the division admitted to-day by almost all authors: 1st. Albuminuria in pregnant women, with pre-existing renal lesions; 2d. Idiopathic albuminuria; 3d. Albuminuria complicating labor.

#### *Albuminuria of Pregnancy with Pre-existing renal Lesions.*

Pregnancy may occur in women having renal lesions before they become pregnant, and these lesions may or may not have been suspected. Bright's disease in these cases develops more rapidly and yields more quickly to pathological manifestations. Under the influence of pregnancy renal lesions may increase more and more, and produce, Bamberger says, in a short time, marked and incurable disorders. Pregnancy becomes a powerful auxilliary cause, and Dickinson has given an exact picture of the progress of the disease.

"When the renal disease advances with pregnancy, it rarely attains a serious stage during the first gestation. Women may die, it is true, in eclampsia, but if they live, little by little the œdema will disappear, the urine will cease to be albuminous, and they will enjoy perfect health until the next pregnancy, which will lead to some accident. The œdema will then increase considerably; the patient will be more exposed to eclampsia, the complication will be slower in disappearing after confinement, and thus, at each new pregnancy, the renal symptom will become more chronic, until the albuminuria continues between the pregnancies, and the patient will then be exposed to all the complications which accompany granular kidneys."

Hypolitte, who has reported a case, proves that in these cases albuminuria does not disappear from the urine, but persists until Bright's disease

has run its course in one way or another. But in these instances, as he has observed, the convulsions are not those of albuminuria gravidarum; they are uræmic convulsions and not eclamptic, and it is easy to make a diagnosis by taking the temperature, the appearance of uræmia and eclampsia differing essentially as we shall see.

*True Albuminuria Gravidarum.*

Albuminuria is far from being a rare disease, at least so the following statistics show:

|           |       |     |       |      |        |                                 |    |            |
|-----------|-------|-----|-------|------|--------|---------------------------------|----|------------|
| Blot      | among | 205 | women | nine | months | pregnant,                       | 41 | times.     |
| Hypolitte | "     | 165 | "     | "    | "      | "                               | 32 | "          |
|           |       |     |       |      |        | Independent of labor, 32 cases, | 10 | "          |
| Meyer     |       | 106 | "     | "    | "      | "                               | 6  | "          |
|           |       |     |       |      |        | 36 in labor and puerperal state | 31 | "          |
| Litzmann, |       | 37  | "     | "    | "      | "                               | 16 | "          |
| Abeille,  |       |     |       |      |        |                                 | 10 | per cent., |
| Möricke,  |       | 20  |       |      |        |                                 | 1  | case.      |
| Petit,    |       | 143 |       |      |        |                                 | 29 | cases.     |

Dumas, who has collected all these statistics, gives 1 in 5 or 6.

As to age, Devilliers and Regnault have fixed upon from 17 to 38 years, or from 17 to 30 years, as the period when the disease is most often seen. Bailly, on the contrary, attaches only a secondary importance to age. It is necessary, however, to take into account these statistics and those furnished by Peter, which seem to indicate that albuminuria is more common in young women than in older ones.

Among 113 women, of which 27 were suffering from albuminuria, Peter found:

| Age.            | No. | Albuminuria. |
|-----------------|-----|--------------|
| 15 to 20 years, | 19  | 6            |
| 21 " 26 "       | 46  | 11           |
| 26 " 30 "       | 28  | 6            |
| 31 " 35 "       | 13  | 1            |
| 36 " 37 "       | 6   | 3            |
| 42 "            | 1   | 0            |

Ought we not here to refer it to primiparity rather than to age, since it is more common as the women are younger?

The influence of primiparity is, indeed, indisputable, and it is acknowledged by all authorities, thus:

|                    |              |     |              |    |
|--------------------|--------------|-----|--------------|----|
| Blot,              | { Primipara, | 99  | Albuminuria, | 30 |
|                    | { Multipara, | 106 | "            | 11 |
| Möricke, 13 cases, | { Primipara, |     | "            | 10 |
|                    | { Multipara, |     | "            | 3  |
| Petit, 212 women,  | { Primipara, | 52  | "            | 13 |
|                    | { Multipara, | 60  | "            | 13 |

Rare during the first months, albuminuria is noticed above all after



the sixth month and during labor. There have been reported, however, a number of cases of early albuminuria. These have been observed by:

|   |             |                     |              |
|---|-------------|---------------------|--------------|
| Bach, . . . . .                         | at 6 weeks. | Ollivier, . . . . . | at 3 months. |
| Cazeaux, . . . . .                      | " 4 months. | Depaul, . . . . .   | " 6 "        |
| Cohen, . . . . .                        | " 5 "       | Bernheim, . . . . . | " 7 "        |
| In <i>Thérapeutic Bulletin</i> , " 5½ " |             | Petit, . . . . .    | { " 5 "      |
| Devanet, . . . . .                      | " 6 "       |                     | { " 6 "      |

We have seen a case at six months and a half in a multipara who had shown it in two previous pregnancies, one of which was complicated with eclampsia.

What are the causes of albuminuria in pregnancy? The causes which, theoretically, produce albuminuria may be reduced to three: 1. Alteration in the blood, super-albuminous. 2. Excess of intra-vascular tension, (the hydræmic state of pregnant women.) 3. Temporary or permanent disorder of the kidneys.

1st. *Super-Albuminous Blood*.—This theory is based on the experiments of Cl. Bernard, who produced albuminuria by injecting into the veins a certain quantity of albuminous liquid; on the experiments of Schiff, of Stokvis, who showed that the development of artificial albuminuria is dependent upon the molecular state of the albumin injected; on the influence of exclusive albuminous diet. (Cl. Bernard, Bareswell, Brown-Séguard, Tessier, Hammond). Gubler has proposed the following theory:

"During pregnancy the mother's blood should furnish the foetus with material for nutrition, but only in a soluble and diffusible form, since there is no communication between the foetal and maternal surfaces of the cotyledons of the placenta.

"There are, in consequence, various forms of albumin which are called upon to nourish the new being, and during this time, the maternal organism must provide for a double waste by absorbing more, by a more strict economy of the proteid elements, or indeed by these two causes together. A greater quantity of these materials must be found ready at hand. It is enough that by virtue of a simple change in the mode of respiratory combustion the ternary substances should be consumed, and that the albuminoid materials escaping the catalytic action of the liver, the direct changes in the capillaries should be entirely reserved for the rôle of plastic alimentation.

"Now, by this new way of working, a system badly regulated or new may go beyond the mark, and the albumin becomes relatively excessive for the wants of the two organisms grafted one on the other.

"This is the easier, since the albumin which has passed through the foetus without being employed in its development comes back loaded with waste material, since respiration is not yet established in the latter, whose urine normally contains albumin, as in batrachians, and never contains urea. Besides, this albumin, as a whole, has returned into the circulation of the

mother, seeing that the renal secretion, not appearing outside, is nearly suppressed during intra-uterine life. Albuminuria in pregnant women thus implies an over-production of albuminoid substances, considering the wants of the two organisms.

“At times the mother produces too much, sometimes the foetus does not consume enough; at other times the two causes join in producing the result.

“If these products increase with weight and dimensions, one may conclude that the albuminuria is produced by organic disorders in the mother. If an albuminuric mother gives birth to a weak, sickly child, there is ground for assuming the want of development of the latter as having occasioned an excess of albumin in the blood and in the urine.”

As Hypolitte remarks, if this theory is admitted, albuminuria should be met almost constantly in pregnancy, but it is not, and, what is more, this theory does not explain the albuminuria of the first months when the nutrition of the foetus is very slight. Finally, the sudden disappearance of albuminuria after confinement in some cases could not be thus explained; and again, children who are born of women suffering from albuminuria do not appear much more sickly than others. Thus:

|  | Weight.                            | Cases. |
|--|------------------------------------|--------|
| Blot, in 32 cases of albuminuria, Twins, together, | 12 pounds.                         | 1      |
| Children more than                                 | $7\frac{1}{2}$ “                   | 5      |
| “ from   | $7\frac{1}{2}$ to $6\frac{3}{8}$ “ | 20     |
| “ less than  | $6\frac{3}{8}$ “                   | 6      |

Depaul, in 13 cases at term :

|   | Weight.                           | Cases. |
|---|-----------------------------------|--------|
| Albuminuric and eclamptic, from 9 to $8\frac{1}{2}$ pounds. | 9 to $8\frac{1}{2}$ pounds.       | 2      |
| “   | $7\frac{3}{8}$ “ $6\frac{3}{8}$ “ | 4      |
| “   | $6\frac{3}{8}$ “ $5\frac{3}{8}$ “ | 5      |
| “   | $5\frac{3}{8}$ “ $4\frac{3}{8}$ “ | 2      |

Showing, in a total of 56 children, 39 were of an average weight or above, and 17 only below.

Petit in 93 cases, 49 being boys and 44 girls, found 22 cases of albuminuria, 11 boys, 11 girls. Eleven times the weights were taken carefully and there were found,

|   | Weight.                                 | Cases. |
|---|---|--------|
| Between $8\frac{1}{8}$ — $7\frac{3}{8}$ pounds, | $8\frac{1}{8}$ — $7\frac{3}{8}$ pounds, | 3      |
| “   | $7\frac{3}{8}$ — $6\frac{3}{8}$ “       | 4      |
| “   | $6\frac{3}{8}$ — $5\frac{3}{8}$ “       | 2      |
| “   | $5\frac{3}{8}$ — $4\frac{3}{8}$ “       | 2      |

The average weight of each infant at term was from  $7\frac{1}{8}$  to  $6\frac{3}{8}$  pounds.

Cassin does not admit this, since he has found that children born of albuminuric mothers, weigh less than others, where the condition does not exist. He believes in the depressing influence of albuminuria.



Robin admits that, in pregnant women, hæmatisis is incomplete. This predisposes to an hydræmic state of the blood, and the relaxation of the tissues; and facilitates and explains the passage of albumin into the urine, which impoverishes the blood and tends to increase its fluidity.

2d. *Excess of Intra-Vascular Tension.*—Beau and Cazeaux, relying on the analyses of Andral and Gavarret and Becquerel and Rodier, first propounded the theory of the existence of a serous-plethora in chlorosis and pregnancy. This plethora necessitates an increased arterial tension, which causes the passage of albumin into the urine.

Upheld by Mangelst, Devilliers and Regnault, Robin and Verdeil, Bouillaud, Potain, Gregory, Johnson, Simon, Bräun, Anderson, Finger, Gallo, Calderini and by Mosier, Kierulf, Herman, Stokvis, who have shown that an excess of water alone in the blood can produce albuminuria, by interrupting the equilibrium existing between the plasma and the globules, and adding the albumin of the latter to the serum, this theory has been taken up lately in a masterly way by Peter, who has given it the name of serumuria.

“Even as,” Peter says, “the pregnant woman, for the hæmatisis and the hæmatopœsis of the fœtus, makes the materials for both, even so she performs the urinary functions for both.

“The pregnant woman excretes daily a greater quantity of urine. While the woman in a normal state eliminates from 330 to 360 grains, Quinquaud has shown that of urea, the pregnant woman eliminates from 450 to 600 grains, *i.e.*, nearly one and a half to twice more than in the unimpregnated state. If she thus makes more urine in twenty-four hours, she ought to do more excretory work, *i.e.*, more blood should be filtered by the kidneys, the greater the functional hyperæmia. But the more the blood in the organ the greater the vascular pressure, and the greater the vascular pressure the more the filtration, not only of the serum of the blood, but even of the blood itself, a phenomenon which is improperly called albuminuria, but which is serumuria.”

Moreover the kidney has a functional relation with the uterus, which has been established by Buquet. This author has noticed the enlargement of the kidneys at the catamenia, in a case of ectropion of the organs.

Finally, the renal arteries give passage to a large amount of blood, which congests the utero-ovarian arteries very much during pregnancy; hence the dilatation of the renal vessels and the increase in the hyperæmia of those organs.

Blot had already pointed out, as a cause of albuminuria, the active and passive congestion of the kidneys, and a sympathetic nervous irritation of the organs, on account of the relation which exists between them and the uterus, and which produces albuminuria, just as irritation of the pneumogastric produced it in the experiments of Claude Bernard.

Martin admits a direct relation between the kidneys and uterus. Every

increased stimulation of the uterine sympathetic system will react on the renal, and produce albuminuria.

Blot, and some other authors, have added, as a cause of blood pressure, the mechanical action of the uterus, which presses on the great vessels of the abdomen, and impedes thus the return circulation.

Frerichs, Bräun, Rosenstein, Wieger, Beckmann, Krassing, Brown-Séquard, Jaccoud, Rose Cormak, Barker, Correnti, Molas, Mohammed, Möricke, Hubert de Louvain, have accepted this last theory.

It is impossible, indeed, to deny this action of the uterus in the last months of pregnancy, but if it is true that albuminuria is most often met with in this period it is none the less true that it is sometimes very often met with, so to speak, at a period when it is impossible to refer it to the pressure of the uterus. We are forced, therefore, to look for another cause, and that of Peter seems the most rational.

This theory of Peter has lately been urged by Möricke: "The stasis of the blood is the cause and origin, for the most part, of nephritis in pregnant women. This stasis acts in two ways: first, causing, as Peter says, a renal hyperæmia; second, alterations in the blood. We know, from modern research, that want or lack of oxygen is the cause which produces fatty degeneration of the kidneys. The intra-abdominal pressure being increased during pregnancy (aside from the direct pressure exercised by the gravid uterus on the renal vessels), produces an obstacle to the return of venous blood to the kidneys. The circulation is not increased in the kidneys, but diminished notably; a less number of red globules pass in a given time than in the normal state. (These red corpuscles are, on account of the pregnant state, less numerous). Consequently, the quantity of oxygen which is taken from these globules by the tissues is diminished in amount. There results, then, disturbances of nutrition and fatty degeneration. Would this condition of the blood predispose also to inflammatory changes? This seems probable, according to Nasse, who says: "up to the present, the uterine lymphatics have not been studied in pregnant animals, but it is very possible that they may play some part in renal inflammation, and even the change in the blood in pregnancy is analogous, in a general way, to that which exists in cases of renal inflammation."

Bailly rejects this explanation, for he thinks that serous-polyæmia is a theoretical rather than a real state of the blood, and, although certain eclamptic women are pale and anemic, others, apparently strong and vigorous, are none the less victims of the disease.

3rd. *Temporary or Permanent Kidney Disease.*—In other words, Can pregnancy become the cause of renal lesions?

We have seen that Nasse and Möricke incline to the affirmative, although they admit this only hypothetically. Rumberg goes farther and says that albuminuria cannot exist without a kidney lesion. The filtration of al-



bumin is only explainable by some modification in the permeability of the membranes, and, even as Robert has shown by his statistics that Bright's disease is much more common in pregnant women during the period of sexual activity, Ollivier arrives at the same results, and concludes that in a good many cases pregnancy may cause or hasten Bright's disease.

We find, then, that the theory of renal lesions as a cause of albuminuria gravidarum, a theory first stated by Rayer and sustained by Gregory Christison, Addison, Johnson in England, by Imbert Gourbeyre, Cohen, Blot, Cazeaux, Devilliers, Regnault, Bach, Gubler, Becquerel and Vernois, Lorrain, Jaccoud, Wieger, and modified by Peter and Petit in France, defended also by Litzmann, Frerichs, Bräun, Schöttin and Rosenstein, is generally accepted.

But opinions differ as to the frequency of these alterations. While Bailly admits that albuminuria is very common, particularly in the acute form, in pregnant women, Blot, Abeille, Barker, Bräun, Bamberger, Hoffmeier, Möricke, Hypolitte, recognize the renal lesions, but consider them much less common, and add that the renal lesions may, sometimes, antedate the pregnancy, and at other times depend upon other causes than those of pregnancy. Bartels, Spiegelberg and Schroeder claim that the changes in the kidney during pregnancy are analogous, not to say identical, to those in the liver, and admit, with Dickinson, that the kidney during pregnancy may undergo a fatty degeneration. There exists a puerperal kidney as well as a cardiac kidney, the first being more dangerous than the second.

Olshausen acknowledges the kidney lesion, but the primary lesion he considers a catarrh of the bladder, the other only being a secondary lesion. The inflammation is transmitted to the uterus, thence to the kidneys secondarily.

Cassin has revived the opinion of Bouchard, and refers to this interesting fact: "When albuminous urine is boiled, add Tanret's reagent, or picric acid, albumin coagulates, and this coagulation may take place in two ways:

"Either the urine remains opalescent or milky, or it may separate out, and the albumin presents a solid mass in the liquid (this mass may be solid or lumpy or as fine as sand). Each of these conditions has a distinct significance. The finely coagulated albumin represents a transient albuminuria, such as one observes in severe fevers, alcoholism. The retractile coagulum, on the other hand, indicates a renal lesion, provided we are certain that the urine contains neither blood nor pus."

Cassin, in 47 albuminuric women in labor, has found in 31 cases the urine opalescent in appearance, and 16 times the albumin was precipitated in lumps. In the 31 cases, the albumin disappeared in forty-eight hours; of the 16 cases, in six the albuminuria was slight, in ten the albuminuria persisted, in seven the urine contained cells and a great number

of granular casts, identical to those which line the tubules. In the ten in which the albuminuria was retractile, 4 had puerperal complications. The observations were taken on 124 women:

|                                     |                  |
|-------------------------------------|------------------|
| 5 observations during the 7th month | 0 albuminuric    |
| 45 " " " 8th " "                    | 5 " "            |
| 124 " " " 9th " "                   | 8 " " 1 in 15.5. |

The figures of the ninth month represent the total, because the examinations of the previous months were continued.

Cassin, taking the different opinions of authorities, shows that they may be reduced to three: 1st. A chemical condition of the blood. 2d. Change in pressure. 3d. Conditions of the histological elements of the kidneys. But he denies, or at least accepts only partially, the first two theories, and accepts the idea of fatty degeneration of the kidney. "It is sufficient to realize that the liver and kidney are organs which cooperate with each other, in order to infer that changes which pregnancy produces in the latter organ would take an important part in the pathology of albuminuria."

Hoffmeier, who believes in the theory of the kidney lesions, has made a careful study of them, and found in 5000 confinements in Schroeder's clinic, from September 1st, 1867, to April 1st, 1878, 137 cases of nephritis, of which 104 were complicated by eclampsia—2 per cent. He has collected them in the following table:

|                                   | Total. | Deaths. | Living. | Children born dead. | Children born living. | ? | Acute. | Chronic. |
|-----------------------------------|--------|---------|---------|---------------------|-----------------------|---|--------|----------|
| Nephritis with Eclampsia, . . . . | 33     | 11      | 22      | 20                  | 15                    | 2 | 2      | 31       |
| Nephritis alone, . . . . .        | 104    | 41      | 63      | 62                  | 46                    | 2 | 89     | 15       |
| Total, . . . . .                  | 137    | 52      | 85      | 82                  | 61                    | 4 | 91     | 46       |

From this table we see that nephritis does not compromise the life of mother and child solely on account of the possible complication of eclampsia, but that the form in which it presents itself ought to be given serious consideration.

This is, besides, the opinion of Bartels, who says, "In cases in which pregnancy, confinement, and the puerperal state pass without uræmic symptoms being developed, rapid recovery generally follows, with a complete disappearance of the renal symptoms; but, as Litzmann adds, the passage into a chronic state is more frequent than in other forms of acute nephritis."

Hoffmeier has often noted a corresponding alteration of the liver, and sees in this proof that nephritis depends upon an over-activity of the renal



function, and in the fact that albuminuria is met often in twin pregnancies. In 137 cases of nephritis, there were 9 cases of multiple pregnancy.

Nephritis during pregnancy may occur in two forms; acute parenchymatous—in this form chiefly do we have eclampsia (in 104 cases given above, in 89 renal symptoms declared themselves suddenly)—at other times a chronic form, characterized generally by a diminution of urine which may go on to complete suppression. The urine contains a considerable amount of albumin, and more or less casts. In 137 cases cited by Hoffmeier, 46 presented this form, of which 31 had simple nephritis and 15 nephritis with eclampsia. It is in this form, as Litzmann and Georgi have shown, that one sees the disease develop a chronic inflammation of the kidneys.

Hoffmeier has found in 28 women, discharged living, 8 only could be considered cured, 5 were unknown and 15 were discharged still having symptoms of the disease.

What is the conclusion to be drawn from all these theories? On which can we rely? We believe it is impossible to adopt one exclusively, and it is also true that each of the authorities who have proposed these different theories would be obliged to confess that they could not explain all cases of albuminuria during pregnancy by it alone. The theory which attributes albuminuria to a temporary or permanent renal lesion seems to us most rational, and yet it has happened to us, as to all authors, to make autopsies on eclamptic and albuminuric women, and never to have found either superficially or with the microscope any renal lesion. We think that Cassin is absolutely correct when he concludes in regard to these different theories in the following way: "Pregnancy produces a condition favorable to the passage of albumin into the urine, but the change of the blood, by pressure, or by its constitution, the influence of renal steatosis, do not explain it, because leucomuria should be as frequent as the gravid state. They explain only the tendency to albuminuria. The fire is ready, a spark is wanted to light it up—then, under the least pathological influence, the renal trouble shows itself without always being the expression of the same lesion."

Mohammed and Barnes have further demonstrated that the use of the sphygmograph in the puerperal state would give us warning of impending albuminuria, and its frequent consequence, eclampsia. "The strong arterial tension which exists generally in the latter part of pregnancy is most marked in primiparæ and constitutes a predisposition to albuminuria and eclampsia. One should fear, then, these two accidents. Where the lying-in period is normal, this high tension soon disappears, as we can prove at the second to the third day, in the tracing which corresponds to the milk fever. This tracing is very characteristic. It indicates a full pulse, soft, slightly dicrotic, beating 120, and is simply the vascular excitability following the secretion of milk. It is analogous, according to Mo-

hammered, to the condition which exists in man during a state of alcoholism. Afterward the pulse becomes gradually normal, also the temperature ( $100^{\circ}$  to  $101^{\circ}$ ) which accompanies this strong tension pulse. If it persists, it indicates some unfavorable complication which may predispose to albuminuria, *i.e.*, a chill, which increases tension in the kidneys, constipation, which poisons the blood, unless indeed this increased arterial tension is not due to nervous excitability, which alone may suffice to cause it, as the author observed in a case after the use of chloroform and forceps." (Hypolitte.)

We cannot accept this comparison of Barnes, milk fever being, in our opinion, very rare, and its physiological appearance, as is seen from study and observation, and the thesis of Chantreuil, is accompanied by a pulse of about 100 to 104 and a temperature of about  $98.2^{\circ}$ . Should the pulse and temperature pass these limits, the puerperal period is no longer physiological but pathological, the woman is sick, and, if the high tension pulse exists as a prodroma of albuminuria (as it may, we admit, according to Mohammed and Barnes), it may also be met with in other conditions, particularly in any of the accidents which complicate a physiological lying-in period, and endanger seriously the woman's life.

Summing up the causes of albuminuria in pregnant women, we can say with Dumas:

1st. Pregnancy is a predisposing cause of albuminuria: *a.* By the age at which it occurs; *b.* The disturbances in the stomach, lungs and nervous system which accompany it; *c.* The modifications in the quality and quantity of the blood which are the result; *d.* The nature of the albuminoid material introduced into the circulation; *e.* The congestion of certain organs which this state of blood induces. Women are, during pregnancy, predisposed to albuminuria.

2d. Pregnancy is an efficient cause of albuminuria. *a.* In primiparæ; *b.* By the functional relations which exist between the uterus and the kidneys; *c.* By the increase of urinary secretion; *d.* By the mechanical pressure of the uterus, (in primiparæ, twin pregnancies, retroversion, hydramnios, rachitis; *e.* By morbid conditions which may accompany it and to which it may always give a serious aspect (pernicious anæmia, diseases of the heart).

3d. Pregnancy may act at the same time as a predisposing and exciting cause, whenever there exists one of the occasional causes which we have enumerated. Hence:

*a.* Albuminuria dependent upon changes in the blood, (albuminuria in the early part of pregnancy, albuminuria or dyscrasia of pregnancy).

*b.* Albuminuria dependent upon anatomical and functional changes of the kidneys (organic albuminuria of pregnancy).

*c.* Accidental albuminuria of pregnancy.

*d.* Mechanical albuminuria of pregnancy (albuminuria in the last months of pregnancy).



*Symptoms.*—The first and only valid one is the presence of albumin in the urine. There are two methods for analysis, heat and nitric acid; but if one wishes to be more exact, he must adopt the method of Petit or Ritter. [The descriptions of these methods are omitted, and our readers are referred to works on medical chemistry for methods of estimating the amount of albumin in the urine.—Ed.]

Other symptoms are the general condition of the patient, who is chlorotic or anæmic, with various digestive disturbances, and becomes gradually pale and feeble. Next, œdema appears; first in the lower extremities, slowly becomes general, and invades the face, so that the patient presents a characteristic appearance.

œdema remains permanent in these localities, but it may vary in its amount, and even collect in the serous cavities, and there may be general anasarca. But puffiness about the face is never absent. The pulse, small, hard, thready, quick, is, in some cases, particularly when eclampsia is imminent, almost imperceptible. Finally, there may be hemorrhages, epistaxis, hæmaturia. Thirst is excessive, digestive disturbances are very pronounced, and may be accompanied by pain in the epigastric region, and alternately obstinate constipation or a persistent diarrhœa. Next the respiratory functions are more or less disturbed, there is dyspnoea, cough, and lastly neuralgic pains appear, cephalalgia, indistinct vision even to blindness, stupidity and deafness. These last symptoms generally announce eclampsia, but they are often slightly pronounced, and albuminuria may pass unperceived if the urine is not carefully examined.

This is, indeed, a precaution that should be taken in all pregnant women, particularly primiparæ. The examination should be repeated at intervals, above all at the end of pregnancy, for at this time albuminuria is most likely to show itself, although it sometimes appears earlier. Prestat reports cases in second month, Bach in sixth week, Cazeaux at four months, Cohen and Peter at five months. As a general rule it appears sooner in primiparæ than in multiparæ. Another reason for examining the urine at frequent intervals, is that the quantity of albumin which may be found is variable, not only from one day to another, but from morning to evening. Albuminuria may disappear completely for a time to reappear again in greater quantity. Its duration may be very transient, sometimes only for a few days or hours but more often for five or six weeks, increasing up to the time of confinement, to disappear entirely in three or four weeks after labor. This is not always the case, and we have seen it once persist after confinement. Tarnier has seen it last fifteen months.

We confined, six months ago, a patient in whom albuminuria still persists. Finally, albuminuria alone may kill the patient, as observations show.

The greater the albuminuria, the more quickly will pregnancy be interrupted.

In the twenty-eight cases cited above from Hoffmeier, only ten went to full term. In eight of these the pregnancy was interrupted in the ninth month (the Germans count pregnancy by the ten lunar months), and in nine at a time when the fœtus was not viable; and of eighteen women who died, five went to the end of their pregnancy; in five pregnancy was interrupted in the ninth, or from the ninth to the tenth month; three before the beginning of the ninth month.

Of forty-five cases of pregnancy with nephritis: pregnancies going to term, fifteen; premature confinements, thirteen; abortions, seventeen.

#### ALBUMINURIA OF LABOR.

Under this name, we understand not only albuminuria recognized during labor, but, according to Hypolitte, Peter, Dumas, Cassin, albuminuria of the two or three days which immediately precede labor. It appears essentially dependent on this act, begins and ends with it, and its duration and intensity are often proportionate to the duration of labor. Petit has shown that if Peter's theory can fully explain all the particulars of albuminuria of pregnancy, it is not so in albuminuria of labor, and, whilst adopting in great part the ideas of his teacher, he thus modifies Peter's theory:

"*A priori* one would think that expulsive efforts alone are capable of congesting the kidney enough to cause filtration of the urine, but if we consider what takes place in the part of the abdominal circulation during dilatation, we will easily realize that this organ must undergo, at the same time with each uterine contraction, a certain degree of hyperæmia, capable also, although in a less degree, of producing the same result. The uterine vessels, arteries and veins, acquire an extreme development during pregnancy; the uterine circulation is interrupted more or less completely in the uterine walls during a uterine contraction. The enormous quantity of blood brought continuously by the utero-ovarian arteries ceases at each uterine pain, to find a free flow through the uterus. There results then, by a mechanism somewhat analogous to that of the hydraulic ram, an increased pressure in the portion of these arteries which remain permeable and also in the trunks from which they spring.

"The utero-ovarian arteries arise from the antero-lateral part of the abdominal aorta, a short distance from the origin of the renal arteries, and at times they arise from the renal arteries themselves. It is then in the latter, as well as in the kidney, that this increased pressure is felt soonest and strongest. But while it shuts off the passage of arterial blood toward the uterus, each uterine contraction presses out in some way the engorged uterine blood, and accelerates the return utero-ovarian circulation: again, the abnormal distension of the trunks to which these veins lead, *i.e.*, the part of the inferior vena cava, near the opening of the emulgent veins,



or some of the emulgent veins themselves, hinders the course of the blood which returns to the kidneys; and venous stasis in the organs results, *i.e.*, a condition favorable to the production of albuminuria. If these views are correct, uterine contraction exerts a pressure toward the kidney from two sides at once: through the arteries by increasing arterial tension, through the veins, by increasing venous pressure; and we perceive how this arterial tension, persisting for a long time, determines the passage of albumin into the urine; above all if we admit with Peter that there exists physiologically, by the fact of pregnancy alone, a functional hyperæmia of the kidney.

Finally, Peter believes that the abdominal muscles have a part in this pressure. As to the notable increase in the albumin which he has demonstrated in the first urine passed after the birth of the fœtus, Petit explains this by the fact that, "accustomed to work during pregnancy, under a gradually increasing pressure, of which they are suddenly deprived, the kidneys find themselves exposed to an intense congestion."

*Frequency.*—Albuminuria of labor is much more frequent than that of pregnancy, and it has been met with by Blot 1 in 5; Petit 1 in 4.8; Hypolitte 1 in 4.23; Litzmann 40.78 per cent. Mörické 37. per cent.

Age and primiparity play an important part: thus Cassin has found, in 427 cases, 197 primiparæ, 67 or 34 per cent; 250 multiparæ, 42 or 16 per cent.

*Number of Pregnancies.*

|     |                                  |   |   |   |   |   |                |
|-----|----------------------------------|---|---|---|---|---|----------------|
| 143 | II. paræ,                        | . | . | . | . | . | 25 = 1 in 5.68 |
| 66  | III. "                           | . | . | . | . | . | 9 = 1 " 7.3    |
| 12  | IV. "                            | . | . | . | . | . | 3 = 1 " 4      |
| 13  | V. "                             | . | . | . | . | . | 1 = 1 " 13     |
| 4   | VI. "                            | . | . | . | . | . | 0              |
| 7   | VII. "                           | . | . | . | . | . | 2 = 1 " 3.5    |
| 5   | having had more than 7 children, | . | . | . | . | . | 2 = 1 " 2.5    |

*Age.*

|     |                      |   |   |   |   |              |
|-----|----------------------|---|---|---|---|--------------|
| 9   | less than 18 years,  | . | . | . | . | 5 = 1 in 1.8 |
| 142 | from 18 to 24 years, | . | . | . | . | 43 = 1 " 3.3 |
| 37  | " 24 " 30 "          | . | . | . | . | 15 = 1 " 2.4 |
| 7   | more than 30 "       | . | . | . | . | 4 = 1 " 1.6  |

The difference of the length of labor is very marked; less, however, than would be supposed. Thus, according to Cassin:

|  | Av. length of labor. |
|--|----------------------|
| Primiparæ, albuminuric, 31; vertex presentation L.O.A. | 17½ hours.           |
| non-albuminuric, . . . . "                             | 12 "                 |
| albuminuric, . . . . R.O.P.                            | 12 "                 |
| non-albuminuric, . . . . "                             | 16 to 17 "           |
| Multiparæ, albuminuric, 31 . . . . L.O.A.              | 9½ "                 |
| non-albuminuric, . . . . "                             | 7 "                  |
| albuminuric, . . . . R.O.P.                            | 18½ "                |
| non-albuminuric, . . . . "                             | 9 "                  |

In our opinion this table is not of great value, because it is in positive contradiction to facts daily observed.

Presentations in R. O. P. would give, if one refers to the tables of Cassin, a duration of labor much greater in multiparæ than in primiparæ, but the contrary is true. Indeed, intervention is more frequent in primiparæ than in multiparæ; but even taking into account this intervention, the duration of labor is not comparable in the two cases. It is the same of dystocia, of which Cassin does not describe the nature.

In 338 women not albuminuric, there were 12 cases of dystocia, or 3.5 per cent.

In 109 women albuminuric, there were 18 cases of dystocia or 16.5 per cent. Albuminuria, in turn, predisposes to hemorrhage. Thus, from Casin:

In 338 women not albuminuric, there were 26 cases of hemorrhage.

In 109 women albuminuric, there were 23 cases of hemorrhage.

We note finally, according to Rayer, Blot, Imbert Goubeyre, Molas, etc., that these hemorrhages, generally uterine, manifest themselves particularly at the time of delivery, and may be met with in other organs, the liver, brain, lungs and bladder.

Although we have insisted at length on the frequency of œdema and dropsy, it is not to be believed that there is a constant and absolute relation between œdema and albuminuria; because, on the one hand, it may be absolutely absent, when women are albuminuric, according to the researches of Blot, and the cases we have cited in our thesis of 1872, and, on the other hand, œdema exists often in pregnant women, without a trace of albumin in the urine, and this fact has been demonstrated without a doubt by Devilliers and Regnault.

The last point to be noted is the relation which exists between albuminuria and eclampsia, and, without encroaching on the following chapters, which are devoted to eclampsia, there is a statement one can make almost absolutely,—we say almost, because there are some exceptions. This is the statement: “If all albuminuric cases *are not* eclamptic, all eclamptic patients *are* albuminuric.”

Peter does not admit this. It follows, however, from these statistics:

|               |       |                        | Albu. | Non-albu. |
|---------------|-------|------------------------|-------|-----------|
| Lever,        | in    | 14 cases of eclampsia, | 13    | 1         |
| Brummerstadt, | “ 135 | “ “ “                  | 106   | 29        |
| Miezkowski,   | “ 50  | “ “ “                  | 46    | 4         |
| Staude,       | “ 40  | “ “ “                  | 32    | 8         |
| Macdonald,    | “ 9   | “ “ “                  | 8     | 1         |

Depaul has met in his private practice and in that of his colleagues, by whom he was called in consultation, twenty cases where he did not find albumin, and we can add cases of Trousseau, Leuret, P. Dubois, Imbert Goubeyre, Mascarel, L'huillier, Schroeder, Trelat, Spiegelberg, Davis, Hartmann, Hicks, Osborn, Van du Meersch, Dohrn, Fabre, etc.



These cases, although exceptional, tend to increase, and they justify our assertion. The frequency of the occurrence of eclampsia and albuminuria has been noted by all authors: Blot in 41, albuminuric 7 times; Stoltz in 7, 1; Devilliers in 20, 11; Mayer in 63, 7; Litzmann in 13, 5; Bräun in 35, 6; Imbert Goubeyre in 159, 94; Hubert du Louvain in 135, 36; Rosenstein in 40, 10; Hoffmeier in 30, 10; Macdonald in 5, 5.

The two tables reported in our thesis were furnished us by :

|                      | Labors. | Eclampsia. | No albuminuria. |
|----------------------|---------|------------|-----------------|
| Clinic, . . . . .    | 30,283  | 133        | 4 only.         |
| Maternity, . . . . . |         | 54         | 2 "             |

As albuminuria, so eclampsia is more frequent during labor than during pregnancy, and there is here also a direct relation between eclampsia and albuminuria. Eclampsia in some cases may appear early, most frequently, however, during the seventh or ninth month, above all during the few days or hours which precede labor, but it may come also after labor—thus:

|                       | Cases. | During Pregnancy. | During Labor. | After Labor. |
|-----------------------|--------|-------------------|---------------|--------------|
| Jacquemier, . . . . . | 197    | 53                | 59            | 85           |
| Jaccoud, . . . . .    | 47     | 18                | 20            | 8            |
| Braün, . . . . .      | 44     | 12                | 21            | 11           |
| Wieger, . . . . .     | 455    | 109               | 235           | 111          |
| Scanzoni, . . . . .   | 28     | 2                 | 23            | 3            |
| Pajot, . . . . .      | 200    | 60                | 100           | 40           |

*Diagnosis.*—This depends on two conditions: 1st. To establish the fact of albuminuria. The examination of the urine leaves no doubt; 2d. To find out whether the albuminuria is dependent upon pregnancy, or upon other causes. Here the sign given by Bouchard and Cassin may be of great importance, coagulation of albumin indicating, according to them, a renal lesion; the non-retractile coagulum indicates a transient albuminuria, such as we observe in severe forms of alcoholism, etc. The importance of this sign is understood (if further observations confirm it) not only from a diagnostic, but also from a prognostic standpoint.

*Prognosis.*—The disease may be always considered grave, because, if a number of women are cured, there are a great many who die, either from the disease itself or from the complications, and we have seen how the albuminuria of pregnancy can become the starting point of a chronic nephritis.

The prognosis will vary according to the nature, the duration, more or less long, of urinary troubles, their intensity, the existence or not of kidney lesions and the morbid cause, the severity of the complications.

The prognosis is particularly grave when the albuminuria exists previous to pregnancy, although we make an exception in case of albumin-

uria of labor and of eclampsia. Hoffmeier, in 48 cases of chronic nephritis, has noted death 18 times. In 104 cases of eclampsia death has resulted in 39 per cent.; Rosenstein 32.9 per cent.; Devilliers in 11 out of 20 cases.

Albuminuria is no less fatal to the fœtus than to the mother, and even excluding eclampsia, which has an extremely bad prognosis for the child, albuminuria is none the less one of the causes which threatens seriously the life of the child. On the one hand, indeed, it may die from the disease itself, and again, albuminuria being a frequent cause of abortion and premature labor, it compromises certainly the life of the child, or subjects it to all those untoward circumstances in which the child finds itself when born before term.

Blot reports 6 cases of premature labor. Rayer, Barker, Hubert de Louvain admit the frequency of abortion and premature labor. The same is true of Braün, 80 per cent. Hoffmeier in 45 cases of nephritis has only seen 15 cases go to term, 13 premature labors, 17 abortions; and in 33 cases of simple nephritis, 20 children died, 13 lived; in 104 cases of nephritis with eclampsia 62 children died, 46 lived, *i.e.*, in a total of 137 cases, 82 children died, 61 lived.

• Finally, albuminuria, aside from post-partum hemorrhage, predisposes the patient to puerperal complications, (peritonitis, septicæmia, puerperal mania, etc.,) and we readily see the importance of treatment.

*Treatment.*—Considering the number of causes of albuminuria and the different theories which have been given to it, one can understand, as Guéneau de Mussy has said, how absurd it would be to seek for a uniform treatment for albuminuria; but it is not at all the same of the albuminuria of pregnancy. This, indeed, presents peculiar characteristics, by the fact that it is intimately dependent upon pregnancy, by its frequent relation to eclampsia, by the influence which it exercises on the child; by those circumstances, in a word, under which it is produced. The increase in the quantity of blood, the alterations in the pregnant woman, the changes which take place in the circulation, the particular tendency to congestion which the woman presents during gestation, seem, *a priori*, to indicate the direction this treatment should take.

Diminish, combat, suppress, if you can, this tendency to renal congestion, bring the blood into its normal condition; these are the two great indications which should govern our treatment of albuminuria gravidarum.

Venesection fills better than any other treatment the first indication, and here we agree with Peter, our teacher and friend. We cannot go as far as he does, in admitting that the greater frequency of complications, and of eclampsia, in the last thirty years, depends on the fact that venesection in pregnant women has been lost sight of. But it cannot be denied that venesection, in a great many cases, renders wonderful service, say 4500 grains, and, as we have already said, we have seen Beau derive excel-



lent results from it. We prefer general blood-letting to local (leeches, cupping,) which do not appear to us without inconveniences, in œdematous and greatly swollen women. Should we make use of it in every case? No, for if bleeding has its advantages, it also has its disadvantages, and it may, in certain women, even when it is moderate, cause a feeble state which cannot be without danger to mother and child. Venesection, indeed, withdraws blood-globules from the pregnant woman who has less than the normal amount. Finally, there are cases where it is impossible to use it. We have at this moment a case in mind. The woman in question is pregnant for the fourth time, and, beside a slight amount of albumen, has hemorrhages, dependent, probably, on a faulty insertion of the placenta.

The patient has been pregnant for eight and one-half months, and has already had, at intervals of forty-eight hours, two hemorrhages, slight it is true, but dependent upon placenta prævia. In presence of the possibility of a future severe hemorrhage, we do not dare to weaken the patient by blood-letting, inasmuch as these two spontaneous hemorrhages have not led to any amelioration of the condition of the patient.

Further, before bleeding, we should always make use of purgatives, in a repeated and constant manner. We try to obtain, by means of purgatives, a serous intestinal discharge, which withdraws from the woman a larger quantity of serum, leaving behind the blood-globules, and therefore we prefer the saline purgatives, sulphate of soda, sulpho-vinate of soda, Seidlitz powders, Carlsbad salts, mineral purgatives, Seidlitz, Birminstoff, Pullna, Hunyadi Janos, and they are employed by us every day in doses of a glass, or at least every other day; in a word, we try to produce a revulsive effect on the intestine. But, in turn, we discard all revulsives applied to the skin, in particular sinapisms and blisters; for several times we have seen gangrenous patches produced where they had been applied, and this should not surprise us when we consider the changes of nutrition in the œdematous, infiltrated, and distended tissue.

We try, further, in all our pregnant women, to build up the constitution, by tonics, iron, quinine, wine, etc. But we have little faith in the action of these agents in albuminuria, and they are excluded by the treatment which we will recommend shortly.

It is the same with diuretics, which to us, as to Jaccoud, appear perhaps more hurtful than useful; with diaphoretics which are inefficient. As for tannin and iodide of potash, they are simply adjuvants, and it is the following treatment, in our opinion, that it is best to use, for it is by far superior to all others. This is the milk diet recommended by Tarnier:

- “ 1st day, a quart of milk with two portions of food.  
 “ 2d day, two quarts “ “ one portion “ “  
 “ 3d day, three “ “ “  $\frac{1}{2}$  “ “ “

“4th day, and following days, four quarts of milk, or milk *ad libitum* without other food, without other drink.

“In the severe cases, if prodromata of eclampsia appear, put the patient at once on three or four quarts of milk per day.

“The influence of the milk diet is never slow in manifesting itself, and in eight or fifteen days after the commencement of the treatment, the albuminuria is diminished very considerably or even cured.”

More radical than Tarnier, we put the patient at once, and in all cases, on a milk diet, without limiting the dose which she ought to take, and prohibit immediately all other kinds of food or drink.

To accustom the patient gradually to a milk diet, (which ought to be taken pure, not boiled, no sugar, but warm or cold as desired—we prefer it cold), the first day they may take a coffee-cupful every half hour or three quarters of an hour or more. The coffee-cup is replaced the next day or the day after by a tea-cup, and when the patient becomes accustomed to milk, she may take it in bowls-full, day or night, when she feels inclined.

Since we have employed this treatment, we have seen eleven cases of albuminuria more or less grave; in ten cases we have seen it entirely successful. Albuminuria, if it has not entirely disappeared, at least diminishes in enormous proportions, and in ten cases the women have gone to term and been confined, without eclampsia, of living children. Twice only have we failed; in one case the woman was syphilitic, and the albuminuria had persisted six months after the confinement. There was no eclampsia. The woman was delivered at seven months of a dead child, having in it and on its placenta syphilitic lesions.

In the other case the milk diet completely failed. It is true that the patient bore it badly, it was not taken continuously, and consequently the method was imperfectly used. But for successful treatment, it is necessary that it should be administered for a certain time, that it should be done in a rigorous and exclusive manner, and that it should be commenced as early as possible.

But this is not always possible, and one meets, unfortunately, in certain cases an irresistible repugnance. We have seen such a case in consultation, and were obliged to resort to venesection, and to purgatives. The woman was seized, nevertheless, with eclampsia, which was cured by chloroform and chloral. One need not fear to continue the milk diet for a long time, even after the disappearance of the albuminuria, for this disappearance may be momentary. Besides, the patient once accustomed to the diet, it is well borne, and we have continued it for three months in the case of one of our patients, who was delivered at term, without eclampsia, of a well nourished child. The albuminuria only disappeared eight days after confinement.

There remains the question of the artificial interruption of pregnancy.



This question was raised for the first time by Tarnier, in case of albuminuria gravidarum, in the notes which he added to the treatise of Cazeaux.

“All accoucheurs,” says Tarnier, “are agreed that labor is a favorable circumstance in eclampsia. We might ask them if, to arrest albuminuria of pregnancy, and to prevent possible convulsions, one ought not to consider the induction of premature labor. This question has generally been answered in the negative. Indeed, observations are not wanting to demonstrate that after suitable treatment, above all after the use of venesection, the albuminuria may diminish, that eclampsia, even after having appeared, may disappear, and it is not rare to see under these circumstances, the pregnancy continue its course, and terminate in a normal confinement. These observations, together with the fact that the women with marked albuminuria do not necessarily have eclampsia, indicate, that one ought only to consider the question of premature labor as preventive treatment in eclampsia with great caution. We believe, however, that the induction of premature labor may, in exceptional cases, render some service. Suppose, at the outset, a woman eight months pregnant, albuminuric, threatened with eclampsia, in whom labor commences prematurely and spontaneously; certainly this last circumstance would appear to the majority of accoucheurs favorable, and nothing would be tried to stop the labor. Admit this, and one will be very near accepting the induction of premature labor. One must not believe, on the other hand, that eclampsia awaits the appearance of labor to declare itself, and that complications will arise at the same time with labor. Often, on the contrary, eclampsia appears before the end of pregnancy, labor only coming on afterward; here the prognosis is still less grave, as the labor is more advanced. For all these reasons, we believe that we should not discard absolutely the induction of premature labor, but in order that we may feel authorized to propose this operation, we should require that the following conditions should coexist:

“1. That pregnancy has reached the end of the eighth month, in order that the new-born child can be raised without too great risk or difficulty.

“2. That the albuminuria should have reached a certain degree, or that the patient should suffer from some prodromata of eclampsia.

“3. That the woman should be a primipara, or that she should have suffered from eclampsia in a previous pregnancy.

“4. That the medical treatment has proved inefficient, particularly venesection.

“Under these conditions, the induction of premature labor seems to me rational, and I am disposed to adopt it, unless further facts give a decided contradiction to my present way of thinking.”

We do not know whether Tarnier would still persist in these views since he has adopted a milk diet and such wonderful results have been

obtained from it; but they have been accepted by Möricke, who goes further than Tarnier, and, considering all treatment as useless, strongly advises the induction of premature labor; also Schroeder, who admits the induction of labor; and Richardson, who wishes that all treatment should be first tried, and when nothing diminishes the quantity of albumin, and when the quantity of urine becomes less and less marked, that the induction of premature labor should be practised; Löhlein, Odebrecht, Martin, who wait for some evidence of eclampsia.

We are opposed to Tarnier, and these other authorities, and we discard the question of premature labor for the following reasons:

1. The success which we have had with the milk diet is such that we believe all other treatment useless, particularly when the milk diet is carefully and sufficiently observed during pregnancy, and soon enough to produce its effects.

2. When the albuminuria is slight, the interruption of pregnancy appears useless, the gravity of the accidents which occur in pregnant women, who are at the same time albuminuric, being, in general, in direct relation with the amount of albumin.

3. When albuminuria produces serious symptoms, it depends upon, not only pregnancy, but also a serious renal affection, which may progress after confinement, and cause, as the observations of Hoffmeier prove, the death of the patient.

4. Labor, as we have seen, has a marked influence in the production of albuminuria and of eclampsia; and as the induction of premature labor, and with still more reason abortion, always requires a certain length of time, the result may be that during this time the patient may be placed in a condition still more unfavorable than that in which she already is, by the mere fact of the albuminuria from which she is suffering.

Finally, although it is true that, in a number of cases, albuminuria has disappeared after the death of the fœtus, and the real cessation of pregnancy, there are many other instances where it has reappeared at the onset of labor, accompanied or not, by eclampsia.

But, although we reject the induction of labor, and still more of abortion, it is not the same with interference after labor has once come on. In this case nature herself shows the way, and as soon as possible without danger to the mother, we hasten to end the labor.

But we never interfere before dilatation of the cervix is complete, and if the contractions are energetic, and the woman a multipara, then we should leave the case to nature. If, on the contrary, the woman is a primipara, and labor proceeds slowly, and the contractions are feeble, as soon as the dilatation is complete or the cervix largely dilated and dilatable, we end the labor by forceps or by version. It is finally a fact, confirmed by all accoucheurs, that labor generally proceeds rapidly in albuminuric



women, except in cases of dystocia, and this gives the child a better chance of surviving.

### ECLAMPSIA.

Eclampsia may declare itself during pregnancy, labor or the puerperal state. Authorities have been accustomed to describe it in the portion of their works which treats of Dystocia. We believe it more rational to arrange it among the diseases of pregnancy, on account of the intimate relations which exist between albuminuria and eclampsia. As we have said, if all albuminuric women are not eclamptic, all eclamptic women, with few exceptions, are albuminuric, and eclampsia is only one of the manifestations of albuminuria in women during pregnancy, labor or the puerperal state. We think that it is of advantage not to separate in our study these two diseases, of which one is the immediate consequence of the other.

Eclampsia by itself does not impede labor, and if it is classified by authors with dystocia, it is not as an obstacle to delivery; it is an accident that endangers the life of mother and child. Although eclampsia is more alarming, generally, after confinement, the risk which the mother and child incur during pregnancy are none the less serious, and it ought, as Cazeaux says, on account of the seriousness and nature of the convulsions, to be placed at the head of the diseases of pregnant women. It is one of the most alarming complications of albuminuria gravidarum, and as such it should be studied immediately after albuminuria.

*Definition.*—Under the name of puerperal convulsions, acute epilepsy, renal spasm, renal epilepsy, uræmic convulsions, acute cerebral uræmia, cerebral uræmia, cerebral albuminuria, epileptic dystocia, convulsive dystocia, eclampsia is described as an acute disease coming on during pregnancy, labor or the puerperal state, and characterized by a series of tonic and clonic convulsions, affecting at first the voluntary muscles, and finally extending to the involuntary muscles, accompanied by a complete loss of consciousness, and ending by a period of coma or sleep, which may result in cure or death.

*Frequency.*—As all authorities agree in regarding eclampsia as a relatively rare accident, it is difficult, according to their statistics, to establish an approximate estimate even, because the frequency of eclampsia appears to vary, not only from the statistics of certain authors, but also even in different countries, and in different years. Moreover, if eclampsia appears more often in hospital than in private practice, it is because the cases are collected from different parts of the town, and brought to the hospital, which necessarily increases hospital statistics. Here are the figures resulting from the practice in different countries:

|             |   |   |   |                                    |
|-------------|---|---|---|------------------------------------|
| In France,  | . | . | . | 457 cases in 131,262 confinements. |
| England,    | . | . | . | 161 " " 66,744 "                   |
| Belgium,    | . | . | . | 13 " " 1,750 "                     |
| Switzerland | . | . | . | 11 " " 6,139 "                     |
| Sweden      | . | . | . | 3 " " 502 "                        |
| Russia,     | . | . | . | 10 " " 2,014 "                     |
| Germany,    | . | . | . | 76 " " 50,558 "                    |
|             |   |   |   | 731 " " 258,969 "                  |

or about 1 case in 354 confinements. Peter has proved that the cases of eclampsia are becoming more and more frequent; indeed, taking the figures given by Depaul in his clinic, and which represent all the cases observed in the hospital from 1834 to 1871, and dividing them into periods of ten years, Peter has arrived at the following result:

|                             |          |
|-----------------------------|----------|
| From 1834 to 1843 . . . . . | 17 cases |
| 1844 " 1853 . . . . .       | 27 "     |
| 1853 " 1863 . . . . .       | 35 "     |
| 1863 " 1871 . . . . .       | 54 "     |

He thinks this result is due to the fact, that the habit of bleeding pregnant women who suffer from this complication has been abandoned. According to certain authors, finally, eclampsia becomes more and more frequent as we approach the equator. Barquissau quotes in connection with this, the personal observations of de Mahy, who has stated that at Bourbon eclampsia is frequently observed, and that it occurs more often in the higher classes and among the negroes than in the middle classes. Eclampsia, as we have seen, may appear at any time during pregnancy, labor or the puerperal state; but if authorities agree that it occurs by far most frequently at the moment of labor, they are not of the same opinion concerning its frequency during pregnancy and the puerperal state. Thus, while the majority of authors arrange the order of frequency as follows: Labor, puerperal state, pregnancy; Bailly proposes to substitute the following order: Pregnancy, labor, puerperal state. Our own opinion would lead us to arrange the order of frequency as follows: Labor, pregnancy, puerperal state.

In reality, there is only here a misunderstanding, and the difference of opinion is not as great as would seem at first sight. We consider eclampsia as closely allied to albuminuria. Now all authors agree on this point: that the albuminuria of labor is more frequent than the albuminuria of pregnancy, that it is at the same time more serious. It is not remarkable then that eclampsia shows itself more frequently during labor. But, on the other hand, under the name of albuminuria of labor, authorities generally mean that which appears during the two or three days before labor, days which correspond to the period which Millot calls the period of secret labor, and these days belong as much to pregnancy as to labor.

As a rule, further, labor comes on at the end of a certain number of



eclamptic attacks; and lastly, delivery does not always suppress these attacks, which are then seen to return either in greater or less numbers than before delivery. Hence the differences of opinion. Group the attacks together, and the eclampsia of labor becomes the much more frequent. If we separate, on the contrary, the three periods distinctly, Bailly gets nearer to the truth, which appears to us to be the division which we have given--Labor, pregnancy, puerperal state.

This seems to be the result of the various statistics in the following table, which we have taken from Wiegner.

|                                 | Before and during labor. |                            | Puerperium.       |                    | Total number.      |     |
|---------------------------------|--------------------------|----------------------------|-------------------|--------------------|--------------------|-----|
|                                 | Before labor.            | During labor.              | During 3d. stage. | During puerperium. |                    |     |
| Collins. . . . .                | 28                       |                            | 2                 |                    | 30                 |     |
| MacClintock . . . . .           | 8                        |                            | 5                 |                    | 13                 |     |
| Rose . . . . .                  | 8                        |                            | 4                 |                    | 12                 |     |
|                                 | Before labor.            | During labor.              |                   |                    |                    |     |
| Mauriceau . . . . .             | 7                        | 19                         | 16                |                    | 42                 |     |
| Jaccoud . . . . .               | 18                       | 20                         | 9                 |                    | 47                 |     |
| Velpeau . . . . .               | 7                        | 5                          | 9                 |                    | 21                 |     |
| Desjardin . . . . .             | 0                        | 5                          | 2                 |                    | 7                  |     |
| Lever . . . . .                 | 3                        | 10                         | 2                 |                    | 15                 |     |
| Ramsbotham . . . . .            | 17                       | 28                         | 14                |                    | 59                 |     |
|                                 | Before labor.            | During 1st stage of labor. | During expulsion. | During 3d. stage.  | During puerperium. |     |
| Schwartz . . . . .              | 2                        | 3                          | 5                 |                    | 1                  | 11  |
| Arneth . . . . .                | 1                        | 7                          | 3                 |                    | 2                  | 13  |
| Lachapelle . . . . .            | 4                        | 4                          | 4                 | 3                  | 1                  | 16  |
| Braun . . . . .                 | 12                       | 11                         | 10                | 3                  | 8                  | 44  |
| Devilliers and }<br>Regnault. } | 2                        | 6                          | 2                 | 0                  | 1                  | 11  |
| Blot . . . . .                  | 1                        | 3                          | 2                 | 1                  |                    | 7   |
| Divers . . . . .                | 36                       | 21 (17) <sup>1</sup>       | 7                 | 4                  | 23                 | 108 |

Thus, in a total of 455 cases of eclampsia, 109 occurred before labor, 236 during labor and 110 after the birth of the child.

Jacquemier found 99 cases during labor, 53 cases during pregnancy, 45 cases after labor. Depaul confines himself to cases before and after labor, and in 133 cases there were 106 cases before labor, and 77 after labor. Of the 77 cases, in 9 only did the attacks appear first after labor, without giving any signs of eclampsia before labor.

In 62 cases there were attacks before labor which continued after. In 11 cases the attacks, which existed before and during labor, were not produced after labor. The other cases refer to women brought to the Clinic, without information concerning the possible attacks before labor. The following then are the figures:

In 133 cases attacks before labor, 106; after labor, 77; first commene-

<sup>1</sup> The period of labor is not specified in these 17 cases.

ing after labor 9; ceasing after labor, 11; before, during, and after labor, 62.

It is rare before the sixth month; although Danyau has seen a case in the sixth week; Bach in the sixth week; Prestat in the second week; Morel d'Argentan in the fourth month; Carville in the fifth month; Charpentier in the fifth month; Cohen fifth and sixth month; Devilliers and Regnault sixth month. The rule is that eclampsia manifests itself from the seventh to the ninth month, particularly a few days before labor.

As to the appearance of eclampsia after delivery, as a rule, the attacks are only the prolongation of those which existed during pregnancy, but even then the attacks may be immediate or a few hours after confinement. We have seen one case in which the attacks came on after a lapse of twenty-four hours. When the attacks come on for the first time after labor, they may be at a greater or less interval after labor. Wieger in 44 cases has noted the following in regard to commencement: At the end of 4 hours, 8; 12 hours, 2; 24 hours, 1; 48 hours, 3; 4 days, 2; 10 days, 1. The invasion may, however, be much more slow. Thus: Ramsbotham has seen it 7, 9, 10, 18 days after labor; Ducheck at 10 and 14 days after labor. The women remained hemiplegic.

Cazeaux has seen it 8, 10, 12 days after labor; Charpentier at 17 and 19 days; Tissier at 17 days; Bailly at 29 days; Simpson at 8 weeks. (Died.)

In 1872, we analyzed 133 cases collected in the Clinic by Dr. De Soyre, and these are the figures for the time of pregnancy at which the attacks showed themselves.

|                                   |      |                                   |        |
|-----------------------------------|------|-----------------------------------|--------|
| Primiparæ eclamptic before labor. |      | Multiparæ eclamptic before labor. |        |
| At 5 months, . . . . . 2          | } 60 | At 6 months, . . . . . 1          | } 20   |
| “ 5½ “ . . . . . 1                |      | “ 6½ “ . . . . . 1                |        |
| “ 6 “ . . . . . 6                 |      | “ 7 “ . . . . . 5                 |        |
| “ 6½ “ . . . . . 2                |      | “ 7½ “ . . . . . 3                |        |
| “ 7 “ . . . . . 6                 |      | “ 8 “ . . . . . 6                 |        |
| “ 7½ “ . . . . . 3                |      | “ 8½ “ . . . . . 4                |        |
| “ 8 “ . . . . . 19                |      | Multiparæ eclamptic at term, 10   |        |
| “ 8½ “ . . . . . 20               |      |                                   |        |
| “ 8¾ “ . . . . . 1                |      |                                   |        |
| Primiparæ eclamptic at term, 43   |      |                                   | Total, |

*Causes.*—A great fact governing all causes of eclampsia, is the almost constant presence of albumin in the urine of the patient. Excepting, indeed, a certain number of cases of albuminuria, which we cited above, albumin is always found in the urine of eclamptic cases, and these cases are too few in number, compared with the others, not to be taken as exceptions, and still, as Cazeaux says, all are not absolutely authentic.

The quantity of albumin found in the urine increases a great deal during the attack, and diminishes usually afterward.

Aside from this great primary cause, authors have noted the following:

*Manner of Living.*—Young mothers are more subject to it than others,



but, as Wieger observes, poverty may contribute to it, particularly grief, and the more so as the primiparæ are young mothers.

*Epidemics.*—This inference is admitted by Wieger, Mende and Mansell, who base their judgment on the frequency of eclampsia at certain times, as observed by authors; but the epidemic influence of eclampsia seems to me to belong in the same category as the influence of seasons and imitation.

*Age.*—This does not appear to have any great influence as a cause, although it is between twenty and thirty years that eclampsia is most frequent, but this is not surprising, since it is at this age that women are more likely to become pregnant.

In 148 cases, Wieger found 37 cases from 15 to 20; 63 cases from 20 to 25; 26 cases from 25 to 30; 20 cases from 30 to 40, and 2 cases from 40 to 46.

## PRIMIPARITY.

This is, without doubt, the most frequent predisposing cause. Most authors will agree in this. Thus

|                                    | Primiparæ. | Multiparæ. | Total. |
|------------------------------------|------------|------------|--------|
| Arneth, . . . . .                  | 8          | 3          | 11     |
| Blot, . . . . .                    | 6          | 1          | 7      |
| Braun, . . . . .                   | 38         | 6          | 44     |
| Chailly, . . . . .                 | 9          | 9          | 18     |
| Clarke, . . . . .                  | 16         | 3          | 19     |
| Collins, . . . . .                 | 73         | 12         | 85     |
| Devilliers and Regnault, . . . . . | 10         | 2          | 12     |
| Jacquemier, . . . . .              | 13         | 4          | 17     |
| Johns, . . . . .                   | 19         | 2          | 21     |
| Robert Lee, . . . . .              | 30         | 16         | 46     |
| Lever, . . . . .                   | 8          | 6          | 14     |
| MacClintock and Hardy, . . . . .   | 10         | 3          | 13     |
| Merriman, . . . . .                | 36         | 12         | 48     |
| F. Ramsbotham, . . . . .           | 43         | 14         | 57     |
| J. Ramsbotham, . . . . .           | 15         | 7          | 22     |
| Colles Rose, . . . . .             | 9          | 3          | 12     |
| Divers, . . . . .                  | 53         | 23         | 76     |
| Depaul, . . . . .                  | 103        | 30         | 133    |
| Scanzoni, . . . . .                | 23         | 5          | 28     |
| Totals, . . . . .                  | 522        | 161        | 683    |

161 multiparæ against 522 primiparæ, or 3.22 primiparæ to 1 multipara.

This proportion would be too low for Madame Lachapelle, who puts it as high as 7 primiparæ to 1 multipara. Usually women who have had eclampsia in their first confinement, are secured from having it in subsequent confinements, but it is not always so, for Collins, Devilliers, Schwartz, Johns, Braun, Dewees, Ramsbotham, Litzmann, have reported cases.

This is not surprising. If we admit the relation of albuminuria to eclampsia, albuminuria does not always appear in subsequent confinements, and the women escape eclampsia; if, on the contrary, albuminuria does reappear, nothing is more natural than to have eclampsia also. This explains cases apparently irregular, in which the first pregnancy, being complicated by eclampsia, a second is passed without any accidents, which, however, appeared in a subsequent pregnancy. Cases are seen in which a woman escapes eclampsia in her first confinement, and has it in her second, third, fourth and even the eleventh, as Dumont has stated.

*Distension of the Uterus.*—Along with primiparity, which acts, according to many, through the great resistance of the uterine fibres, must be placed excessive distension of the uterus dependent upon the large size of the child, twin pregnancies, hydramnios; finally, different causes whose action is much less evident, *i.e.*, erosions, fright, indigestion, and retention of urine.

*The Length of Labor.*—Labor may be prolonged by the causes given above, by mechanical causes, deformed pelvis, uterine and abdominal tumors. The influence of the length of labor in the production of eclampsia is undisputed. But eclampsia, we have seen, is produced often during pregnancy, and, when labor comes on in these cases, it was generally rapid, unless there was some mechanical obstacle; and one of the proofs that eclampsia is not always connected with labor, is, that there are a great many cases in which eclampsia, coming on during pregnancy, has not brought about confinement, which only takes place later. Most often the child dies, the eclampsia ceases, and the woman is delivered later of a dead child, changes in which are the more pronounced the greater the length of time between its death and its expulsion. We have had one case in our Clinic. The woman was confined eight days later; and to this case we can add those of Lever, Litzmann, Wegscheider, Lachapelle, Boer, Braün, Lauer, Mauer, Rodenstein, Baschwitz; and finally, Simon, Devilliers and Regnault, Blot and Wieger, have cited cases in which the eclampsia came on during pregnancy, did not bring about labor, and in which the women were delivered later of living children. In each of these cases the eclampsia was reproduced neither during labor nor after confinement.

What are then the determining causes of eclampsia? We must remember here all the causes we mentioned under albuminuria, *i.e.*, alteration of the blood, increase of blood pressure and renal lesions, etc., but if those theories account for albuminuria, they do not suffice to show why eclampsia occurs in certain cases, and why it is wanting in others, and so the aim has been to discover the true cause of eclampsia; hence the new theories which Bailly classifies under the following heads: Eclampsia is due: 1. To a structural change in the nerve centres and their envelopes; 2. A cerebro-spinal congestion; 3. Eclampsia is a neurosis, caused by a reflex



irritation of the spinal system, originating in uterine pain; 4. To a general or cerebral anæmia; 5. To a condition of the blood which renders this fluid less ready to stimulate regularly the nerve centres (uræmia, ammonæmia, urinæmia.)

Depaul and Hypolitte have endorsed these divisions of Bailly. All of them we think are open to objections more or less grave. As Cazeaux has stated, all these causes may act in producing an irritation of the nerve centres, and Scanzoni has already tried to show that this convulsive attack is due to an excitation, an irritation of the peripheral nerves, and of those of the spine or brain.

It has been shown, he says, that the sensory nerves, extending into the walls of the uterus, may at once, by irritation excited in them during pregnancy and labor, produce a reflex action on the motor nerves which are given off from the spine. Admit this, and it is no longer doubted that this reflex action, under the influence of extreme congestion, (renal hyperæmia), which may increase the excitability of the general nervous system, may go beyond its normal limits and produce contractions, convulsions, of the muscles supplied by these nerves. If the excitation produced in the sensory nerves of the uterus is not extreme, or even limited to a small part of the sensory nerves, these reflex movements will be produced in the voluntary muscles only to a very limited extent. This is confirmed every day by cramps that are observed in the lower extremities, where terminal spinal nerves are distributed. \* If the irritation increases and extends, reflex convulsions may be seen in the muscles of the trunk. This increase of sensory uterine irritation during labor may be produced by all the causes which may make traction on or compress the nervous filaments during the uterine contractions. Thus we see these convulsions occur in parturient women, in cases of mechanical obstruction to labor, which exerts on the uterus a greater force than customary; when the uterine wall is in close apposition to the child, and makes considerable pressure.

It is the same when it is an isolated part of the organ which is exposed to those causes of excitement, (inferior segment of uterus in the vicinity of the os internum.) All the causes which lessen dilatation may also provoke convulsions, partly because the inferior segment of the uterus is compressed in a marked degree by the uterine contents, and, partly, because the longitudinal fibres which produce the dilatation are exposed to increased tractions. This is one of the reasons which explain the greater frequency of eclampsia in primiparæ. Finally, as a cause favoring convulsions, we must mention spasmodic contractions of the os externum, and all those causes which produce rigidity. Moreover, extraneous causes, foreign to the mother, may produce this excessive irritability of the uterine nerves, and lead to convulsions by reflex action, *i.e.*, manual or instrumental dilatations of the cervix. The central nervous irritation may react either on the spine or brain.

As for the spine, we must consider hyperæmia of the cord and its membranes. *A priori*, it may be admitted, that the same causes which, during pregnancy and confinement, lead to congestion of the abdominal viscera, and particularly the kidneys, may produce congestion of the lower segment of the cord; and experience has shown that pregnancy is accompanied almost always by congestion in the lower part of the cord. But no doubt, hyperæmia in this part of the cord does not favor convulsions. We must admit that a woman, during pregnancy, confinement and the puerperal state, is predisposed more than in all other conditions to these convulsions. It is, however, understood that these congestions, to cause these convulsions, must not exceed a certain degree, and must not be accompanied by exudations into the medullary tissue or the arachnoid sac, for otherwise we would not have convulsions, but paralysis. Finally, no one doubts but that the medullary irritation causing convulsions must have its origin in the brain.

Eclampsia then may, according to Scanzoni, show itself in three forms: 1st. Reflex convulsions arising from the peripheral extremity of the uterine sensory nerves; 2d. Spinal convulsions arising from the direct irritation of the spinal cord, an irritation which is referred to the peripheral extremities; 3d. Cerebral convulsions, when the irritation arises in the brain, and is referred to the spinal cord.

Cazeaux says that this last form may be controverted, and, according to him, spinal irritation is always the origin of eclampsia. "It is a fact established by all physiologists, that the irritation of the cord, medulla, or tubercula quadrigemina, alone causes convulsions, while irritation of other points of the cerebrum or cerebellum produce nothing similar. Cerebral lesions may indeed destroy voluntary movements, but the involuntary contractions, those of which the excess and irregularity constitute eclampsia, are not affected. These last may still be produced by spinal irritation or of its nerves when the brain and cerebellum have been destroyed."

In 1875 Cohen of Hamburg proposed two original ideas, of which we will speak in a few words. According to him there are two kinds of eclampsia: "Uterine eclampsia, which may be produced by irritation of the uterus, referred secondarily to the brain; cerebral eclampsia, which, on the contrary, originates in the brain, and is referred secondarily to the uterus, thus causing convulsions. These two forms are found clinically. Uterine eclampsia is divided into two classes, one which is called uterine eclampsia at term, which results in phenomena which occur during labor and confinement; the other eclampsia before term, which depends upon the contact, at the end of the sixth month, between the fœtus and the inferior segment of the uterus, and on the distension and change of form which the lower uterine segment undergoes. This form will give a favorable prognosis for mother and child; the other, cerebral eclampsia, depends upon a cerebral affection, and presents some of these signs from the outset.



In this case there is either abortion or premature labor, or labor at term; and this confinement may either lead to a favorable ending of the cerebral affection, or, on the contrary, may aggravate and hasten the death of mother and child. The following are, according to him, characteristic symptoms, which enable us to differentiate these two eclampsias.

*Differential Diagnosis of Uterine and Cerebral Eclampsia.*

UTERINE ECLAMPSIA AT TERM.

1. Begins at term.
2. Each attack is accompanied by contraction of the uterus, recognized through the abdomen.
3. Eclampsia disappears with birth of child and placenta, and after uterine contractions cease.
4. Convulsions come on gradually and increase.
5. The remission resembles sleep without coma.
6. Rotation of head only in very marked cases.
7. Rarely is the protrusion of the tongue very marked, as well as the closure of the jaws.
8. Excretions rarely involuntary.
9. Dilatation of the cervix goes on continually.
10. Obstetrical intervention acts favorably, particularly in hydramnios.
11. The convulsions are always preceded by nervousness, by groans.
12. The duration rarely exceeds a day.
13. The child is born alive, the mother usually recovers.
14. Rarely in multiparæ does the os remain closed.

UTERINE ECLAMPSIA BEFORE TERM.

1. Begins at end of 6th month.
2. No true coma, no involuntary excretions, no protrusion of the tongue.
3. Caused by the descent of the child.
4. Action of narcotics rapid.

CEREBRAL ECLAMPSIA.

1. Begins at any period of pregnancy or puerperal state.
2. Each attack comes on suddenly with uterine contractions.
3. The attack may come on after labor or in the puerperal state.
4. The attack reaches its acme suddenly.
5. Coma profound; stertorous breathing.
6. Rotation of the head very marked.
7. Always protrusion of the tongue and spasmodic closure of the jaws.
8. Excretions involuntary immediately after the beginning of the attack.
9. The cervix remains closed during the attack, which lasts some hours or days; the cervix dilates suddenly.
10. Obstetrical intervention while labor is not at hand is useless.
11. No nervousness, no groans.
12. The convulsions last a long time.
13. The child generally dies, the mother often.
14. As frequently in multiparæ as in primiparæ.

1. At any period of pregnancy.
2. Cerebral symptoms very well marked.
3. Caused by Bright's disease, fright, mental emotions.
4. Narcotics often without action.

In making a division so well marked Cohen goes much too far, but, without sharing his views, one must confess that eclampsia is far from being always the same in its characteristics, and, while preserving its general characteristics, the attacks may vary in different women, or even in the same. How, on the one hand, can the attack, so frequent in some women, be explained, and so rare, on the contrary, in others? Why, in some women, does labor come on after a few attacks, while in others, who have a great many attacks, labor does not come on? Why does the child die so quickly in some cases, and in other cases survive so long? Why do certain women die after 8 or 10 attacks, and others have 30, 40, 50, 60 or 100 attacks or even more, and still live, as has been shown by Pajot and Bailly? These questions are so numerous that it is impossible to answer them definitely.

1st. *Eclampsia is due to an Alteration of the Nerve Centres and their Envelopes.*—Supported by Marchal de Calvi in 1851, this theory has against it, as Hypolitte has observed, the results of autopsies, for the lesions met with do not, as a rule, exist in the spine, the medulla, or the tubercula quadrigemina, which, according to physiologists, are alone capable of producing the convulsions. Coindet and Odier, Grisolle, Hardy and Behier, Graves, Cahours, explain the encephalopathy by hydrocephalus; Owen, Rees, Traube, as cerebral œdema due to Bright's disease, and the experiments of Munck (who injected water into the carotids, first having ligated the ureters and jugular veins), seems to confirm this view. Otto, Bidder, performing these experiments, without ligating the ureters or jugulars, have shown that the increase of pressure did not produce the convulsions, and that there must be concomitant hydræmia. It is on this fact that Traube bases his theory of cerebral œdema with subsequent acute anæmia. To explain this cerebral œdema, Traube invokes first, the hydræmia shown to exist by Andral, Gavarret, Devilliers and Regnault; and secondly, an increase of the intra-vascular pressure, due to the cardiac hypertrophy of pregnant women, and the increased tension of the cerebral vessels, produced by the pressure of the uterus on the abdominal aorta at the end of gestation.

Hypolitte says, that there are certain forms of eclampsia, which seem at first sight to justify this theory. "Those, for instance, where the urine is diminished to 1500 grains per day. This urine is concentrated, and the dropsy (œdema) diminishes generally before the cerebral complications appear. Dropsy then spreads from the lower extremities to the brain. This is the mechanical uræmia of Jaccoud; but, as Hypolitte has observed, hydrocephalus, and œdema of the brain or its membranes, far from producing excitement or twitchings, seem, on the contrary, to produce weakness. Convulsions are not the result, but paralysis."

Nevertheless, Traube's theory, if it does not apply to all cases, may at least explain a great number, for it is supported by undoubted clinical



facts, and we can not compare, as Hypolitte has done, the acute œdema of Traube to the chronic œdema of the paralytic.

2d. *Eclampsia is due to a Cerebro-spinal Congestion.*—Originated by Mauriceau, defended by Levret, Broussais, Blot, Peter, this theory is denied by Hypolitte, Testut, Depaul, who consider the cerebral congestion and cerebral hemorrhage, which have been found on autopsies, the result and not the cause of convulsions. We will see further on that the course of the temperature, very different in cerebral hemorrhage and in eclampsia, justifies the opinion of the latter authorities. But is not the eclampsia due to a rachidian hyperæmia, resulting from an irritation of the cerebro-spinal system, or the sensory terminal filaments? This brings us to the third theory.

3d. *Eclampsia is a Neurosis, by a reflex Irritation of the spinal System, whose Point of Origin resides in the Uterine Pains.*—This is the opinion, formally upheld by Tissot, Cullen, Vogel, Sydenham, Sennert, Jacquemier, and revived by Dubois, Scanzoni, Axenfeld, Marshall Hall, Tyler Smith, Fleetwood Churchill, and refuted by Depaul, Bailly and Hypolitte.

As Depaul observes with reason, if one admits, with the advocates of this theory, the irritation of the nerves of the uterus or pelvic cavity, by the increased growth of the uterus, or the action of the parturient state, "Why are not all primiparæ eclampsic, since in them the uterus is enlarged for the first time? Why are not all rachitic cases eclampsic? We have already seen that this last cause is more rare than we generally believed. That all these conditions may predispose to eclampsia, I grant; but there must be other causes added to produce convulsions. It is this other cause that I look for in this theory and do not find; and further, How explain an eclampsia which may occur during the puerperal state, when the irritation of the uterine nerves is not present? If the Marshall Hall theory is rightly established, it must still fall to the ground, since this author pretends that no lesion of the brain or cerebellum can give rise to convulsions if the spine is secure from irritation. And so Tyler Smith believes convulsions to be due to a reflex irritation of the spine through the nerves of the uterus. I would answer him even as I have Axenfeld in regard to his theory.

"I do not see what can be the cause of this irritation of the nerves of the uterus, when I remember that eclampsia may be developed before the beginning of labor, or even of the puerperal state. Some interesting experiments have lately been made on this reflex power, but every time that the convulsive movements were produced, they were partial and not general, aside from the fact that, where a like result has been reached, the point of origin is known, and one can localize the irritation on such or such point of the organism. Is it the same with eclampsia? What is this pretended irritation of the nerves of the uterus? Are not all women in a like situation? Labor produces in all very severe pains; the cervix

itself is irritated where we aim at the induction of premature labor; and yet, is it common to produce eclamptic attacks? It is not then in the uterus that we must look for the causes of this accident, because, although, sometimes we see convulsions following on a severe pain, how many times under other circumstances, do we see the disease develop before the beginning of labor, or even after delivery.

‘Further still, much has been said about the accumulation of feces in the rectum, of foreign bodies in the intestine, of worms, of emotions, etc. But I will not expatiate on this point. I do not think that simple sympathetic phenomena can be invoked to explain the etiology of eclampsia, and I reject as well the neurosis, by the reflex action on the cerebro-spinal system, as the neurosis essential to the acute stage.’ (Depaul.)

4. *General or cerebral Anæmia is the Cause of Eclampsia.*—According to Fournier, Traube, Sée, the phenomena of eclampsia (uræmic eclampsia, *i. e.*, blood poisoning) are analogical, from the point of view of the particular mode of their production, with the pathological process, which Kussmaul, Tenner and others, assign to epilepsy. By the altered state of the blood, there is produced an irritation of the vaso-motor nerves of the cerebral arteries; these arteries contracting, there result, either convulsions from oligemia of the cord, or coma from oligemia of the brain.

Testut, who is an advocate of the reflex action, admits that it produces anæmia of the brain. “Instead of being arrested in the cells of the sensory and motor columns of the cord, the irritation from the uterus is carried quickly toward the vessels of the mesophalon, and causes the elements of its muscular tissue to contract, and anæmia of this portion of the brain resulting, the conditions are evoked on which stress has been laid by Kussmaul and Tenner for the development of epileptic attacks.”

Before considering the last cause of eclampsia, the poisoned state of the blood, it is necessary here to return to the “renal theory,” the theory which we have spoken of in detail, in the chapter devoted to the study of albuminuria. Let us remember only that, while certain authors declare that there is no eclampsia without albuminuria, and no albuminuria without a renal lesion, others, whose authority is no less, do not share this view, and that the latter oppose to the first the relatively numerous cases where there has occurred eclampsia without albuminuria. These cases have been multiplied during the last years; and it will be sufficient to refer to 141 cases, which we have taken from the literature on the subject, and if some of the cases may be doubted, the greater number offer well-authenticated characteristics. Renal lesion is not, therefore, constant in eclampsia. Also certain authors have gone still further, and have declared, that it was not only not albuminuria which produced eclampsia, but eclampsia which predisposed the patient to albuminuria. Blot and Depaul have already noted the increase of albumin during the attacks, and often also, albuminuria, which did not exist before the con-



vulsions has shown itself, and disappeared with them. This they call nervous albuminuria, and three possible causes are assigned to it: lesion of the renal nerves, those of the splanchnic, and the floor of the fourth ventricle. The experiments of Wittich, of Herman, of Ludwig, of Stokvis, have only confirmed those of Cl. Bernard as to lesions of the floor of the fourth ventricle being sufficient to produce albuminuria; and Paul Dubois has said in his clinical lessons: "Since numerous experiments have proved that lesions of certain portions of the nervous system may suddenly produce various disturbances in the urinary secretions, it is not impossible that albuminuria may not be the cause of eclampsia, but the result of the same lesion which causes the nervous affections."

Hamon has shown albuminuria to be a neurosis of the central nervous system, cerebro-spinal and ganglionic. Tessier, to the renal alterations and to those of albuminuria of the blood, adds the influence of the central nervous system or the nerves which preside over the urinary secretion. But as Hypolitte rightly observes, the neuroses are of all affections those which are most rarely accompanied by albuminuria. This fact is particularly true of epilepsy, the most serious of all; and Hypolitte, who tries to explain these facts, supposes as an hypothesis, that eclampsia might lead to albuminuria, "first, from the nervous troubles which are of the same essence as it is by acting directly on the kidneys, then by the blood changes and the pseudo-asphyxia which immediately results, by preventing the intra-capillary combustion from taking place."

This opinion is not sustained to-day, and Depaul, not considering it too radical, hastens to add: "If albuminuria does not certainly lead to eclampsia, I do not believe either in the necessary production of albuminuria by eclampsia, but I consider these two symptoms, as dependent upon the changes which pregnancy produces in the composition of the blood."

Let us add, finally, that if albuminuria may be wanting in eclampsia, it is the same in anasarca and in œdema, and that in a still greater proportion. Thus the absence of œdema has been noted: In 27 cases, by Blot 13 times; in 62, by Wieger 10; in 44, by Braün 9; in 133, by Depaul 14.

One can not be certain, therefore, from the absence of œdema, of the absence of albuminuria; and the necessity of examining the urine of all pregnant women cannot be too much insisted on.

There remains, then, the last theory:

5th. *Eclampsia depends upon a poisoning of the Blood, which renders this Fluid unfit to stimulate regularly the Nervous Centres.*—What is the toxic principle? Is it urea? Is it the transformation of this urea into carbonate of ammonia? Is it the extractive or coloring materials of the blood? Each of these theories have been sustained, and thence the three theories of uræmia, of ammonæmia, and urinæmia.

1. *Uræmia*—Although Rostock, Christison and Gregory, first described

the presence of an excess of urea in the blood of eclamptic patients, it was Wilson who, in 1833, created the word, and the morbid entity, uræmia. (Hypolitte.) Adopted since by all authors, this word has remained in science, but if the word has remained, it is not so with the theory, which attributes the cerebral phenomena to the presence of an excess of urea in the blood. While Wilson, Hammond, Treitz, Lalesky, consider urea as poisonous, Babington, Bright, O. Rees, Christison, Frerichs, Schöttin, Segalas, Hoppe, Gallois, Brown-Séguard, Cl. Bernard, Oppolzer, prove that urea is inoffensive, and the theory of Wilson was overthrown by the experiments of Cl. Bernard, who, injecting urea into the veins without producing convulsions, proved that urea is incapable of producing the nervous complications of albuminuria and eclampsia. The fact, itself, of the excess of urea in the blood during the eclamptic attacks, has been confirmed by the analyses of Devilliers and Regnault, Wurtz and Berthelot, Gubler, Ritter, Parkers, Schöttin, Mosler, etc. Moreover, recent researches in regard to the temperature in eclampsia, entirely overthrows the theory of uræmia, because the temperature in uræmia is lowered gradually and considerably, while in eclampsia, on the contrary, it continues to rise. Let us add, finally, that in cholera, when an enormous quantity of urea is found in the blood, eclamptic convulsions are not observed.

2. *Ammonæmia*.—Impressed by the impossibility of explaining these complications by uræmia, Frerichs proposed the following theory: It is not urea by itself which leads to these complications, but they are due to the fact that urea, accumulating in the blood, is transformed, by a ferment, into carbonate of ammonia. It is to this carbonate of ammonia that the nervous complications are due. According to Mercier, it is not carbonate of ammonia, but urate of ammonia, which is the toxic agent. Finally, Treitz returned to the theory of carbonate of ammonia, but it is no longer, according to him, in the blood that the change of urea into carbonate of ammonia is made. "Whenever the urinary secretion is suppressed, the excretory matter, especially urea, accumulates in the blood. Now this urea passes from the blood into all the secretions of the economy, but it is, above all, the intestinal mucous membrane which eliminates the greatest quantity of urea. Poured into the digestive tube, the urea is changed into carbonate of ammonia, and produces many lesions. At this time the ammoniacal salt has been reabsorbed, and it passes into the blood, and the more surely as the important function of the intestinal mucous membrane is exactly the absorption of the liquids which bathe it. It is the reabsorption of this ammonia contained in the intestine which produces ammoniacal intoxication or ammonæmia. This theory, upheld by Christison, Jaksh, Brettet Bird, Oppolzer, Wieger, Braün, has been attacked by Richardson, Picard, Lalesky, and overthrown finally by Cl. Bernard, who has shown "that the blood of a well or sick person contains



almost always carbonate of ammonia; and that, if urea is found in the intestinal fluid as an ammonia-salt, and not as urea, it is only because when this substance appears in the intestinal canal, it dissolves in the fluids, in the midst of which fermentation goes on, which continually destroys the ammoniacal salts, as soon as they are found."

3d. *Urinæmia*.—Schöttin has declared that the kidneys secrete not only urea, but other substances still little known, (creatin, creatinin, leucine, etc.), and designated under the vague name of extractive materials; these accompany urea, remain in the blood, and produce blood poisoning, and consequently convulsions. This theory, upheld by Reuling, Hoppe, Oppler, Perls, Lalesky, Fabius, Fournier, Chalvet and Gubler, has received from the latter authors the name of *urinæmia*, by which it is known to-day. The experiments of Challan, 1865, have confirmed it, and it is accepted by Peter.

"The pregnant woman, affected by eclampsia, is *urinæmic*. It is because all the elements of the urine have accumulated in her blood, that she is a prey to the complication known as eclampsia. There occurs a great and complex disturbance of innervation, of which convulsions are only a symptom. There may be convulsions, coma or delirium, but always with a predominance of convulsions, and it seems best to designate the combination of symptoms by the term '*puerperal urinæmia*.' The analysis of the urine shows, without a doubt, that the woman excretes daily a greater quantity of urea. Quinquaud has shown that during pregnancy, and on its account, a woman excretes daily one and a half times more urea than in the non-pregnant condition. If she excretes twice as much urea in twenty-four hours, she ought to do more work—*i.e.*, more blood passes through the kidney, and there is an increased functional hyperæmia. As a result of more blood, there is greater pressure; if greater vascular pressure exists, then possible filtration of the serum of the blood, may even the blood itself—a phenomenon which is called incorrectly albuminuria, but it is serumuria." Now how does this serumuria, physiological when it is of slight amount, becoming greatly increased, irritate, poison the organism, and cause eclamptic attacks?

One can, by the aid of the examination of the urine, judge of the state of the kidney. The more serum there is, the more the kidney is inert, so that the integrity of the kidney is in inverse proportion to the amount of albumin contained in the urine. With the microscope, the exact state of the kidney can be made out, by means of the presence of casts, granular and hyaline. These latter show that, at certain points, where this desquamation has taken place, the kidney is totally useless, so far as secretion of urine is concerned. It is only a passive organ, through which the serum filters, as it would through a filter paper. It is necessary, therefore, to look for serum in the urine; if it exists there, to examine the state of the nervous system for premonitory signs of eclampsia. There is not

present as yet eclampsia, but only a tendency toward urinæmia. There is not only an accumulation of urea, but the accumulation of all the constituents of the urine.

Very exact analysis of the urine shows an accumulation of all the materials of the urine in the blood of a woman inclined towards urinæmia. In a first observation, in place of 6 parts of extractive matters in 15,000 grains of urine, Quinquaud found 21 parts, *i.e.*,  $3\frac{1}{2}$  times more urea in the blood. These figures agree exactly with a second observation which gives 19.2 in place of 6 parts; a third gives 18.3. This makes three times more extractive material. I do not know of anything more convincing, and we need not say that it is only creatinæmia (Schöttin and Hoppe), but all the urinary extractives are present, that is to say, urinæmia. The pregnant woman no longer forms urine, no longer selects decomposed elements which are the urine; they remain and accumulate in the blood, and therefore she is diseased.

Contrary to Quinquaud, Hypolitte has not found urea increased in the blood of pregnant women, but diminished; and finally he says, that in certain patients suffering from oligemia or anuria, as in cases of hysteria, or of retroversion of the gravid uterus, accompanied by compression of the bladder and oligemia, eclampsia is not observed.

Hypolitte gives in the following table the examination of the urine of eclamptic women:

| Eclampsia.                                  | Temperature Axilla.              | Volume of Urine. | Urea.            |                    | Albumin.      |
|---|----------------------------------|------------------|------------------|--------------------|---------------|
|   |                                  |                  | Process of Yvon. | Process of Liebig. |               |
|   |                                  | Ounces.          | Grains.          | Grains.            |               |
| 28 days before labor                        |                                  | 27               | 108              | 180                | Albumin.      |
| During labor and during an eclamptic attack |                                  | 15               | 48               | "                  | 14 grains.    |
| Eclampsia during labor                      | 98.4° evening.<br>102.° morning. | 47               | 375              | "                  | Marked trace. |

From this table it results that urea is rather diminished than increased during pregnancy, and that it varies with the process employed. Thus between Yvon's and Liebig's methods, there may be a difference, varying between 15 to 75 grains. What do all these theories prove? which is true? It is at the present time impossible to say.

It cannot be doubted, says Fournier, "that it seems rational to attribute these phenomena, observed during life, to an alteration in the blood. This alteration is not doubted; it does not consist in the retention of one principle alone, but the alteration is still poorly understood."

Lately, practical researches in regard to the temperature in eclampsia have shown that all these theories are useless. It was in France that the first authentic researches on the temperature in eclampsia were published, and Winckel is in error when, with the fairness and fidelity which charac-



terizes the Germans, he tries to appropriate the credit of this discovery, (but this does not surprise us). "The French authors," says Winckel, "naturally do not recognize my works." This important work confines itself to the following phrase, which is found in the "Clinical observations on the Pathology of Labor," 1869, Rostock, which he has reproduced in his second edition. "The temperature rises very considerably at each new attack. It may go as high as 104.5° F." From 1874 to 1875 and 1876, in these observations and studies, he published various observations on eclampsia, in which he notes the temperature before the attack, but not during, and he takes it again only after two days, to find that it has risen to 105° F., under the influence of a new disease. It was only then in 1879, *i.e.*, when he must have known of the French works for a long time, that he really began the study of the subject. This does not surprise us, for this appropriative method does not confine itself to scientific subjects.

It was in France, in the Faculty at Strasburg, that the first observations on the temperature in convulsions were made. It is to Kien, a pupil of Hirtz, that they are due. For, although Quincke had, in Germany, in 1869, taken the temperature in eclampsia in a careful manner, he had drawn no conclusions, and confined himself to a simple statement; and the proof of this is, that Wunderlich, whose work appeared in 1871, collected all the thermometric observations acquired in medicine, and left aside entirely the course of the temperature in puerperal eclampsia.

In 1869, at the suggestion of Charcot, his teacher, Bourneville undertook the study of the course of the temperature in diseases of the nervous system, and in 1871 to 1875, pursuing these studies, he arrived at the following conclusions, based on 13 personal observations and 4 of Budin's.

1st. In eclampsia, the temperature rises from the beginning to the end of the attack.

2d. In the interval, the temperature remains high, and, at the time of a convulsion, there is a slight rise.

3d. If the eclampsia is going to prove fatal, the temperature continues to increase and may be very high. If, on the contrary, the attacks disappear, and if the coma lessens or ceases altogether, the temperature falls gradually, and may become normal.

4th. Finally, Bourneville, concerning the diagnosis between puerperal eclampsia and uræmia, adds: "Most authors class under the term uræmia both eclampsia and various forms of uræmia. Now of 31 cases of true uræmia which we have observed in men and in women, whether caused by an affection of the kidneys, or an obliteration of the ureters, (calculi, cancer, etc.), whether it be in the form of coma or convulsions, the temperature gradually falls, and at times below 93° F."

Hence a very striking contrast between the thermometric curve of puerperal eclampsia and that of uræmia, which we will sum up in the follow-

ing statement: In the beginning, a lowering of the temperature in uræmia is noticed, and an elevation of the temperature in puerperal eclampsia. In the course of uræmia, the temperature falls gradually, while in that of eclampsia it rises more and more, from the beginning of the attack, usually very suddenly. These differences are greater at the approach of and even at death. In uræmia the temperature falls very much below the normal; in puerperal eclampsia, on the contrary, it rises very high above the normal.

Pinard and Budin have published a great many thermometric observations of eclampsia. Also Dieudé and Herbart have written on the subject (1875), also Buffet (1877), Lorain (1877), Deubel (Nancy, 1879) and lastly Hypolitte (1880.)

In 1879 only, does Winckel report four cases of eclampsia, and reach the following conclusions: "The most striking thing is the unusual course of the temperature, which, during sixteen hours without attacks, rose from normal to  $102.4^{\circ}$ , which, a little before the third attack, had fallen to  $100.4^{\circ}$ , and rose again at the beginning of the sixth attack to  $102.3^{\circ}$ , but fell, finally, from  $1^{\circ}$  to  $5^{\circ}$  until death, although during this short space of time the patient had still attacks of eclampsia."

Dieudé, from his observations, concludes that: "The first statement of Bourneville is too absolute, and that in eclampsia, not only does the temperature not rise continually, from the beginning to the end, but it may, rarely it is true, remain stationary or fall in spite of the attacks; but he is in accord with him in this, that, whenever the temperature, after having followed the ordinary course peculiar to puerperal eclampsia, falls gradually, a favorable termination can be prognosticated."

Deubel similarly considers the statements of Bourneville as too absolute.

Finally, Hypolitte, who bases his researches on thirty observations, has arrived at the following conclusions, which are those of Dieudé slightly modified.

"1st. In the great majority of cases, the temperature rises from the beginning to the end of the attack, but it may, though rarely, remain stationary or fall in spite of the attack. The temperature rises most often to the highest point during the tonic convulsion, to fall slightly—two-tenths to three-tenths of a degree, during the clonic convulsion. 2d. Between the attacks, the temperature remains high, and, on the return of a spasm, the temperature rises. After several attacks, the temperature may remain normal or subnormal or over  $1^{\circ}$ , but the temperature does not remain there with subsequent attacks, or in the interval between the attacks, the temperature reaches the high point which is usually observed. 3d. If the eclampsia is to end in death, the temperature continues to increase, and rises very high; if, on the contrary, the attacks disappear, and if the coma diminishes, or ceases altogether, the temperature falls



gradually and becomes normal. It may happen, also, that the temperature begins to fall before the end of the attack. 4th. In eclampsia, the temperature remains usually between  $100.4^{\circ}$  and  $104^{\circ}$ , and may go above  $105.4^{\circ}$  after death, and even reach  $106^{\circ}$  to  $107^{\circ}$  and over. The pulse follows the course of the temperature exactly, 100 to 140, and at times 160."

As we will see, these thermometric researches have a great importance from a diagnostic and prognostic standpoint.

*Symptoms.*—Although eclampsia sometimes develops suddenly and sharply, surprising the patient as an epileptic attack, this is not the rule, and, most commonly, the attacks come on after a prodromic stage, but the prodromata themselves present certain differences, occasionally being faint, at other times they come on just before the attack. They are cephalalgia, disturbances of vision, epigastric pain, dyspnoea, vomiting, insomnia, vertigo and excitement.

Among the slight prodromata must be noted insomnia, or, on the contrary, deep sleep, excitement, vertigo; the latter may be accompanied with a dullness of the intellect, more or less marked. The patient seems simply to exist, scarcely interesting herself in things about her, answering questions more or less correctly. She seems to live in a sort of trance, a physical and moral apathy. She complains of vertigo, transient dimness of vision, and, above all, of head-ache more or less severe, situated generally in the back part of the head, rarely in the occiput, sometimes in the temporal region. This head-ache, which is at first transient, and appears only occasionally, becomes day by day more persistent, more fixed, more intense, and finally continuous, and when the attack is near at hand the head-ache becomes so intense as to be unbearable. Then vomiting appears, which may be bilious or stercoraceous, and may reappear suddenly in some women who have been free from it for some time.

Next appear the prodromata which indicate that the attack is imminent, *i.e.*, disturbances of vision, epigastric pain with or without dyspnoea. The disturbances of vision, although being an indication of an impending attack, may come on beforehand, but then, usually, they are not well marked. They accompany then the head-ache, and are confined to a little disturbance of sight, and fatigue, which prevent the patient from reading or amusing herself. But when they come just before the attack, they are more marked, and the disturbances of vision are observed, *i.e.*, amblyopia, diplopia, and even complete blindness. At the same time, the head-ache becomes more marked, and the patient goes into a state of profound stupor, which had been slight up to this time. To the disturbances of vision are often added a sharp epigastric pain, sometimes so violent that the patient cries out. This pain, this epigastric oppression, may accompany dyspnoea, although this sometimes precedes the epigastric pain.

Epigastric pain, disturbances of vision and dyspnoea, are the three

symptoms which announce the onset of eclampsia, and which may precede it by a few hours, but sometimes come on only a few minutes before the attack.

In spite of the disturbances of vision, the ocular media remain transparent, excepting a little congestion of the ocular conjunctiva, on a level with the oculo-palpebral fold, but it is only after an attack that we find retinal lesions, hemorrhages and congestion, which often, however, may be wanting.

Wieger claims that the frequency of the prodromata is not the same, according as the eclampsia occurs before, during or after confinement. Eclampsia of pregnancy will have prodromata in 40 per cent. of the cases; that of labor in 30 per cent., and that of the puerperal state in 20 per cent.

Attacks of eclampsia are not all alike, and if, in most cases, the movements are not increased, and do not require a great amount of power to restrain the patient, at other times, on the other hand, the patient is greatly excited, so that we can, with difficulty, prevent her from falling or throwing herself out of bed.

The attack finally comes on and may be divided into three periods: 1. The period of invasion; 2. The period of tonic convulsions; 3. The period of clonic convulsions.

1. *The Period of Invasion.*—All at once the eyes become fixed, there follows a moment of quiet, and the attack begins by convulsive movements of the face, which is contracted in a thousand ways and makes horrible contortions. The eyelids fall and rise through rapid twitchings, and the eyes, drawn by the convulsive movement of their muscles, roll in their orbits, drawn sometimes one way, sometimes another. The pupil is dilated, immovable, insensible to light, the ocular conjunctiva is insensible to stimulation and to light, and finally the eye, drawn upward by the levator muscles, partly disappears behind the upper lid, leaving in view only the lower segment of the sclerotic, and a very small part of the pupil. It lastly remains fixed on that side of the orbit toward which the commissure of the lips is drawn. These are not slow in taking part in the convulsions; the mouth, more or less distorted, deviates strongly to the left side, as a rule, and the head being rotated, the face to the left side rotates back again to the right shoulder, and finally, it is directed to the left; the alae of the nose, strongly pinched and contracted, draw down, and towards the lower part of the nostrils.

2. *Period of Tonic Convulsions.*—From the head, the convulsions extend to the muscles of the neck, of the body, and the limbs, which are greatly contracted. The extensor muscles of the neck and trunk produce a curve of the spine, with the concavity turned backward, and the patient, raised up by the contraction, only rests on the bed by the head and lower limbs, in a true state of opisthotonos, the whole body being rigid. At the same time, the arms are stretched and rigid, undergoing a marked



movement of pronation, while the fists are closed, and the thumbs turned into the palm of the hands, which cannot be opened. The diaphragm, the muscles of the thorax, take their turn. Respiration is suspended, and the face, instead of the livid pallor which it has presented, becomes red, swollen and tumefied, as in asphyxia. At the same time, the muscles at the base of the tongue contract, the tongue projects out of the half open mouth, the jaws rise and fall spasmodically; the tongue is bitten and cut by the teeth, and the blood mixing with the saliva, forms a bloody froth which dribbles out of the mouth. The muscles of the larynx, throat, pharynx, contract violently, and when respiration becomes re-established, it is noisy and whistling. At the same time, there is absolute loss of sensibility and intelligence, so that the patient may be pinched and pricked without being conscious of it.

Such is the ordinary aspect of the eclamptic, during the tonic period, which is thus characterized by rigidity, immobility, and insensibility of the patient, with impeded respiration, all coming on suddenly and unexpectedly. It is not always so, however, and with many patients, as Bailly has shown, the attack is preceded by a very short period of excitement, during which the patient, instead of stretching her arms along her body, raises them over her face, as if she wished to defend herself from an imaginary enemy. The tonic contractions come on secondarily. This exaggerated tonic state of the muscles lasts generally for fifteen to twenty seconds, and then begins the third period of clonic convulsions.

*Third Period.*—This general muscular rigidity is followed by shakings and twitchings, which agitate incessantly, and in turn, all the muscles of the face, body and limbs. As in the tonic convulsions, it is in the face that they begin, to reach finally the body and limbs. The face, also, is horribly disfigured, the jaws open and shut, cutting the tongue, which bleeds more and more, swells, and thus contributes to increase the hindrance to respiration. It is, indeed, in the clonic convulsions, that respiration, suspended during tonic convulsions, reappears, but it is irregular, noisy and whistling, and is accompanied, at each expiration, by expulsion of a froth more or less bloody, sometimes even, when the tongue is very much cut, by almost pure blood. Generally, the shaking of the body and limbs makes itself apparent by slight twitchings, which pass off, and occur without the patients changing much in position. This is not always so, however, and in certain cases, as soon as the clonic convulsion comes on, they are very much excited, throw themselves from right to left, so that it is difficult at times to hold or restrain them. During this period, the cutaneous and visceral congestion increases, and the face is blue, red, livid, seems as swollen as that of a drowned person who has been long in the water. Sub-conjunctival hemorrhages take place, and, on account of contractions of the diaphragm, or the muscles of the abdomen, as Jacquemier, Depaul and Bailly believe, or even on account of intestinal contrac-

tions, as Lachapelle and Tyler Smith and we are disposed to believe, abdominal evacuations frequently occur. Evacuations of urine are not very frequent, owing to the small amount of urine in the bladder of eclamptic patients. Vomiting is rare, and we have seen it generally in patients who have inhaled chloroform.

This period of clonic revulsions is longer than the tonic period, but we have not seen it extend over one or two minutes. Bailly, who has given one to five minutes as the limit, appears to go too far; likewise, Tarnier, who has seen the attack prolonged twenty minutes by the watch. Ordinarily we would yield to the testimony of such a conscientious and careful observer as Tarnier, but we believe that he has taken the case of a woman in whom the attacks followed each other so quickly that there was no intermission, and therefore the limit we have fixed upon for the duration of the attacks seems to be the rule.

If we consider the congested and asphyxiated condition of the patient during a tonic and clonic convulsion, we can not understand how, when respiration is so impeded, the patient could long survive such a condition of things.

While the limbs and body are so shaken by convulsive twitchings, the face, which was drawn to one side, returns to the middle line, but is still carried from one side to another by muscular twitchings. The twitching of the eyelids is still present, and also the movement of the eyes. Respiration, for a while suspended, returns, but accelerated, and becomes more and more blowing and whistling. It is irregular, the muscles of inspiration and expiration taking part in the clonic convulsion which involves the whole system.

Tyler Smith states that the muscles of the larynx share in this spasmodic contraction, and it is the closure of the glottis that is the cause of the bruit produced in respiration. Asphyxia is the consequence of the suspension or diminution of the blood-producing process. Hence the bluish-black discoloration of the face, the swelling of the neck and face, the enlargement of the jugulars, and the violent beating of the carotids. He thinks also that the heart participates in the convulsion, and this would explain why the lividity and turgescence is not always limited to the face, but may extend sometimes all over the body.

At the beginning of the attack, Cazeaux says, the pulse is full and strong, but we have, on the contrary, seen it always rapid and feeble, so feeble that it is sometimes difficult to count it; but, remarkable enough, however feeble, we have always seen it increase in cases in which venesection has been practised, as in Depaul's clinic.

When the end of the attack approaches, the skin, which was dry, becomes covered with perspiration more or less abundant, the respirations become a little longer, more regular, the convulsions diminish in violence and frequency, first in the body and limbs, then in the face, the livid ap-



pearance disappears gradually, lastly in the face, where it may remain for some time. The attack ends generally with a deep inspiration, followed by a slow and prolonged expiration. The patient sinks back in bed in a state of coma or stupor more or less pronounced. Whether there be one eclamptic attack or several, never does the patient regain her normal condition immediately after the attack, but she remains, for a given length of time, in a comatose state, with loss of intelligence and sensibility. But it is understood that this condition or state is less pronounced and long as the attacks are less violent, or as they have been few in number, and, finally, the further apart the attacks have been.

Generally, after the first attack, coma and stupor do not persist a long time. In a few minutes the breathing, which was noisy, becomes calm and regular. The patient, quiet and motionless, moves frequently in bed, opens her eyes, looks vaguely about her, without knowing where she is, or why she is kept there, nor does she recognize those about her. Little by little consciousness returns, sensibility reappears, and, when the patient is spoken to, she tries to reply, and is not able to do so, on account of the mental disturbance which exists, and also on account of difficulty of articulation caused by the swelling and sensibility of the tongue. Slowly consciousness returns, but memory is still at fault, so much so that the patient has forgotten her pregnancy, her address or her name, and it is only after several hours that consciousness is more completely restored, but memory returns only at the end of twenty-four to thirty-six hours or even more. At times, it is true, when there is only one attack, a normal condition is regained sooner, but this is rare, and usually the first attack is soon followed by another or several. The new attacks may be separated by shorter or longer intervals, and then, in the first instance, they come upon the woman when she is in the coma following the first attack; or, secondly, the woman may have regained consciousness, and have come out of her comatose state before the return of convulsions. Each new attack is preceded by a new period of excitement, and the scene is gone over again, with a severity proportionate to the number of the attacks. As these attacks are renewed, the coma becomes more and more profound, and, in cases where they are renewed again and again, the patient passes from a comatose state into new attacks, and *vice versa* to the last.

But the attacks themselves vary in intensity. At times one or two violent attacks are followed by a lighter one, then there follows a more violent one. Sometimes two or three attacks follow each other in quick succession, then after an interval of half an hour or several hours; then the attacks are renewed with greater frequency and intensity. Sometimes the attacks come at regular intervals, five to ten minutes, every half hour, or every hour; at other times without regularity; at other times still, they are repeated with such violence and intensity that they do not in-

termit at all, but are continuous, and we believe these to be the cases, cited by certain authors, in which the attacks lasted ten to fifteen minutes, as in Tarnier's case. The tonic period is obscured by the incessant clonic convulsion, and this will explain the error into which these observers have fallen, when they give such a long duration to an eclamptic attack. The coma is always proportionate to the severity of the attack, and, when they are numerous, the woman, if she recovers, is always a longer time in coming out of the coma than when the attacks are few in number, and the interval between them long. On the other hand, if the attacks are long and repeated, the coma is profound and persistent. It is often only at the end of twelve, twenty-four or thirty-six hours that the patient becomes conscious of what is going on about her.

The patient may be roused from her stupor for a moment, her eyes open, but shut again at once, the few words which can be drawn from her are incoherent, the movements, if any, are mechanical, and she soon relapses into the comatose state. The memory is the last to return, and this rarely takes place until three or four days have passed, the patient being only partially conscious of what is going on about her. As for the attacks, the patients are not at all conscious of them, and manifest some surprise at finding themselves in bed, and know nothing of their confinement, which, as we shall see, may have taken place during the convulsion; and when they find themselves in the hospital, they ask why and how they have been brought there. When, on the contrary, they die, the coma becomes more marked, the breathing becomes stertorous, consciousness and sensibility is entirely abolished, and death takes place, either in a new attack or before the patient becomes conscious. In some cases, the coma is interrupted by a certain amount of excitement, by cries; it would seem that the patient was going into another attack, but this is aborted, and she passes into a stupor which may yield in its turn or end in death.

*Course and Duration.*—Eclampsia, on account of the rapidity of its course and its gravity, should rank among the acute diseases. It is rare for it to last more than two days without ending in a cure, or in complications which may lead to death; but the course of the disease may present numerous varieties. First, the number of the attacks, which in some women are limited to two or three or even one, may reach in others to 100 (Bailly, Pajot) or 160 as Crettet observed. The intervals between the attacks are not fixed, and the attacks themselves, which are renewed with a sort of mathematical regularity, may, on the other hand, be very irregular. At times, several attacks occur one after another, and a long interval passes without an attack, when they occur again with renewed violence. In some patients the attack appears over, when, at the end of twelve, eighteen, twenty-four, forty-eight hours, a new attack appears, and this explains why certain authors have described the startling and



very sharp forms, and those relatively slow. Paul Dubois goes farther when he says that one of the dangers of eclampsia, once declared during pregnancy, is that it will reappear until term. But this must be very rare, for where eclampsia, which occurs before term, ceases in a few days, it reappears no more even at the time of confinement, or else, as a rule, it induces premature labor. The attacks themselves present many varieties; sometimes few, with long intervals, or at other times slight and frequent. Often they have this character during labor. The latter ended, there is an interval of repose, and the attacks are renewed with a fatal result. At other times, instead of beginning with the uterine contractions, the attacks come on before labor, cease when it begins; then labor is arrested, the attacks come on again; at other times there is an attack at each contraction.

*Termination.*—Eclampsia may end in cure, in death, or in the development of another disease, the result of the convulsions. Cure, however, is happily the most frequent termination, although the mortality is very great. When the case is going to end happily, one of the signs that is noticed after the cessation of the attack is the progressive diminution of the albumin which the urine contains, and its complete disappearance at the end of a time which may vary from several hours to several days. Generally it is in the first two or three days that this disappearance is noticed, and, at the same time, the urine, which was almost wholly suppressed during the attack, and likewise cloudy, takes on again, little by little, its normal quantity and appearance. Then consciousness gradually returns, but it is not rare to see it remain for some time, sluggish and troubled. It is the same with memory and disturbances of vision, but generally all complications cease in the fortnight after confinement, and the patients recover their health almost entirely, save a feeling of feebleness and fatigue, which may last much longer.

Unfortunately it is not always so, and death is too often the end of eclampsia. At least statistics go to show it:

*General Mortality of Eclampsia.*—Lachapelle and Romberg, 50 per cent.; Devilliers and Regnault, 55 per cent.; Brummerstädt, 37 per cent.; Dohrn, 29 per cent.; Merriman, 22 per cent. Churchill, 27 per cent.; Lever, 28 per cent.; Collins, 16 per cent.; Ramsbotham, 16 per cent.; Murphy, 24 per cent.; Blot, 35.5 per cent.; Wieger, 30 per cent.

According to Kiwisch, one-third of the women attacked by eclampsia die during the convulsive period, and one-third of those who survive are carried off by secondary puerperal complications. In 318 cases collected by Wieger there were 96 deaths. In 60 the cause was as follows: 41 women died from eclampsia, and 19 from complications.

Death may occur in different ways. 1st. Death may come on before, during or after confinement, and then it is due, either to the attacks themselves or to the consequences of the attack, or to the sequelæ.

When death comes on before labor, it is either during the attack, and although rarely, it has been observed by Baudelocque, Kiwisch, Prestat, Depaul; or else, and this is the rule, it may come on during the period of coma. Ordinarily, after a certain number of attacks, labor comes on, and then, indeed, death may take place either during labor in an attack, or after labor in another attack, or, as a rule, during coma. Pulmonary complications are very common, and may carry off the patient; also pulmonary œdema, congestion or apoplexy; death, even, may result from cerebral apoplexy or paralysis produced by congestion, which in turn results from disturbances of respiration and circulation, or by extravasations into the cranial cavity, which may be either serous or bloody.

Litzmann and Braün attribute the cause of death either to uræmic poisoning, *i. e.*, to the toxic influence of the blood on the nervous system, or to secondary lesions of the brain or lungs. The apoplexies into the cranial cavity or tissue of the brain have been noted by Chaussier, Velpeau, Ménière, Larcher, Dugès, Prestat, Bailly, Depaul, Charpentier, and Molas, who has in his thesis collected five to six cases. Blot and Molas have noted hemorrhages in the liver. These hemorrhages are not surprising, for since Blot noted the frequency of hemorrhages in connection with albuminuria, all authors have noted similar cases.

Hamilton, Baudelocque, Miquel, Scanzoni, Cazeaux have reported cases of rupture of the uterus during an eclamptic attack; and Bailly has seen death in one case due to the swelling of the tongue, produced by blood extravasation into the organ, the result of the deep bites inflicted during the convulsions. In these cases, death is no less rapid, and, in general, the women die in twelve or twenty-four hours or more after the last attack.

2d. Death may be caused by complications which are frequent in eclampsia, but they are not all of the same gravity; and, if some are the immediate cause of death, others may be only a predisposing cause, and such are hemorrhages in general. Aside from the blood extravasations, such as sub-arachnoid or cerebral or hepatic hemorrhages, or pulmonary apoplexies, which we have noted, Blot has called attention to a hemorrhagic tendency which eclamptic and albuminuric women have, a tendency which shows itself in epistaxis, otorrhagia, hematemesis, hematuria, but, above all, uterine hemorrhage, which comes on during the third stage of labor, and to which he attaches great importance, and which has been since observed by other authors. If these hemorrhages, indeed, are not serious in themselves, they weaken, exhaust the woman, and predispose her thus to puerperal complications.

Authors are agreed in establishing the frequency with which puerperal complications follow eclampsia, and Blot has shown that these complications are the more grave and serious as hemorrhages have been severe. In 28 cases of albuminuria, with or without eclampsia, Blot has observed 15 cases with hemorrhages, more or less abundant, with 6 deaths.



These complications may be arranged under five heads: 1st. Women may suffer from puerperal complications (Blot, Depaul, Braün, Devilliers and Regnault, Litzmann, Krassnig, Dohrn, Grenser, Cazeaux). These accidents are classic, *i.e.*, peritonitis, metro-peritonitis, phlebitis, lymphangitis, etc. 2d. Women may die from meningeal complications, (Cazeaux, Pelissier). 3d. The albuminuria was dependent upon Bright's disease, chronic or acute, which becomes increased, in passing into a chronic state, and may kill the patient. (Hoffmeier, Möricke). 4th and 5th. Eclampsia may end in paralysis, or puerperal mania, which will be treated of in a chapter devoted to that subject.

We will only say here, that mania is much more frequent than paralysis, since Wiegner saw 10 cases in 140; Grenser 4 in 19 cases; Braün 5 in 44 cases, and Simpson much more frequently still.

*Pathological Anatomy.*—The lesions which are found on autopsies of patients who die of eclampsia are so numerous and varied, that one might well ask, Is there a pathological anatomy of this disease? The lesions are found in the brain, lungs and kidneys, but it is impossible, at present, to find one lesion which is characteristic of the disease, or constantly present. The kidney lesions may be often wanting, so it is not to be wondered at that so many theories are advanced. The lesions themselves are in no respect constant, and in a great many cases, general congestion is only present to explain the convulsions.

On referring to different authors, we find that Lachapelle, Cruveilhier, Baudelocque, Ramsbotham, Velpeau, Scanzoni, Cazeaux, Kiwisch, Jacquemier, in a number of autopsies have found no appreciable lesion, it may be in the brain or adnexa. The following lesions have been demonstrated by others:

Braün, in 10 autopsies, 1 case of meningeal apoplexy, 10 cases of anæmia and œdema of the brain and its envelopes.

Krassnig in 9 autopsies, 6 cases of anæmia and interstitial serous effusions, 1 case of congestion, 1 case of meningeal apoplexy; 1 case nothing was found. Devilliers and Regnault, Lever, Hardy, Collins, Mac Clintock, Ramsbotham, Kiwisch, Grenser, Martin, found in 42 autopsies: Hyperæmia, 10; anæmia, 4; normal, 4; serous effusion of arachnoid, 7; serous effusion in ventricles, 5; apoplexies, 12.

Depaul, Blot, Bailly, Mercier, Charpentier, have found cerebral hemorrhages; Molas hemorrhages into the arachnoid.

Helm, Kiwisch, Braün, congestion of the membranes and meningeal apoplexy.

Bluff, serous effusion into the spinal cavity.

Braün found the brain and its membranes sometimes anæmic or normal, sometimes congested.

The arachnoid and ventricles sometimes contain fluid. The eye, in spite of amaurosis, may be normal, or the aqueous humor may be in-

creased (Cucuel, Abeille, Crocq, Collard, Marchal); sometimes there may be hemorrhages in the retina (Turcq); the blood is slightly coagulable, and has a violet color. In the lungs there is always œdema, and emphysema may or may not be present, as Bar has stated. Usually they are congested and contain apoplexies. Delmas has shown that serum exists in the pleural cavity. The spleen and liver are more or less congested. Blot, Molas, have found hemorrhages. The changes that are most often met with are those in the kidneys, but, Bailly to the contrary, they are not constant, and if it is true that, in a certain number of cases, the lesions have escaped observation on account of the insufficient means employed in the search, the microscope is not always able to find them; and although we think that there is an almost constant relation between albuminuria and eclampsia, we believe that in many cases the renal lesions are very slight, and sometimes they cannot be found by the most careful research, because they do not exist. When the renal lesions do exist they may be met with in the three forms described by Frerichs.

*First Degree. Commencing Hyperæmia and Exudation.*—The surface of the kidney is smooth, the capsule is easily removed, the venous plexuses are dilated and gorged with dark blood; the cortex is reddish-brown, soft and friable. On cutting through this substance, a gelatinous bloody fluid oozes out which infiltrates the substance of the kidney. The pyramids are congested. The mucous membrane of the calyx and infundibulum is swollen, covered with congested vessels and contains a bloody fluid. Except for the hyperæmia, the substance of the kidney does not appear very much diseased. Sometimes hemorrhages are found coming from the glomeruli, again from the vascular plexus, the uriniferous tubules, or even from the veins spread over the cortex. The epithelium of these tubules is not yet very much altered, but it is easily detached. The tubules are filled with an exudation, or fluid in the form of casts, transparent, bloody, constituting fibrinous casts.

*Second Degree. Exudation and commencing fatty Degeneration.*—It is characterized by a dull, yellow color of the cortex, by vascular striæ, by red spots and by the size of the kidney, the weight of which is above the normal. Then the kidney is softer, more friable, opaque and dull, its surface is sometimes smooth, sometimes granular, covered with little elevations of the size of a poppy seed, an appearance which is due to the fact that the tubules, whose walls reach the surface of the kidney, are distended with fluid.

The capsule of the kidney may with difficulty be separated. The pyramids are dark red, the mucous membrane of the infundibulum is a dirty red, the glomeruli are covered with fine granular material, and in places there are areas of fatty degeneration. Between the glomeruli and the capsule lies a thick bed of solid, granular matter, in which fat globules are found and sometimes cholesterine. When the disease is more ad-



vanced, the interior of the epithelial cells, filled with fat globules, becomes cloudy. Finally, by the increase in granules, the cells themselves become disorganized, and then the epithelial cells themselves undergo fatty degeneration.

*Third Degree. Atrophy.*—The kidneys may have returned to their normal size, or even smaller, the capsule has a dirty white color, it is thick at certain points, and closely united to the cortex, and can with difficulty be detached without bringing away with it portions of the kidney. The surface of the kidney has lost its polish, is rough and nodular, studded with deep depressions or furrows, which divide it into lobes. The color of the surface of the kidney is dirty brown, the depressed portions seem like cicatrices, and are generally pale. They have at times a bluish black color, due to old extravasated blood. Generally, some parts of the organ retain their normal color. The friability which the kidney presented in the preceding stage gives way to a hardness like leather. On section the cortex has more or less completely disappeared. The uriniferous tubules are destroyed and the Malpighian capsules retracted, after the obliteration of their vascular coat. There remains no more of the destroyed uriniferous tubules than the basement substance, which in its turn becomes wrinkled and shrivelled. When, in the first two conditions, a part of the exudation has passed into the interstitial tissue, it becomes organized, more or less completely, into a tissue which surrounds the tubules and capsules of Malpighi, and, contracting like cicatricial tissue, becomes one of the chief causes of atrophy. The atrophy of the pyramids of Malpighi and of Ferrini, is less than is found in the cortex. There is found at their base, scattered between the straight tubules, fine granulations which compress them, and separate them one from the other. The calices are usually enlarged, their mucous surfaces are thick and studded with varicose vessels, which give them a bluish gray color. The mass of fatty matter about the kidney diminishes when the atrophy of the organ begins (Braün). But it is rare that this third stage is found in women who die of eclampsia. The first two stages are most commonly met with.

*Diagnosis.*—The diagnosis of eclampsia may be difficult or not, depending on the stage or period of the disease in which we see it. It is, however, particularly during the period of convulsion and of coma that we are liable to be in error; for often, the patient is seen by the physician, suddenly, before he has gained any information in regard to the case, and it may sometimes be very difficult to reach a diagnosis at once. The first point which ought to arouse the suspicion of the physician is the fact of pregnancy. Convulsions come on generally in the sixth or seventh month, *i.e.*, when the positive signs of pregnancy have existed for a long time. It is easy, hence, to determine pregnancy with certainty. The urine should be examined at once for the presence or absence of albumin, and albuminuria once determined, the probability is that the convul-

sions, if there are any, are true eclamptic convulsions, and that the coma may be the result of the convulsions. There are, however, a certain number of morbid states independent of albuminuria, which may produce convulsions, followed by coma, either during pregnancy, labor or the puerperal state, which may lead to error. We will review them rapidly.

It is Braün who has gone extensively into the diagnosis, but as Bailly remarks, he has gone much too far, when he has tried to establish the differential diagnosis of eclampsia, with the convulsions which may come on in poisoning by mercury, copper, silver, arsenious acid, hydrocyanic acid; by the use of the preparations of hemlock, belladonna, tobacco, strychnine, etc., and even poisoning from snake bite. Only lead poisoning could lead really to error. We will limit ourselves here to those diseases which present phenomena like those of eclampsia, either during the period of convulsions or coma.

1. *Cholemic Eclampsia*.—It is always joined to acute yellow atrophy of the liver, to typhoid icterus, to pyæmia and to puerperal diseases. It is always accompanied by fever, and the diagnosis ought always to be based on the diminished size of the liver, made out by percussion.

2. *Hysteria*.—The convulsions of hysteria come on during very difficult labors. The urine never contains albumin. Consciousness is always preserved, if not wholly, at least very appreciably; sensibility may be lessened, but preserved. Hysterical convulsions are always accompanied by other phenomena—globus hystericus, oppression, dyspnœa, etc., but there are neither “tonic nor clonic” convulsions. During the attack, there is a tendency to loss of consciousness, but there is no coma after the attacks, which end usually by the passage of clear urine, limpid, not albuminous. These attacks do not interfere with the course of pregnancy.

3. *Epilepsy*.—The convulsions are chronic; they come on during pregnancy, at intervals of several days or weeks, but very rarely several times in the same day. There is no albumin in the urine. The attacks are often preceded by an “aura epileptica.” Epilepsy is, moreover, characterized by insensibility, and it is not rare to see consciousness return very quickly and rapidly after the attack. Further, in epilepsy, reflex sensibility coincides with loss of consciousness from the beginning to the end of the attack. But it is the disease which most nearly resembles eclampsia, for in epilepsy the attacks have a period of tonic and clonic spasm, and also of coma; but the prodromata, and the absence of albumin in the urine, are the diagnostic peculiarities. We may add that, except the aura, epilepsy never presents the prodromata which are seen in eclampsia, and that the infiltration which is so frequently found in albuminuria and eclampsia is never present in epilepsy.

4. When the woman is comatose, the diagnosis must be made between coma of epilepsy, apoplexy, cerebral hemorrhage, and the coma of alcoholism.



(A). *Coma of Epilepsy*.—It is very difficult, if one has no information, to make a diagnosis between coma of epilepsy and that of eclampsia. The examination of the urine may remove all doubt; besides, the coma of eclampsia always lasts longer, is more persistent than that of epilepsy. While in the latter consciousness may be recovered completely, in eclampsia consciousness comes back only slowly, at first incompletely, and the patient remains more or less time in a state of discomfort, which does not exist in epilepsy. Memory comes back much more slowly, and the persistence of disturbances of one or more of the senses are often noticed—hearing or sight. Finally, it is not rare to see mania, paralysis, etc., follow eclampsia, which does not happen in epilepsy.

(B). Cerebral hemorrhage is accompanied by hemiplegia, no albuminuria.

(C). Coma of drunkenness (alcoholism) is diagnosed by the odor of the breath, and by the nature of the vomited material which is noted in these cases. There is no albuminuria.

(D). But with epilepsy, which is the disease most commonly confounded with eclampsia, lead poisoning must be mentioned. The latter is accompanied by nervous phenomena similar to those of puerperal eclampsia; attacks of convulsions, coma, albuminuria like that of nephritic albuminuria; but, as Depaul says, who has observed a remarkable case, the coma is not as deep—the loss of consciousness exists, but insensibility is not completely lost. The eyelids and the lips twitch, and there are convulsive movements, but the head remains fixed, the other muscles of the face are not convulsed, and the tonic and clonic spasm are incomplete. Further, the lead line of the gums aids the diagnosis, which is furthermore assisted by the information drawn from the patient. In Depaul's case, the autopsy revealed the presence in the brain of fifteen grains of lead. In this case the diagnosis was facilitated by the absence of infiltration, and also the absence of albumin in the urine.

We only mention here meningitis and chorea, which are distinguished by such characteristics that an attentive physician cannot be mistaken.

The application of the thermometer to eclampsia gives to-day a much greater precision in the diagnosis, which is remarkably facilitated by the study of the temperature. Thus, in eclampsia the temperature rises gradually and rapidly from the beginning of the attack, and it continues to rise even after death. (109.2°.) In uræmia, the temperature falls from the beginning, and continues to fall gradually until death, when it may descend even to 98° F. In some cases, however, the temperature stays high at the beginning, but always falls the following day.

In epilepsy, under the influence of an attack, the temperature rises slightly, but the highest point is 101.4°—the rule is 100.2°. The attack ended, the temperature falls, only to rise again at the beginning of a new attack. In epilepsy, the temperature curve is the same as that in puer-

peral eclampsia; it rises gradually, stops, and descends gradually after the attacks. It is then by the previous history, and above all by the absence of albuminuria, that the diagnosis is made. But when the epileptic attack presents the two periods, convulsive and meningitic, described by Delasiauve and Bourneville, at the beginning there is an elevation of temperature, then a depression, which is succeeded by a sudden elevation to  $104^{\circ}$  to  $105.3^{\circ}$ .

In hysteria and hystero-epilepsy the temperature rises during the attacks, but where the attack is over, it descends again gradually to the normal.

In lead poisoning the temperature follows the same course as in epilepsy, moreover the pulse is tricotoc. In cerebral disturbances the temperature does not rise.

*Cerebro-spinal Meningitis.*—The pulse is slow, and the temperature presents morning remissions and evening exacerbations. Finally, in the comatose period of cerebral hemorrhage, there is an initial lowering of the temperature, and then a much greater elevation as the disease is going to end fatally.

*Cerebral Concussion.*—There is always a lowering of the temperature.

It is not necessary to quote a large number of statistics of the mortality of women in the puerperal state to establish the seriousness of this disease. We must, in order to make our prognosis, seek, in the circumstances which accompany eclampsia, or in which it is produced, the elements for our prognosis, and finally determine what may be the consequences for mother and child. We think that eclampsia shows itself in this order of frequency: 1st. During labor. 2d. During pregnancy. 3d. During the puerperal state. Is eclampsia equally serious during these three periods, or is it more serious during one than during another?

First of all, it is a fact admitted by all authorities that death rarely takes place during the attack, and that it is, generally, during the comatose period or in consequence of puerperal complications that the fatal issue manifests itself.

Contrary to the opinion of Cazeaux and Ramsbotham, who consider eclampsia more fatal when it occurs during the puerperal state, Depaul and Mme. Lachapelle believe the mortality greater when the convulsions occur during pregnancy or labor. Here are the statistics of Wieger:

|   | Cases. | Cured. | Deaths. |
|---|--------|--------|---------|
| Before labor, . . . . .                       | 65     | 40     | 25      |
| At the end of labor, . . . . .                | 51     | 33     | 18      |
| During labor (stage not indicated), . . . . . | 50     | 35     | 15      |
| During the period of expulsion, . . . . .     | 25     | 18     | 7       |
| After labor, . . . . .                        | 62     | 42     | 20      |



Wieger hence agrees with Depaul. If the mortality of eclamptic women before and at term be compared, we find:

|                                  | Cases. | Cured. | Deaths. |
|----------------------------------|--------|--------|---------|
| Eclamptic before term, . . . . . | 50     | 37     | 13      |
| “ at term, . . . . .             | 50     | 38     | 12      |

The mortality is then about the same in each, and Wieger is still in accord with Depaul.

Among the elements of prognosis, the number of the attacks must be considered. Our statistics give the following:

|  |
|--|
| In 45 women having had 1 to 10 attacks the mortality was 11. |
| “ 31 “ “ “ 10 “ 20 “ “ “ “ 10.                               |
| “ 24 “ “ “ 21 “ 50 “ “ “ “ 12.                               |

Beyond this last number, which varied from 50 to 100 or 160, according to Bailly, Cretet and Depaul, we can make no statement, the number of cases being too small; the patients of Bailly and Pajot were cured.

We say, therefore, that the number of the attacks has a marked influence, because the mortality is increased with the number of the attacks; and since it has been proved that the number of the attacks is far from being proportional to the renal lesion, one is forced to admit that the attacks themselves have some influence.

The information derived from the thermometer ought to be a help in making a prognosis. But it is not the maximum temperature which ought to guide us, although it has some importance. (All the women, indeed, who have died, have had a temperature as high as  $105.4^{\circ}$  or higher, except two. In women who have been cured, the temperature has remained below  $105.4^{\circ}$  except two, in which cases the temperature reached this point). It is the course of the temperature which enables us to make the following propositions: 1. Whenever the temperature, after having followed the ordinary course, *i.e.*, elevated, which is usual in puerperal eclampsia, falls slowly and gradually, a favorable prognosis may be given. 2. If, on the contrary, the temperature continues, and gradually increases and becomes very high,  $105^{\circ}$  to  $106^{\circ}$ , an unfavorable prognosis can be given, for, in these cases, the eclamptic attack usually terminates in death.

*The Influence of Eclampsia on the Course of Pregnancy, and consequently on the Fœtus.*—This influence is gloomy, and in the great majority of cases, women attacked with epileptiform convulsions are confined prematurely. (Depaul.) Cohen has gone too far in affirming that he has never found albumin in the urine of any pregnant woman, unless the pregnancy was interrupted in its regular course. Blot has proved how exaggerated this opinion is, by showing that in the albuminuric women examined by him, 34 went to term, 7 only had premature labors. But in those cases, it was a question of albuminuria and not of eclampsia, which has a differently marked influence.

Without speaking of the cases in which eclampsia comes on during labor, it is undoubted that in most cases, when eclampsia comes on during pregnancy, before term or at term, labor is induced, and almost always, when labor does not come on immediately, the child dies. It is delivered later, with alterations proportionate to the length of time which it has passed in the uterus after its death. The further from term eclampsia declares itself, the more danger there will be for the child; on the contrary, the more advanced pregnancy happens to be, the more chance there will be for the child to survive, and these chances will be increased the more as the eclamptic attacks supervene in the few days preceding full term, and the more rapid the labor has been, or has allowed active intervention nearer to term.

As to the cause of the death of the child, must we look, as most authors do, to the convulsions, to disturbances in the blood, *i.e.*, to asphyxia, to an altered state of the blood? All these causes may act, because a certain number of children born alive die soon afterward, some because they were born prematurely, others because the asphyxia was so pronounced that they could not be revived. Others, finally, only die at the end of some days, and then, as Depaul says, the death must be attributed to congenital weakness or to convulsions, which seem to resemble somewhat the eclampsia of the mother, although we are not able to say that the two conditions are identical.

Van der Donckt admits that the death of the fœtus may result: 1st, from asphyxia; 2d, apoplexy in the brain or cord. According to Grenser, Litzmann found in the bodies of twins born of an eclamptic mother, a great many blood extravasations between the dura mater and the inner surface of the skull. The pleura and the entire surface of the lung presented others, about the size of the head of a pin, and the pericardium contained bloody serum. Grenser has found pin-head ecchymoses and blood extravasations of the size of a lentil seed on the pleura, pericardium, and peritoneum, in a case where there was a slight effusion of blood in the meninges; 3d, to blood poisoning; 4th, to non-albuminuric convulsions, coming on in utero or after birth (Cazeaux, Depaul); 5th, finally to peritonitis. (Grenser.)

Kiwisch attributes the death of the child in part to an arrest of the circulation in the placental vessels, during the attack of eclampsia and the resulting asphyxia, but he does not think that death of the fœtus results from asphyxia.

Braün, on the contrary, thinks that uræmia is the cause of the death of the fœtus. After the first or second attack, the fœtus is already affected, and dies almost always after a certain number of attacks. If the mother dies, the child, which is delivered by the Cæsarean section, is always dead. If the child is born alive, we find considerable urea in the blood which flows from the cord. If it is dead, carbonate of ammonia is



found in the blood immediately after delivery. If the labor is premature, the child dies in two or three days. Uremia alone can kill the child without eclampsia having developed at all. The children of eclamptic mothers are often themselves albuminuric.

Now we have seen that the thermometer shows that the eclamptic attack is not uræmic, and also that the temperature reaches in eclampsia  $104^{\circ}$ ,  $105^{\circ}$ , and  $106^{\circ}$ , and it results from Runge's researches that the fœtus dies whenever the maternal temperature reaches  $104.2^{\circ}$ . It is more than probable that, in the majority of cases, the death of the fœtus is due to the high temperature of the mothers. In the cases where the maternal temperature does not reach so high a point, death may be attributed either to the frequency of the attacks, to blood changes which result from it, or to blood poisoning.

Whatever the cause, the mortality of the fœtus is very great. Thus:

|           |                           |                     |
|-----------|---------------------------|---------------------|
| Blot,     | in 58 cases of eclampsia, | . 39 children died. |
| Möricke,  | " 104 " " "               | . 62 " "            |
| Merriman, | " 51 " " "                | . 34 " "            |
| Scanzoni, | " 25 " " "                | . 16 " "            |
| Champion, | " 10 " " "                | . 5 " "             |
| Depaul,   | " 132 " " "               | . 64 " "            |
| Wieger,   | " 368 " " "               | . 179 " "           |
|           | 748                       | 399                 |

According to Braün:

|                              |           |              |
|------------------------------|-----------|--------------|
| Mortality during labor,      | . . . . . | 51 per cent. |
| " " expulsion,               | . . . . . | 15 "         |
| " " the attack and 3d stage, | . . . . . | 45 "         |

Finally, Wieger gives the two following tables:

| Eclampsia before or during labor. |                  | Mortality.  |          |  |        |         |       |                         |      |         |                              |      |         |                 |     |        |                              |    |        |
|-----------------------------------|------------------|---|----------|--|--------|---------|-------|-------------------------|------|---------|------------------------------|------|---------|-----------------|-----|--------|------------------------------|----|--------|
| Children at term,                 | { 32 per cent. } | Average, 27 per cent.   |          |  |        |         |       |                         |      |         |                              |      |         |                 |     |        |                              |    |        |
| " before term,                    | { 40 " }         | 64 "  |          |  |        |         |       |                         |      |         |                              |      |         |                 |     |        |                              |    |        |
|                                   |                  | <table> <thead> <tr> <th colspan="2">Children</th> <th rowspan="2">Cases.</th> </tr> <tr> <th>Living.</th> <th>Dead.</th> </tr> </thead> <tbody> <tr> <td>Eclampsia before labor,</td> <td>. 19</td> <td>29 = 48</td> </tr> <tr> <td>" at the beginning of labor,</td> <td>. 28</td> <td>21 = 49</td> </tr> <tr> <td>" during labor,</td> <td>. 7</td> <td>8 = 15</td> </tr> <tr> <td>" " the period of expulsion,</td> <td>19</td> <td>3 = 22</td> </tr> </tbody> </table> | Children |  | Cases. | Living. | Dead. | Eclampsia before labor, | . 19 | 29 = 48 | " at the beginning of labor, | . 28 | 21 = 49 | " during labor, | . 7 | 8 = 15 | " " the period of expulsion, | 19 | 3 = 22 |
| Children                          |                  | Cases.  |          |  |        |         |       |                         |      |         |                              |      |         |                 |     |        |                              |    |        |
| Living.                           | Dead.            |   |          |  |        |         |       |                         |      |         |                              |      |         |                 |     |        |                              |    |        |
| Eclampsia before labor,           | . 19             | 29 = 48   |          |  |        |         |       |                         |      |         |                              |      |         |                 |     |        |                              |    |        |
| " at the beginning of labor,      | . 28             | 21 = 49   |          |  |        |         |       |                         |      |         |                              |      |         |                 |     |        |                              |    |        |
| " during labor,                   | . 7              | 8 = 15  |          |  |        |         |       |                         |      |         |                              |      |         |                 |     |        |                              |    |        |
| " " the period of expulsion,      | 19               | 3 = 22  |          |  |        |         |       |                         |      |         |                              |      |         |                 |     |        |                              |    |        |

These figures confirm the propositions which we made above.

The prognosis of eclampsia is also aggravated by the fact that it leads to puerperal complications, metritis, peritonitis etc. But along with these serious complications, there are two which, if they do not lead to the death of the patient, merit none the less serious attention. We refer to puerperal mania and paralysis.

In the following chapters we will treat in detail of these two conditions, and at present we will limit ourselves with what concerns the direct relations between puerperal mania and eclampsia, before entering more carefully into details in the chapter on puerperal insanity.

It was Simpson who first noted the relation which exists between eclampsia, albuminuria and puerperal mania. Scanzoni has seen 4 cases; Wieger has seen 10 cases in 100 eclamptic women; Grenser 4 times in 19 women; Braün 5 times in 44 women; and it has also been observed by Gooch, Merriman, Esquirol, Sanchez Frias, Selade, Billod, Marcé and all alienists.

In cases of this nature, sometimes, the maniacal state immediately succeeds the coma which follows the convulsion. Sometimes the delirium does not break out for twenty-four or thirty-six hours after the cessation of the convulsions, when everything seems to indicate the end of all cerebral complications. As a rule, cure follows at the expiration of more or less time, but it is not always so, and mania may be incurable or even end in death. But we must be careful not to confound these cases of true mania with the cases of puerperal meningitis with delirium, which Cazeaux has mentioned among the terminations of eclampsia. These may occur without albuminuria or eclampsia, and, although they are generally fatal, there are exceptional cures, as we observed in consultation, several years ago, in a single case.

Fritz, agreeing with Griesinger and Winckel, divides puerperal mania into three categories.

1. Symptomatic mania, which is only of interest on account of the febrile delirium, which increases and diminishes with the affections which cause it.
2. Puerperal mania, which develops slowly and a long time before confinement, and gives rise to the furious delirium which labor or the puerperal state excites, by becoming the occasional cause;
3. Puerperal mania, properly so called, which results from hemorrhages, eclampsia, violent physical and moral suffering, without hereditary predisposition.

In this last class, Winckel distinguishes two kinds of mania. In one the affection is acute, the course rapid, and there is an increase in the temperature and acceleration of the pulse. The maniacal attack is preceded and accompanied for some time by head-ache, hotness of the head, photophobia, great susceptibility to noise, tinnitus aurium and insomnia. In the other, the same general symptoms are not observed; the pulse is normal, or slightly accelerated; the life of the patient is not in danger, but the mental disorder is more or less chronic, and persists sometimes indefinitely.

It is the first of these two forms which Simpson and Donkin Scott make dependent upon albuminuria. Fritz, on the contrary, declares that there is no relation of cause or effect between albuminuria and mania. Braün says that the mania which succeeds eclampsia is afebrile, but he has



almost always had in his cases a very marked acceleration of the pulse and elevation of the temperature. If, generally, mania follows eclampsia, it is not always so, and it may come on before, during and after the convulsions, and he cites in support of his views four observations which were in part personal and in part reported by Leubuscher, Grenser, Donkin, Scanzoni, Spiess, Devilliers and Regnault, Esquirol, Trousseau, Seydel and Bonifas. Often the mania has ended in a few days, and again it has become chronic; but in these there were hereditary tendencies; two cases ended fatally, one by puerperal fever, one in profound coma coming on after an attack of mania.

From these observations Fritz has drawn the following conclusions: 1. In whatever period eclampsia comes on, it may be accompanied or followed by mania; 2. Mental disturbances predispose the pregnant woman to mania and eclampsia, during and after confinement; 3. During labor, mania may appear either during the prodromic period of eclampsia, or during the interval of attacks, or else in the state following, or lastly even several days after the cessation of the attacks; 4. It is not rare to see an interval of health, more or less long, separate two of these periods. The mania is of short duration according as the attacks are feeble, and the interval between the attacks are longer; 5. The form of the mental disturbances which succeed almost always the eclamptic attacks is acute mania; 6. In all cases, a woman who has had eclampsia is predisposed more than all others to puerperal mania.

Rocher does not believe with Fritz that eclampsia is, properly speaking, the cause of mania, and he is rather disposed to admit that the two diseases depend upon the same lesion, which we do not yet know. Nevertheless, eclampsia constitutes a predisposition to puerperal mania, which may start up soon after the complete return of consciousness, and it is in the organic alterations, more or less serious, that we must seek the occasional cause. These having the same origin, sometimes they start up simultaneously, sometimes succeed one another. To the cases already cited, he adds three of Plasse D' Einbeck, of which two were cured, and one died.

Cortyl, 1877, considers puerperal mania following eclampsia as depending on a true perversion of nervous action, which, after producing disorders of motion, ends by provoking outbursts of mental disorders.

Finally, eclampsia may produce paralysis, either of the senses, blindness, or deafness; of the limbs, hemiplegia, paraplegia. We will refer again briefly to puerperal paralysis.

*Treatment.*—In 1872, we concluded our article on this subject in the following way. “In presence of a disease so serious as eclampsia, it is the duty of the physician not to limit himself to one mode of treatment, but he should have a choice of several methods, without being a partisan of any one, to the exclusion of all others.”

To-day, ten years later, we would give the same opinion, and although

numerous works have been since written on this subject, we repeat what we have just said: There is no specific treatment for eclampsia. But we are not on this account wholly helpless when brought face to face with this disease, and if we have no exclusive method for treatment, it is no less true that we have at our disposal a certain number of means, which, fortunately, have given good results in many cases. We proceed to refer to these.

The treatment of eclampsia may be divided into two great classes: the preventive treatment, the curative treatment. The last may be divided into the medical and obstetrical treatment.

1. *The Preventive Treatment.*—Does there exist a preventive treatment of eclampsia? Since we consider eclampsia as almost always dependent on albuminuria, we do not doubt this, and the best way to prevent eclampsia will be to treat the albuminuria. It is necessary, then, in our opinion to resort at once to a milk diet, continued if necessary for weeks or months. But for this treatment to be of use, it must be tried in a thorough manner, and it will be necessary, often, to overcome the patient's prejudices, for they are easily induced to stop the treatment as soon as they become a little better. So long as albumin remains in the urine, the treatment should be thoroughly continued. As soon as the albumin disappears, it should be stopped at once, but the patients ought only to return slowly and gradually to their ordinary diet. The examination of the urine should be continued every four or five days, and the treatment be renewed if albumin reappears, even in a small quantity. If the albumin has disappeared for eight days we can make use of tonics,—quinine, gentian, together with small doses of iron. We prefer the extract of quinine, and we give it in the following way:

|                      |       |       |         |
|----------------------|-------|-------|---------|
| ℞. Extract Quinæ,    |       |       |         |
| Extract Gentianæ,    | . . . | āā 4  | āā 3 i. |
| Ferri Subcarbonatis, | . . . | 1     | gr. xv. |
| Pulv. Rhei.          | . . . | q. s. | q. s.   |

M. Ft. pil. No. 100.

Sig. Take five or six pills during the day.

At the same time, the patients should take every two or three days a light purgative (Castor oil, mineral water or magnesia). Since we have employed this treatment, we have had only good results, and it has been used with success in cases seen by us in our own practice and also in consultation. Unfortunately, there are cases in which the patients have such a dislike for milk that they can neither take it or keep it down. In such cases venesection should be our choice, as recommended by Cazeaux, Peter, Depaul. We withdraw from 4500 to 6000 grains of blood, according to the case. Peter goes further, and advises wet cups to the lumbar region; *i. e.*, he believes, "that the dreaded uræmic complications should be guarded against by general blood-letting; that the renal



congestion should be relieved by local blood-letting, this renal congestion being the first and only cause of the disease. The congestion of the kidneys may also be relieved by purgation." Besides the means given above, others have advised numerous agents in which we have little confidence.

*Diuretics.*—These are recommended with more or less reserve by Frerichs, Braün, Pajot, Cazeaux. Bailly prefers vegetable diuretics. The infusion of triticum repens, adding or not some nitrate of potash, squills or digitalis. Braün advises the use of vapor baths and also seltzer water and Vichy. Frerichs, theoretically, advises benzoic acid, lemon juice, or tartaric acid, with the hope of neutralizing the carbonate of ammonia produced in the blood by the decomposition of urea. Tannin, iodide of potassium and extract of aloes have also been recommended; Johnson and Collins have recommended emetics.

Unfortunately all these means have an uncertain action, and venesection even, whether it be general or local, does not always suffice to prevent the attack. Therefore, with certain restrictions, we have seen that Tarnier recommends the induction of premature labor as a means of preventing eclampsia. We have given reasons which have induced us to reject it. We will not refer to them here.

[Nevertheless, the induction of premature labor meets with the approval of most American accoucheurs, provided that other means have been tried faithfully. It will be sufficient, in this connection, to quote the words of our distinguished teacher and writer, Lusk, of New York, who says, "My own convictions are clear that, so soon as grave cerebral symptoms develop, the period of folded hands has passed. The relief to be obtained from chloral and catharsis is, as a rule, of short duration, and we cannot go on giving chloral and cathartics to the end of gestation. Moreover, it is necessary to take cognizance of the well-being of the foetus, which is threatened by the continued circulation of urea in the maternal blood. The induction of premature labor is attended by but moderate risks, if resorted to after the uremic symptoms have been got fairly under control. If employed as a last resort, its use then partakes rather of the nature of a forlorn hope. So far as my own experience goes, however, the practice of waiting upon nature has proved uniformly disastrous, whilst the induction of labor has furnished me with a certain proportion of recoveries."—Ed.]

*During Confinement.*—Bailly advises the use of baths, of chloroform, and the termination of labor as rapidly as possible. We endorse the opinion of Bailly, excepting the baths and chloroform. We prefer chloral to chloroform. But we are not agreed with him in regard to the prophylaxis of eclampsia after labor. Bailly says that the rapid delivery of the placenta and blood clots is necessary. We cannot believe that he advises, by the words extraction of the placenta, the artificial de-

livery of the placenta. He knows better than any one the dangers and difficulties of the operation, and, moreover, the manipulations which are necessary would in themselves be sufficient to produce an attack of eclampsia. On the other hand, although we are advised to deliver the placenta as soon as possible, this is only practicable when the placenta is detached. Nature alone should indicate when one could or should deliver the placenta. As to general blood-letting after labor, we think that it only should be resorted to in exceptional cases, for nature alone should interfere in these cases. All accoucheurs, since Depaul has called their attention to this point, have noted the frequency of uterine hemorrhage during the third stage, in albuminuric women. It must be one of two things. If the hemorrhage is useful, why should we be eager to stop it? Or if it is useless, why should it be replaced by general blood-letting?

It is true that in the last case, the amount of blood wished to be withdrawn can be controlled; while, in the uterine hemorrhage, the loss may be considerable, but there will always be time enough to interfere and stop this hemorrhage before it reaches serious proportions. There is still another reason why we do not advise venesection after delivery. Albuminuric women are, by the fact of the disease alone, predisposed to puerperal complications, and those who have had hemorrhages, are even more apt than all others to suffer from complications. Certain authors have gone further, and said that puerperal mania has been produced by frequent and copious bleeding, and by the anæmia which is the result. In such cases we limit ourselves to medical treatment, and, above all, to a milk diet as long as albumin remains in the urine.

## II. CURATIVE TREATMENT.

*Medical Treatment.*—The eclamptic attack has appeared and the pregnant woman, during labor or after delivery, is in its power, either because the albuminuria was not recognized or treated, or it may be because the milk cure, or preventive treatment has failed. What is to be done?

Before entering into the discussion and into the valuations of the two great methods of treatment, the antiphlogistic and the anæsthetic treatment, there are a few little points that it will be best not to overlook, for they are applicable to all cases, and when they are disregarded, they may, sometimes, cause complications more or less serious.

During an eclamptic attack, the patient becomes completely unconscious, suddenly, even in a moment. The horizontal position, both during and after the attack is indispensable, and this position will be of advantage, because, in general, during the attack, patients are not at all likely to change their position. Unfortunately, it happens too often that eclamptic women are taken by surprise and fall unconscious, and are thus exposed



to those lesions which are seen in epileptic cases (wounds and burns) which, although they have no influence on the attack, may retard the cure.

Airing the room, loosening the clothing, in a word, every thing which facilitates the free movement of the chest, have a true influence, and there is another cause still which may aggravate the condition of the patient, the distension of the bladder. The urine, it is true, is not secreted abundantly in eclampsia (so little is secreted that sometimes it is difficult to procure enough to establish the presence of albumin), but, in some exceptional cases, the bladder is so distended with urine that it may be the cause of serious complications, and Lamotte has cited two cases in which the convulsions seemed to depend directly on this distension, since the evacuation of the urine by the catheter caused it to cease at once. One should never forget to see that the bladder is empty.

Often, also, patients are worried by attendants who wish to restrain them. A careful watching of the patient is all that is necessary, because touching often excites a patient, and at times it may be the means of renewing the eclampsia. Auscultation and abdominal palpation should be resorted to only exceptionally, and only when it is necessary to be sure of the condition of the child. All the more is this true of the vaginal touch, which, whether the prostration of the patient is real or apparent, produces nearly always in her a feeling of revolt or repulsion, which makes itself known by a low groan or even by some excitement, and may produce the eclamptic attack itself. This abstention, however, has its limits, and one should not forget that frequently labor comes on during eclampsia, that it may be extremely rapid, that dilatation, scarcely commenced when we first examine, may take place in a few hours or less, and that uterine contractions, continuing to take place in spite of the coma, may overcome the resistance of the cervix and of the perineum, and expel a child which, if it survives, is exposed to all the risks consequent upon unexpected delivery. It is best then to assure ourselves from time to time, by examination, in regard to the progress of the labor in the interest of the child. Another reason is that thus we may know the time when intervention is possible, an intervention which, if it is not always in the interest of the mother, as we shall see, is so for the child in a certain number of cases.

At the beginning of the attack the tongue hangs outside the mouth, and the spasmodic closure of the jaws exposes it to cuts and tears, which are accompanied by swelling, impeding respiration and deglutition, not to speak of hemorrhage. The tongue must be replaced and kept behind the jaws or teeth. It has been advised to place between the teeth a handle of a spoon, a cork, a piece of cloth or wood. These agents, however, are not without their inconveniences, and Depaul has in his museum a piece of wood nearly 5.5 inches long, which did considerable damage. This piece of wood, first placed between the jaws, was displaced by one

end; it sank into the œsophagus, and injured the ranine artery under the tongue, from which there was a severe hemorrhage, which did not kill the patient, but was only stopped by the use of the cautery. The simplest way consists in replacing the tongue behind the teeth at the beginning of the attack, and to keep it there by the use of a cloth held by both hands during the attack.

The two principal methods of treatment at present, are: 1st. The antiphlogistic. 2d. The anæsthetic method. Each of these methods has ardent admirers and violent opponents. Should preference be given to one, or will advantage be gained by using them together?

A. *Antiphlogistic Method.*—General and local blood-letting, purgatives, revulsives.

(a). *General Blood-letting.*—This was formerly the prevailing opinion, and Mauriceau, Dionis, Sauvages, Dewees, Burns, Hamilton, Chaussier, Baudelocque, and also P. Dubois, Cazeaux, and above all Depaul and Peter, are the defenders of this theory, which counts among its adversaries such men as Braün, Maygrier, Peterson, Kiwisch, King, Blot, Campbell, Sedywick, Churchill, Litzmann, Williams, Miquel, Schwartz, Legroux, Thomas, etc. But even among its advocates there is a difference of opinion. It is only necessary to cite the two professors of the French school: while Depaul favors copious and frequent bleeding, Pajot states that “he has seen the method employed so often without success, that he does not advise it. He has not, however, banished bleeding completely in the treatment of puerperal eclampsia; in certain robust and plethoric women it is useful.”

Thus Depaul does not hesitate to withdraw at least 30,000 grains of blood from a woman in a few hours. Dewees proposes to bleed at each attack. Hamilton proposes to withdraw three pounds of blood and repeat the operation if necessary. The bend of the knee is the situation most usually selected. A sufficiently large vein is opened to obtain a rapid and continuous flow, and this is not always easy on account of the movements of the patient. Bleeding is practised at any time when the convulsions appear, before, during, or after labor, with this exception, that one ought to consider, in cases when the disease comes on during or after labor, the amount of blood lost at delivery. In acting thus, says Barquisseau (1876) “one diminishes the general mass of the blood, one relieves the nerve centres, which have a tendency to become congested, and by making the spinal bulb anæmic we deaden reflex irritability, which keeps up the hyperæmia, and by which the convulsive attack may be revived.”

The advocates of moderate blood-letting, compared with copious and repeated, believe that the advantages of extensive blood-letting are more than counterbalanced by the serious complications in the present and in the future. For the present, it is to be feared that depletion, carried beyond certain limits, would itself become a cause of



irritation to the brain and spinal cord, as is the case after profuse hemorrhages, of which the final symptoms are almost always convulsive. For the future, the bleeding impoverishes the blood of an eclamptic patient, whose blood is already very poor, and forces the unfortunate patient into a chloro-anæmic state, the intensity and persistency of which may give rise to great alarm. Lee, in 19 cases in which he withdrew a large amount of blood, has reported 19 deaths, and 35 cases cured in 35 patients where the blood-letting was moderate. Braün himself, who is so opposed in a general way to bleeding, accepts moderate blood-letting in robust and plethoric women. There results from statistics at our Clinic the following:

|   | Cured. | Deaths. | Mort.          |
|---|--------|---------|----------------|
| 58 women having been bled once with or without leeches, | 34     | 24      | 41.3 per cent. |
| 24 " " several bleedings,                               | 11     | 13      | 54 "           |
| General mortality by bleeding,                          |        |         | 45 "           |

The conclusion to be drawn from these statistics is that moderate venesection is always followed by a less mortality than the more copious bleeding. Therefore we prefer moderate bleeding, although, aside from the general action on eclampsia, we can state the following facts:

First and most often, the pulse undergoes marked changes; although it may be very feeble, it becomes less rapid and stronger, being easily felt under the finger; this is one of the first and most evident effects of bleeding. But there is still another effect which it is well to state, although in many cases it is not constant, *i.e.*, that nearly always there is a greater interval between the attacks. This is undoubted, for in a certain number of observations, in those cases in which the attacks continued in spite of the bleeding, their violence was lessened and the intervals which separated the attacks was greater. In 297 cases gathered from various authors, we find:

|   | Cases. | Cured. | Deaths. |
|---|--------|--------|---------|
| Bleeding useless or inappreciable,          | 72     | 55     | 17      |
| Attacks increased in spite of the bleeding, | 46     | 14     | 32      |
| " diminished or ceased after bleeding,      | 92     | 86     | 6       |
|   | 210    | 155    | 55      |

155 cured; 55 deaths; mortality, 26.1 per cent.

|                                 | Cases. | Cured. | Deaths. | Mort.          |
|---------------------------------|--------|--------|---------|----------------|
| One bleeding,                   | 111    | 66     | 34      | 30.6 per cent. |
| Bleeding repeated and frequent, | 83     | 65     | 18      | 21.6 "         |

In 54 cases at the Maternity, general mortality by bleeding, 34.7 per cent.

|                    | Cases. | Cured. | Deaths. | Mort.          |
|--------------------|--------|--------|---------|----------------|
| Repeated bleeding, | 13     | 8      | 4       | 23.3 per cent. |
| One bleeding,      | 13     | 7      | 4       | 36 "           |

It is seen from these tables, which have a total of 494 cases, that a conclusion cannot be drawn, for in comparing them we obtain:

*General Mortality of Bleeding Compared.*

|                  |              | One bleeding.  | Repeated bleeding. |
|------------------|--------------|----------------|--------------------|
| Clinic, .        | 45 per cent. | 41.3 per cent. | 54 per cent.       |
| Observations, 26 | “            | 30.6 “         | 21.6 “             |
| Maternity,       | 34.7 “       | 36.3 “         | 33.3 “             |

While in the Clinic, where the repeated bleeding is used with greatest severity, the mortality has risen to 54 per cent., exceeding considerably the mortality of single bleeding, in our own observations and at the Maternity, on the contrary, the mortality of single bleeding exceeds that of repeated blood-letting. It is impossible, therefore, to draw any conclusions in favor of one or the other method, and we can only state the favorable influence which blood-letting has on the course of the attacks. This is one reason why bleeding should not be discarded entirely.

(b). *Purgatives.*—Together with this method, purgatives must be mentioned. Those which are constantly and with good reason employed (because they are easily managed) are calomel and jalap, to which we can add other purgatives, senna, sulphate of soda, etc. These only act as adjuvants.

(c). *Emetics.*—We reject all emetics, in spite of the fact that Legroux advocates them. Collins classes them with bleeding and calomel, and he is supported in this by Lever, Johnson and Johns. It is difficult to assign to each of these therapeutic agents the part which belongs to them.

*Revulsives.*—We have entirely given up the use of sinapisms, blisters, etc. Besides the irritation they produce, they may cause ulcers, more or less severe, or gangrene sometimes so extensive as to alone cause the death of the patient.

We believe the following are useless, if not dangerous: Fly blisters, sprinkling the abdomen with cold water (Denman), ice applied to the head, cold baths, anti-spasmodics, camphorated ether, valerian, assafoetida. Bromide of potash has seemed to be useful and efficient in some cases, and Trousseau has prevented an attack by compressing the carotids on each side.

Jaquet has advised the use of a wet pack, and Porter seems to have had very good results from this treatment.

Brummerstädt recommends opium, but it should be given freely to have the desired effect. According to him, at the first onset of the attack, 1 to 2 grains of pure opium (or a corresponding amount of the tincture) must be given, and later  $\frac{1}{2}$  a grain taken after each attack until narcotism is reached. It must also be given after the last attack. Subcutaneous injections of morphine may be preferred.

[In this country many observers have obtained better results in the treatment of eclamptic seizures, from the subcutaneous administration of opium, than from any other method. It acts as quickly, nearly, as chloroform, and does not alarm the patient to such a degree. The injection should



be given in full doses at once, one grain of morphia at least, and boldly repeated with the recurrence of fresh attacks. For our part, if the convulsions did not yield to morphia, we believe that the immediate termination of labor offers the patient the best chance.—Ed.]

Lately, subcutaneous injections of pilocarpine have been tried in doses of  $\frac{1}{8}$  grain, repeated if necessary, and it has been tried to induce labor by means of it, and again as a means of treating the eclamptic attacks. We will confine ourselves here to this last effect, and reserve for further consideration the ecbolic effects of pilocarpine. Here are the results:

|               |                  |                            |                   |
|---------------|------------------|----------------------------|-------------------|
| Massmann,     | 2 cases          | 2 cures.                   |                   |
| Fehling, .    | 2 " (1 hopeless) | 2 "                        | Infus. Jaborandi. |
| Prochownick,  | 2 "              | 2 "                        |                   |
| Bidder, .     | 2 "              | 2 "                        |                   |
| Ludwig, .     | 1 case           | 1 death.                   |                   |
| Strognowski,  | 1 "              | 1 cure.                    |                   |
| Schramm,      | 2 cases          | 2 cures.                   |                   |
| Boegehold,    | 3 " uræmic,      | 3 "                        |                   |
| Pasquali,     | 1 case           | 1 cure.                    |                   |
| Braun, .      | 1 "              | 1 "                        |                   |
| Barker, .     | 6 cases          | 6 pulmonary complications. |                   |
| Sänger, .     | 3 "              | 3 "                        | " "               |
| Kleinwachter, | 4 " albuminuric; | 2 cures, 2 failures.       |                   |
| Galabin, .    | 1 case, failure; | success with chloroform.   |                   |
| Nowitzki,     | 2 cases          | 1 cure, 1 death.           |                   |
| Hamilton,     | 1 case           | 1 "                        |                   |

In 34 cases where pilocarpine has been used for eclampsia, it acted well in 20 cases, 2 cases died; 9 cases had such pulmonary complications that it had to be given up.

The results seem very encouraging; unfortunately, these cases prove very little, for pilocarpine has almost never been given alone, but it has been associated with venesection, chloroform, or other means, douches, sounds intended to produce an abortion. It is thus difficult to say what part pilocarpine alone had in the cure.

Sänger, who has written the most complete work on pilocarpine, concludes that it is not an ecbolic primarily, that it cannot bring on uterine contractions, but only reinforce and regulate them. 1st. When the cervix is more or less dilated, even when there are no true uterine contractions (the period of false pains), pilocarpine may produce labor. 2d. When there are irregular pains, pilocarpine will regulate them. 3d. During the period of dilatation and expulsion, pilocarpine is a means of making the labor more rapid, by regulating the pains and making them stronger and more frequent; and when the head is delayed by the feebleness of the pains, pilocarpine, by shortening the confinement, may take the place of forceps. The danger and inconveniences are easily overcome by the use of atropine, which is the physiological antidote.

As to eclampsia, pilocarpine by injection, is only successful in cases in

which it will produce sweating and salivation, or at least the latter. In these cases alone can it replace other therapeutic means.

In dangerous cases it ought not to be used exclusively. One of its advantages is to accelerate labor. Barker, on the contrary, who has used it in six cases, has seen bad results from it in every case, either in the heart or lungs, and does not believe that it should be used in eclampsia, and accepts it only as an adjuvant. Kroner has always seen it fail, both as an ebolic and as a cure of eclampsia. Finally Marti-Autet, collecting the observations of different authors, and the experiments of Hyernaux and Chantreuil, has arrived at the following conclusions:

1. In a great number of cases, subcutaneous injection of pilocarpine has given a negative result. It has not brought on uterine contractions. (Welponer, Parisi, Hyernaux, Sanger.)

2. There has been the same result in a number of experiments on animals. (Hyernaux, Chantreuil.)

3. Under special conditions, the subcutaneous injection of pilocarpine seems to cause uterine contraction, when the woman or animal experimented on is already in labor or has arrived at term.

4. Under these conditions, the uterine contractions come on some minutes after the injection of the pilocarpine; they increase in frequency for a time, then remain stationary, and finally diminish. Renewed injections give like results. (Kleinwachter, Sanger.)

5. At times the action is sufficient to expel the fetus. (Schauta, Sanger, etc.)

6. Now and then the action has been insufficient to expel the fetus. (Sanger.)

7. Hence, it seems reasonable to assume, that if pilocarpine is given at term or during labor, it seems to have a real influence on uterine contractions; before term, subcutaneous injections of pilocarpine are usually insufficient to produce premature labor.

All these agents are really palliatives or adjuvants, and if they are useful in some cases, they fail in many others. They cannot then constitute, so to speak, a method of treatment. Generally, they have been combined with venesection, chloroform, chloral, and premature labor, therefore, it is not possible to say just what has been useful. Eclampsia is essentially rapid in its course, and a great number of these drugs are slow in their action; therefore we think that they will be more successful if they are not employed alone, but are associated with other means, and in particular with venesection *i.e.*, the antiphlogistic treatment.

B. *Anaesthetic Method.*—Three agents are usually employed. Ether, which has given place to chloroform, and lately chloral. In 15 cases reported by us in which ether was employed:—influence none or not evident, 2 deaths in 3 cases; aggravation of the course of the disease, 4 deaths in 4 cases; diminution or cessation of the attacks, 8 cures in 8 cases. The



general mortality, then, is about 40 per cent. But since the substitution of chloroform for ether, the anæsthetic method as applied to eclampsia has been thoroughly tried, and has given some authors most surprising results. Unfortunately, contradictory facts have been collected, and we think that anæsthetics, no more than venesection, can be considered an heroic remedy for eclampsia. Is the method rational?

The opponents of chloroform object to it on the grounds: 1. In a great many cases not only are the attacks not diminished under the influence of an anæsthetic, but they come on more frequently, and more strongly. 2. Although chloroform arrests the attacks, they reappear in the interval between the inhalations, and the woman cannot be kept under chloroform for some time without danger. 3. Chloroform is irrational, because it produces congestion of the nerve centres, and may thus increase cerebro-spinal congestion, which is already so much dreaded in eclampsia. 4. Chloroform increases the asphyxia of eclamptic subjects already predisposed to this complication; 5. The use of chloroform in some eclamptic cases has been followed by the appearance of puerperal mania.

Depaul, finally, who is one of the most determined opponents of chloroform, admits that it does modify to a certain extent the attacks of eclampsia, but they exist, none the less, as well as all the complications that go with them—congestions, central hemorrhages, pulmonary congestion, etc.

The opinions of authors are divided on this subject; while Richet, Gros, Sprengler, Scanzoni, Braün, Späth, Meinsinger, Blot, Charrier, Richardson, Bazin, Macario, Wittle, Liégeard, Maugenest, Farnet, Derby, Kiwisch, Wieger, Chailly, Channing, Campbell, Schneiseson, Schroeder, Spiegelberg, are advocates of this method, others, as Depaul, Pajot, Tarnier, Jacquemier, Guéniot, Bailly, are more conservative, or even reject it all together.

We believe that it is not at all necessary to accept it exclusively, nor reject it absolutely; and, if chloroform has failed in a good many cases (we have had in our own practice an unfortunate example), there are others where it has rendered excellent service. In one article we collected 63 cases in which chloroform had been administered by inhalation or internally, and the following are the figures:

|  | Cases. | Cures. | Deaths. | Mort.        |
|--|--------|--------|---------|--------------|
| Cases in which the influence has been nil or could not be noticed, . . . . . | 8      | 6      | 2       | 25 per cent. |
| Cases in which the disease has not been arrested, . . . . .                  | 6      | 2      | 4       | 33.3 "       |
| Cases in which the attacks, at first modified, have ceased, . . . . .        | 49     | 48     | 1       | 2.4 "        |

The figures of the average mortality are only raised to 11 per cent., but

this we believe is too small, and because the successful cases have been published and the unsuccessful ones not. Nevertheless, taking the highest figure of the mortality, *i.e.*, in the unfortunate cases—33 per cent., and we have pretty nearly the figures obtained by us in the Maternity by venesection—34 per cent.; and a much lower figure than at the Clinic—45 per cent. This would seem to settle the question, but, on the other hand, if we compare all statistics at the Maternity, we find that the mortality by bleeding is 34.7 per cent.; by the use of chloroform, 50 per cent. The results, therefore, are somewhat contradictory.

|                      | Bleeding.   | Chloroform.  |
|----------------------|-------------|--------------|
| Clinic, . . . . .    | 45 per cent | 33.3 per cen |
| Maternity, . . . . . | 34.7 “      | 50 “         |

The use of chloroform once granted, how should it be administered? It should be inhaled and carried to complete narcosis, but the use of chloroform must not cease when once it has been employed. Inhalation should begin the moment the nervous excitement commences before the attack; it should be given rapidly in order to get complete anæsthesia as soon as possible. This once obtained, the inhalations should not be given up, but should be continued for several hours, six, eight, twelve, fifteen hours or even more if necessary. If the attacks are far apart, the amount of chloroform may be diminished or suspended altogether during the interval. Do not allow the patient to come out of the chloroform and regain consciousness; at the least sign of a return of an attack give the chloroform again to complete anæsthesia. Tarnier, in one case which he cured, kept the patient under chloroform all night, and 6000 grains of chloroform were used. When once complete anæsthesia is produced, keep it up without regard to time. This is well in theory, but it cannot always be done in practice; for there are cases in which the use of chloroform must be suspended after a certain time, although it need not be given up altogether, as in our patient.

It is well then, to resort to other means; but in general, it is astonishing to see with what ease patients will endure a long-continued anæsthesia, and the length of time that they can be kept under its influences without inconvenience. There is still one other difficulty, *i.e.*, how is one to know the exact time when it will be safe to give up chloroform? This cannot be fixed exactly. It is not rare to have the interval between the attacks last for several hours, and we seem to have mastered it, when in reality there has been a short suspension. The question cannot possibly be answered absolutely. When the patient has gone several hours without an attack, it is best to withdraw the chloroform a little without giving it up altogether. We would keep the patient in a half-sleepy condition, so that, if necessary, we may produce by a few inhalations complete anæsthesia if there are any other symptoms of the attack. But it is



only after some time that the chloroform can be entirely given up. Baily goes still further, and advises in cases in which the attacks continue, and with greater obstinacy, not to keep up the chloroform more than twelve hours at once, but to stop it at the end of this time, to allow the blood to become purified, and to make use of chloroform again in case of a relapse. We do not accept this view, because we think that chloroform acts only on condition that its influence is prolonged, and therefore it must be given continuously. Admitting the action of chloroform on the nerve centres, we believe that, in acting as Baily would have us, patients would be exposed to all the dangers of chloroform without deriving any advantage from it.

But there is another agent, little known, or better, little used until 1872, which has since taken a prominent place in the treatment of eclampsia, and we have reported already some marvellous cases in which it has been employed. This is chloral-hydrate. The use of chloral-hydrate in the treatment of eclampsia either by the mouth, rectum or subcutaneously, only dates back a few years. It is only since 1869 that chloral has really taken its place in practice in the treatment of eclampsia.

Employed for the first time, in 1869, by Saint Germain, it was not slow in taking its place in obstetric practice, and we limit ourselves to the following works on the subject: Lecacheur, 1870; Alexander, Sedywick, Demarquay, 1870; Campbell, Milne, Flok, Mackintosh, 1870-71; Raymond, Furley, Stearly, Mac Rae, Bookley, 1871-72; Windhorn, Mawsell, Phillips, Tarnier, Bourdon, Charpentier, 1872; Franco-y-Mazora, Pélissier, 1873; Fauny, 1874; Belière, Chouppe, 1876; Testut, 1877; Troquart, 1877, Delaunay, 1877; Pélissier, 1878; Tucoulat, Froger, 1879. Fauny, in 1874; collected 36 cases, 16 of which had been given chloral after other treatment, and 20 had received chloral alone. The following results are given:

|                                      | Cases. | Cures. | Deaths. | Unknown. | Per cent. |
|--------------------------------------|--------|--------|---------|----------|-----------|
| Chloral given after other treatment, | 16     | 14     | 2       | 0        | 12.5      |
| “ “ alone,                           | 20     | 19     |         | 1        |           |
| Women treated by chloral alone,      | 36     | 33     | 2       | 1        |           |
| Mortality,                           |        |        |         |          | 3.7       |

Chouppe has had good results from chloral, and adds one cure. Legroux, always a partisan, reports some cases of death by an over-dose of chloral. Depaul reports 3 deaths, and, without giving up chloral, is but little in favor of it. Lissonde rejects it entirely; but the best and most interesting papers on the subject are those of Delaunay and Testut, 1877, and a paper by Froger in 1879.

Testut admits two kinds of eclampsia; the one from reflex irritation, and the other from cerebral œdema. “In the first, chloral is all powerful; (a) in quieting the spinal nerve-centres in which arises all the muscular and motor excitement; (b) in paralyzing the vaso-motor centre in the medulla,

it thus renders the contraction of the vessels impossible, and also the appearance of anæmia of the convulsive areas, and opposes at the same time outward manifestations of eclampsia." In eclampsia due to cerebral œdema, chloral would be powerless.

Delaunay admits that chloral acts on the nerve-centres themselves: "The blood being unable to stimulate the centres regularly, produces, in some way or other, a general irritation, which leads to an eclamptic attack more or less long, which may or may not be repeated. Is this central-nervous irritation due to cerebral congestion, to serous exudation into the ventricles and meninges of the brain, to œdema of the brain substance, or to an alteration in the nerve tissue itself? We do not know. In any event, if other lesions do exist, it is not on these that the influence of chloral is exerted. Its action must, of necessity, be exerted on the nerve-cells themselves, particularly on the nerve-cells of the spinal cord, which all regard as the seat and origin of all convulsive attacks of whatever kind. Chloral acts first as an hypnotic, and then stupifies the cerebral nerve-centres, and makes them insensible to the cause of the attack."

Froger has collected all the cases since 1879, *i.e.*, 110 cases, in 51 of which chloral was alone used, with 49 cures and 2 deaths—4 per cent. Finally Testut, who has taken the statistics from our table and observations, gives the following table, which comprises the results obtained from different methods of treatment.

|   | Mortality.   |
|---|--------------|
| 1. Revulsive treatment, . . . . .                                 | 50 per cent. |
| 2. Blood-letting " . . . . .                                      | 35 "         |
| 3. Purgative " . . . . .  | 56 "         |
| 4. Blood-letting and purgative treatment, . . . . .               | 17.3 "       |
| 5. Anæsthetic treatment, . . . . .                                | 17.8 "       |
| 6. Surgical " . . . . .   | 29.7 "       |
| 7. Chloral alone, . . . . .                                       | 4.0 "        |
| 8. Chloral and bleeding, . . . . .                                | 9.01 "       |
| 9. Chloral and other treatment, . . . . .                         | 13.32 "      |
| The general or average result of the chloral treatment, . . . . . | 8.49 "       |

Admitting even that a certain number of fatal cases have not been published, the results given by chloral differ so much from those given by other methods, that they cannot be but striking, and Belière was right in saying, in 1876, when speaking of our work of 1872, that perhaps later we would give a more decided opinion. Since that time, indeed, cases have increased and are multiplying every day, and, in our opinion, the treatment of eclampsia to-day may be summed up in two great classes: 1. To bleed the patient moderately; 2. To give chloral in large doses, as we shall show.

Before studying the different methods of giving chloral, let us say that Bourdon is not satisfied with giving chloral when the eclamptic attack is



in full force, but he has employed it as a prophylactic agent in an albuminuric condition. In these cases chloral was given in doses of 60 grains at the time of confinement, and the labor has ended without eclampsia.

How and in what dose should chloral be given? Chloral may be given by the mouth, by the rectum, subcutaneously, or by intravenous injection. Of these four ways, there are two which we discard at once, *i.e.*, 1st. the intravenous injections, because they are dangerous, and therefore should not be employed except as a last resort. 2d. Subcutaneous injections, because they expose the patient to abscesses, phlegmon, gangrene. There remains then the mouth and rectum. But eclamptic cases, besides that they swallow with difficulty, vomit often all that they take. This would leave the rectum for the administration of chloral.

Bourdon begins with 60 grains of chloral, then he gives 15 to 30 grains every quarter of an hour, until 150 grains have been given. If the attacks do not cease, he waits some time before continuing the treatment. Choupe goes as high as 180 grains. Testut at first gives 60 grains, then 15 grains every hour until the enema is used up. The enema is made of 150 grains of chloral and 5000 grains of distilled water.

Our method differs slightly. At first we give 60 grains to our patient; if this is not retained or only partially, we give immediately a second, and if necessary a third until the medicine is borne. Whether the attacks continue or cease, we do nothing for a few hours, say five or six if necessary, and it is only at the end of this time that we give another 60 grains of chloral.

It is rare that we have to pass this limit, which represents 180 grains of chloral, to be taken in eighteen or twenty-four hours. We do not fear to give a still larger dose, and in one case we have given as high as 240 grains in twenty-four hours. If the attacks become farther apart, we make the interval between giving the medicine longer; if, on the contrary, the attacks persist, we do not wait as long. In one case which was cured, (by bleeding and chloral) we gave without inconvenience, 180 grains of chloral in 10 hours. We never stop the medicine suddenly, but we give the patient always, even when cured, 60 grains of chloral at the end of the first twenty-four hours after the attack. By separating the doses, and giving them in large quantities, we obtain greater quiet with less trouble and worry to our patients. We have never had to exceed this dose, but we would not hesitate to do so if necessary, even to go as high as 300 grains, as Delaunay and Froger have done.

Does disturbance of cardiac innervation and organic heart-trouble contra-indicate the administration of chloral, as Gubler would have us believe? The cases of Liebreich, of Davreux, of Waters, of Dunlap, of Meldola, of Smalman, seem to justify this view. But Waters, Ogles, Peyers, Westrangle have, in spite of cardiac trouble, had good results from chloral. The cases of Lucas Championnière seem to justify these authors,

for not only does he not fear to use chloral in patients who have cardiac disease, but he does not even see any contra-indication to chloroform in cardiac disease.

In all of his surgical operations, Lucas Championnière uses chloroform, whatever be the state of the patient's heart, and he has never had an accident. It is true, that in these cases the prolonged action of chloroform is less than that of chloral. These facts, nevertheless, are very encouraging, but we will still resort to chloral only in these cases, although, perhaps in smaller doses.

2. *Obstetrical Treatment.*—All accoucheurs are agreed on this one point, that, whenever one can terminate the labor either by the use of forceps or by turning without injury to the mother, it will be best to do so, as well for the mother as the child, *i. e.*, whenever the cervix is dilated or dilatable.

Depaul goes still further when he says, "if the cervix is already dilated, although insufficiently, and the child living, there is reason to fear that in the new attack the child may die. Auscultation will enable us to foresee this by the disturbances in the foetal circulation. If, at the same time, labor goes on slowly, if the cervix is rigid, the hope of saving the child would warrant a more active interference and furnish an indication for lateral incisions of the cervix."

But when the cervix is neither dilated nor dilatable, when, in a word, labor has not commenced, ought one to artificially induce labor? Authors are far from agreeing on this subject. While Kiwisch, Holst, Wiegner, Grenser, Litzmann, Stoltz, Simon, Thomas, Schillinger, Legroux, Braün, declare that the prompt evacuation of the uterus is of the greatest importance in the treatment of eclampsia, and that it is necessary to induce it as rapidly as possible, in cases in which labor has not already come on; others, with Tarnier, Busch, Bailly, accept the induction of labor only under certain circumstances, and have recourse to it only when the medical treatment has failed absolutely, and, in spite of the convulsions, the labor does not come on spontaneously. Finally, P. Dubois, Pajot, Blot, Depaul, discard it entirely. We ally ourselves with those who hold this last opinion. Our reasons are as follows: 1. Eclampsia is only a symptom of a general disease which the emptying of the uterus cannot eradicate at once. 2. In a good many cases not only do the convulsions continue after labor, but even they are produced after confinement. 3. Eclampsia is an acute disease, rapid in its course, and the time required for the induction of labor surpasses often the duration of the eclampsia. 4. When, on the contrary, labor does come on, on account of the eclampsia itself, it progresses rapidly, and allows generally of some interference without danger to the mother. 5. All irritation in or around the uterus is sufficient, sometimes, to cause a convulsion much more so will it be the same with processes which are employed to induce labor. If we formulate these objections, and if we discard the artificial induction of labor,



with how much greater reason should we reject forced delivery. Of this, there cannot be question in any case.

But to these theoretical reasons we can add others which result from figures collected in our article. Thus: in 127 cases the attacks have come on before labor in 105 cases, and they have continued in spite of delivery, or they have come on only at this period, in 75 cases. Of 75 cases at the Maternity, in 38 cases the attacks have persisted, or were produced after delivery. In 297 cases, 155 of them have had the attacks continue or appear after labor, *i.e.*, in a total of 478 cases, 278 times the attacks have continued or were produced after delivery, *i.e.*, in more than half of the cases. We do not then believe in the absolute efficacy of labor in puerperal eclampsia; therefore we discard the induction of labor.

If now we resume the therapeutic indications of eclampsia, they may be stated as follows: 1. Albuminuria once established, put the patient at the beginning on a milk diet, bleeding if necessary beforehand to the extent of 4500 or 6000 grains without going beyond this limit; 2. If this preventive treatment fails, and if eclampsia develops, venesection must be performed and from ten to sixteen ounces of blood withdrawn. An enema containing from one to four drachms of chloral should be given, and, if necessary, during the paroxysm a few inhalations of chloroform; 3. If labor begins, it is to be terminated as quickly as possible by forceps or version. We must, however, await the dilatation of the cervix. In exceptional cases the cervix should be incised if the child is alive and the attacks continue unabated; 4. Premature labor is never to be induced, and still less abortion; 5. For *post-partum* eclampsia give chloral, and, if necessary, chloroform during the paroxysms.

#### CONVULSIONS NOT DUE TO ECLAMPSIA.

*Puerperal Convulsions.*—Besides eclamptic convulsions, we find numerous cases referred to in literature, as puerperal convulsions. These are convulsions occurring in the puerperal state, and differ essentially from true eclampsia. Thus, Jacquemier, under the heading convulsions without determinate form, cites Baudelocque's case of a woman who fell into convulsions whenever her child moved. Deneux saw a woman who, immediately after conception, was seized with spasms of the whole left side. These spasms lasted without pain or functional derangement until the third month of pregnancy. Residence in the country afforded relief in three weeks. Dubois saw a woman, pregnant between five and six months, whose abdominal muscles contracted so violently as to force the uterus completely down into the pelvis. The organ then quickly returned to its place, rebounding like an elastic ball. Other little prominences, apparently due to spasmodic contractions of the viscera and of the abdominal walls, appeared in the loins, the epigastrium and the umbilical

region. This woman recovered without an abortion. Velpeau cites an analogous case. Delamotte has seen convulsions from retention of the urine. Hysteria, tetanus and catalepsy, may occur during pregnancy.

### *Neuralgias.*

These are common in pregnancy. The most frequent form is dental neuralgia, upon which Lindner has recently written at length. It is one of the early symptoms of pregnancy, but puerperal tooth-ache is not always purely neuralgic; it is often due, as Pinard says, to gingivitis or even to caries. In these cases the teeth should not be extracted, but local measures relied on.

Pregnant women are also often the victims of migraine, head-aches, cramps, pains in the legs and of intercostal neuralgia. They often have hepatalgia, with or without biliary calculi. We have seen hepatalgia without calculi repeated in the same patient in three consecutive pregnancies. We have also recently seen, with Dr. Magnin, a case of inflammation of the gall-bladder, which ended in eight days, without inducing premature labor. We have seen six cases of hepatic colic, either during utero-gestation or during labor. In neither of them was pregnancy interrupted. Quinine best relieves these neuralgias, but they are very rebellious, and only stop after a certain stage of pregnancy. Morphine, hypodermically, has rendered us some service. Neuralgias of the legs are most persistent, and sometimes do not disappear until after labor. Duprilot classifies neuralgias as follows:

1. *Nervous Troubles from mechanical Causes.—Abdominal Pains.*—These correspond nearly to the points of exit of the lumbo-abdominal and sacral plexuses. Pectoral: at the waist or near the insertions of the abdominal muscles. Lumbar or inguinal: not very serious; sometimes prodromata of abortion. Crural: numbness and cramps. Uterine: uterine rheumatism.

2. *Nervous Troubles of central Origin.*—They are due to an alteration of the blood, or to a direct action of the blood on the nerve tissue. A. Abnormal distribution of blood due to pregnancy. 1. Whenever there is a determination of blood to one organ the others suffer from lack of blood. Compression of large abdominal veins by the fœtus. B. Abnormal composition of the blood, during pregnancy. Plethora; anæmia. In the head: ringing in the ears; disturbances of the senses; muscæ volitantes; irritability; change of disposition; vertigo; insomnia; headache. In the chest: palpitations; syncope; dyspnœa. In the stomach: anorexia; dyspepsia; gastralgia. Various sensory derangements. C. Depreciation of blood by abnormal substances. Albuminuria.

3. *Reflex Troubles.*—Tetanic, apoplectiform, hysterical, epileptic and eclamptic convulsions; emesis; cough; spasms; reflex vesical irritability; vascular spasms; spasms of the capillaries; hemiplegia; paralysis.



*Vertigo, Sparks before the Eyes, Syncope.*

Syncope is, certainly, the most frequent of these accidents, is independent of cardiac affections, and occurs from insignificant or from indeterminate causes. It may be produced by emotion, joy, anger, fright, strong odors, repugnance for objects or persons, or movements of the child. Often it occurs at meals, but most often when the horizontal position is exchanged for a vertical one. Ordinarily occurring without precursory symptoms, syncope may be preceded by yawning, malaise and præcordial heat, but almost never induces complete loss of sensibility and intelligence. Generally short, syncope may still be protracted, and is then often accompanied, as Cazeaux remarks, by hysterical symptoms, such as oppression, hypogastric pain, constriction of the throat, and, sometimes, true convulsions. The best treatment is to stretch the patient out flat, with the head low, and then to employ tonics and antispasmodics. These purely nervous accidents are, generally, devoid of gravity, and do not disturb the regular course of pregnancy.

*Puerperal Paralyses.*

Paralysis may supervene during pregnancy or after delivery, as is the case with eclampsia. Hence their designation by the generic term, puerperal paralyses. As the older writers especially noticed these paralyses after labor, they referred them to the two great theories then dominating puerperal pathology, retention and suppression of the lochia, and milk metastases. These paralyses are now better studied, and, having ascertained that they occur during pregnancy, we have been forced to attribute them to another source. These paralyses are very varied in their manifestations, although they affect, particularly, three leading forms. There may be hemiplegias or paraplegias, which are complete or incomplete, local or general, *i.e.*, affecting one limb or both limbs, on the same or on opposite sides. The paralysis may be limited to the face, or affect the face and the limbs; it may particularly involve some one organ of sense or one part of the muscular or nervous system, but there is always a marked tendency toward hemiplegia or paraplegia.

By complete paralysis we understand the forms in which, if the case be one of hemiplegia, the upper and lower limbs of the same side are both involved, or, if paraplegia be present, both lower extremities are implicated. The term partial paralysis is reserved for the cases in which a single limb is attacked. Among these paralyses there is one special variety observed only after labor. This is the traumatic paralysis seen after difficult labors, with or without surgical intervention, and to which we compare the palsies of newborn children extracted by the forceps or by version.

*Frequency.*—Although not extremely frequent, paralysis is not very rare for, in our monograph of 1872, we had already collected 149 cases, thus classified: Hemiplegias, 57; paraplegias, 25; traumatic paralyses,

12; partial paralyses, 21; paralyses of the senses, 34; total 149. We will now study these different varieties.

### *Hemiplegia.*

The first and by far the most frequent form of puerperal paralysis is hemiplegia. Out of one hundred and forty-nine cases of paralysis, we found, in 1872, fifty-seven hemiplegias. Five years later, Darcy quoted ten new examples, and since then, all authors who have paid attention to this question have published new cases.

The causes are numerous. Aside from the two old theories, retention and suppression of the lochia, and milk metastases, which could, at the best, only be applied to the explanation of paralyses occurring after labor, we mention:

1. Cerebral hemorrhage, cited in 1848, by Menière, who particularly insists upon the hypertrophy of the left ventricle and plethora. Darcy admits three forms: *a.* Apoplectic, in which the apoplexy is often so profound that the existence of hemiplegia can not be ascertained. *b.* Mixed form. Consciousness lost, but only for a short time, and eclampsia may or may not have preceded. This is not genuine apoplexy. *c.* Paralytic form. In these cases there is hemiplegia lasting at least several months, and undergoing a gradual cure. *d.* Pregnancy occurring in hemiplegic women.

2. *Cerebral Congestion.*—This is particularly induced by the efforts of labor or by eclampsia. It produces torpor, slight or well-marked, after which more or less complete hemiplegia remains and disappears, ordinarily, quite rapidly.

3. *Cardiac Affections.—Endocarditis.*—This may be the acute, ulcerative, typhoid or pyohæmic form of Senhouses Kirke, Simpson, Hardy, Charcot, Peter, Bucquoy, Martineau, and Decornière, or the subacute and chronic form of Ollivier, to which recent researches on puerperal cardiac troubles lend new importance. Attacking by preference the mitral valve, as does rheumatic endocarditis, it advances progressively and increases with the number of pregnancies. Causing the growth of valvular vegetations, it may give rise to cerebral embolism. In this connection we should mention the arterial thromboses reported by Oke, Risdon, Bennet, Turner and Simpson. This last author divides them into five kinds caused by: *a.* The detachment of old or organized cardiac concretions and their transportation into arterial channels. *b.* Entrance into the circulation of recent coagula formed in the heart or in the great arteries. *c.* Local arteritis. *d.* A lesion of the tunica intima of the arteries. *e.* Foreign bodies coming from the veins and lodged in the pulmonary artery or its divisions.

4. *Alterations in the Blood.*—These changes play the leading rôle in producing endocarditis, acute or sub-acute, and arterial thrombosis. Hemiplegia is thus only the epiphenomenon of a cardiac affection developed during pregnancy, or after numerous pregnancies, and reacting, in turn, on the central organ.



5. *Albuminuria*.—Cases have been reported by Fleetwood Churchill, Latham, Romberg, Simpson, Lever, Imbert Gourbeyre, Johnson, Braün, Fournier, etc.

6. *Puerperal Septicæmia*.—Hervieux and Charpentier, have reported cases.

7. *Anæmia*.—Stork, Bataille, Ley, Churchill, Laurent.

8. *Reflex Action*.—Whyt, Prochaska, Lever, Churchill, Imbert Gourbeyre, Pellegrini, Crosse and Stokes, have reported cases.

The last two causes cannot be absolutely eliminated, but, in reality, two grand causes seem to us to dominate the pathogeny of puerperal hemiplegia. First, cerebral lesions, congestions, hemorrhages, thromboses of the sinuses, whether primary (Menière) or secondary, lead to cardiac affections, *i.e.*, to the acute puerperal endocarditis of Simpson and Decornière, or to Ollivier's sub-acute progressive endocarditis, or to puerperal cardiac disturbances (Peter, Marty, Berthiot and Porak). These affections act, in turn, either rapidly or slowly, in determining the sudden or the slow development of hemiplegias. Second, we place albuminuria with or without eclampsia. We place last, as quite subordinate, and perhaps, doubtful, anæmic hemiplegias, as well as those due to reflex action and to puerperal septicæmia.

*Frequency*.—Although not rare, puerperal paralyses are not very frequent, but it is impossible to furnish reliable statistics, since many cases pass unobserved, owing to the coexistence of coma. The age of the patients does not seem to have a great influence, for, although there are more cases between twenty-five and thirty years, this is the age at which women generally become pregnant. Our outside figures were eighteen and forty-five years. Darcy gives twelve and forty-five years. Among thirty-five of our cases, twenty-four women were from eighteen to thirty years, and fourteen from thirty-two to forty-five years. Among thirty-six of Darcy's cases, twenty-one were less than thirty years, and fifteen were from thirty to forty-three years. The same obtains as regards primiparæ and multiparæ. Our statistics are thus as follows:

| Charpentier.       |    | Darcy.             |    |
|--------------------|----|--------------------|----|
| Primiparæ, . . . . | 17 | Primiparæ, . . . . | 15 |
| Multiparæ, . . . . | 14 | Multiparæ, . . . . | 17 |

which may be thus classified:

|                        |    |                        |    |
|------------------------|----|------------------------|----|
| 1st pregnancy, . . . . | 17 | 1st pregnancy, . . . . | 15 |
| 2d " . . . .           | 1  | 2d " . . . .           | 3  |
| 3d " . . . .           | 8  | 3d " . . . .           | 3  |
| 4th " . . . .          | 1  | 4th " . . . .          | 2  |
| 5th " . . . .          | 1  | 5th " . . . .          | 2  |
| 6th " . . . .          | 1  | 6th " . . . .          | 3  |
| 7th " . . . .          | 1  | 10th " . . . .         | 1  |
| 10th " . . . .         | 1  | 13th " . . . .         | 3  |
|                        |    | Before " . . . .       | 3  |

| Time of appearance.           |           | Charpentier. | Darcy. |
|-------------------------------|-----------|--------------|--------|
| Hemiplegias before pregnancy, | . . . . . | 3            | 3      |
| “ during “                    | . . . . . | 19           | 23     |
| “ “ labor                     | . . . . . | 1            | 1      |
| “ after delivery,             | . . . . . | 8            | 23     |
| “ not stated,                 | . . . . . | 8            | 8      |

| Charpentier.                            |    | Darcy.                                  |    |
|---|----|---|----|
| 1st month, . . . . .                    | 2  | 1st month, . . . . .                    |    |
| 2d “ . . . . .                          | 2  | 2d “ . . . . .                          | 2  |
| 2d and $\frac{1}{2}$ months, . . . . .  |    | 2d and $\frac{1}{2}$ months, . . . . .  | 1  |
| 3d month, . . . . .                     | 1  | 3d month, . . . . .                     |    |
| 4th “ . . . . .                         | 1  | 4th “ . . . . .                         | 1  |
| 5th “ . . . . .                         | 1  | 5th “ . . . . .                         |    |
| 6th “ . . . . .                         | 1  | 6th “ . . . . .                         | 3  |
| 7th “ . . . . .                         | 1  | 7th “ . . . . .                         | 6  |
| 7th and $\frac{1}{2}$ months, . . . . . |    | 7th and $\frac{1}{2}$ months, . . . . . | 1  |
| 8th month, . . . . .                    | 1  | 8th month, . . . . .                    | 8  |
| 8th and $\frac{1}{2}$ months, . . . . . | 1  | 8th and $\frac{1}{2}$ months, . . . . . | 2  |
| 9th month, . . . . .                    | 4  | 9th month, . . . . .                    | 5  |
|   | 15 |   | 29 |

Thus, it is in the last two months of pregnancy that hemiplegias are the most frequent. After labor they appear, usually within ten days.

#### *Hemiplegias after Delivery.*

|                            | Charpentier. | Darcy. |
|----------------------------|--------------|--------|
| Almost immediately after,  | . . . . . 3  | 3      |
| 2 days after, . . . . .    | . . . . . 1  |        |
| 3 “ “ . . . . .            | . . . . .    | 1      |
| 4 “ “ . . . . .            | . . . . .    | 2      |
| 7 “ “ . . . . .            | . . . . .    | 1      |
| 8 “ “ . . . . .            | . . . . . 1  | 3      |
| 9 “ “ . . . . .            | . . . . .    | 1      |
| 10 “ “ . . . . .           | . . . . . 2  | 4      |
| 14 “ “ . . . . .           | . . . . .    | 1      |
| 15 “ “ . . . . .           | . . . . . 1  | 1      |
| 16 “ “ . . . . .           | . . . . .    | 1      |
| One month after, . . . . . | . . . . .    | 2      |
| Six weeks “ . . . . .      | . . . . .    | 1      |

As regards the side on which the hemiplegia was located, Darcy has found: Right hemiplegia, 26; crossed hemiplegia, 2; left hemiplegia, 16; side not stated, 14.

*Signs and Diagnosis.*—There may be prodromata or these may be absent. Hemiplegias due to cerebral lesions commence, most frequently, suddenly, like an apoplectic attack. In women with albuminuria, however, headache, disturbances of vision, or even convulsions, generally precede the attack by a few hours or days. The characters of the paralysis are as follows: Often it develops quickly, simultaneously invading the two limbs and even the face. Often, also, the upper and lower limbs are



successively attacked. Sometimes the hemiplegia is incomplete, now affecting the upper extremity, and being accompanied by facial paralysis or amaurosis; now attacking the lower limb of the same or of the opposite side; now being limited to the face. It simultaneously involves motion and sensation, but is rarely attended by vesical or rectal difficulties. More rarely yet the intelligence is impaired. Generally it remains perfect after the patient has recovered consciousness. Speech is, indeed, affected, but that is due to impaired motility of the tongue, and, excepting in one case of our own, and in two of Témoin, in which delirium persisted several days, the intellect was unimpaired. Paralysis seems limited, in short, to motion and to sensation. The lesions of motility are the predominating features. Sometimes there is simply weakness or numbness, accompanied, in some cases by tremors, formication, or more or less acute pains in the limbs involved. Sometimes the limbs are absolutely motionless and remain inactive in any position, without the patients being able to move them at all. Mobility may be progressively restored, or even rapidly, in a few hours or days. Sometimes the paralysis lasts several months before absolutely disappearing. In rare cases, death closes the scene, but patients generally recover, if not entirely, yet to such an extent as to resume some of their occupations. Disturbances of sensibility present greater variety than those of motility, but exist habitually. In the majority of cases, motility is notably impaired. There may be all kinds of analgesia and of anæsthesia, which may be the first symptoms of the paralysis. The patients notice that some part of their person first becomes insensible and then immobile. So the two symptoms, impairment of movement and diminution of sensibility, progress side by side, sensibility generally returning sooner in cases resulting in a cure. This change in sensibility, limited to the paralyzed side, or involving the other as well, is more or less profound, varies from the mildest analgesia to complete anæsthesia, and presents remissions and exacerbations accompanied by sensations of cold or heat, without these two agents locally applied producing appreciable phenomena. One may prick or pinch the patients without their knowledge. Again, there may be real hyperæsthesia, always attended by sensations of cold or of heat.

This difference in the symptoms, may serve to farther facilitate the diagnosis and often reveals the source of the paralysis. Thus, in paralysis from cerebral affections, the inception is always sudden, and the pathological conditions rapidly reaching their maximum, are lasting and fatal. On the other hand, in so-called reflex paralysis, the beginning is insidious. The lesions of motility, at first consisting in weakness and numbness, gradually pass into complete hêmiplegia. In the former case all the extremities are almost always simultaneously involved, while, in the latter case, partial paralysis is often seen. Moreover, in the latter case, the lesions of sensibility are various, while, in cerebral lesions, sen-

sibility is usually just as completely abolished as motility. In the variety due to albuminuria, there are usually prodromal symptoms, *vis.*, headache, visual derangements, eclampsia, convulsions. In these cases constitutional symptoms, fever, peritonitis, phlebitis, and lymphangitis are absent, although they do occur in paralysis from puerperal septicæmia. These hemiplegias considerably resemble those occurring aside from pregnancy, but the puerperal state impresses a certain stamp upon their course and their termination. Puerperal hemiplegias, commencing often during the later months, increase as pregnancy advances, acquire greater intensity during labor, and subsequently disappear, either completely or by gradual subsidence. In some cases the hemiplegia does not entirely disappear, and if several pregnancies succeed each other, the paralytic symptoms are aggravated either at the time of a new conception, or during utero-gestation. In these cases there is sometimes amelioration of the symptoms in the later months, but during parturition, or some days later, there is a real relapse from which the patient does not recover for some time. Again, in rarer instances, hemiplegia begins during labor, but it is then almost always the result of eclampsia, albuminuria having been super-added to the influences due to the puerperal state. In a third class of cases, which are, at least, as frequent as the first, the paralysis does not begin until after labor, and, strangely enough, generally after a natural, easy and short confinement.

*Prognosis.*—This is very variable, and depends chiefly upon the cause producing the paralysis. Hemiplegia due to organic lesions is quite often fatal, but the other forms of hemiplegia are not. Hemiplegias may be divided into two large classes: those due to extensive, and those due to transient or slight cerebral lesions. In fatal cases, death usually occurs very soon, within two or three days, and the autopsy reveals considerable cerebral lacerations and hemorrhages. When death ensues more gradually, we find meningitis, or much less important hemorrhages, or a combination of lesions which suffice of themselves to cause death, independently of the cerebral affection. When recovery occurs, it is generally very rapid, taking place in a few hours or days, thus showing the lesion to have been transient. In some cases, if long protracted, the intellect has been impaired. Death does not occur so frequently as might be expected. We find it to have taken place in twenty of our fifty-seven observations. Another peculiarity of these hemiplegias is that, in some cases, before permanently disabling a limb or a side, they may alternately disappear and reappear. This characteristic feature is not always a proof of benignity, for two such cases resulted fatally. These hemiplegias exert hardly any influence upon pregnancy and labor. The majority of hemiplegic women almost or quite reach full term. Among fifty-eight of Darcy's cases, thirty-two reached the full term. In ten cases labor occurred prematurely, but this hardly happens except when albuminuria



is present. In the cases referred to, eclampsia preceded labor, and the paralysis was consecutive to these attacks. In only two or three instances, has labor been slow and prolonged. In all the others parturition was normal, easy and rapid.

The treatment varies with the cause, the nature and the form of the paralysis. Venesection, friction, mineral baths, strychnia, and electricity have been employed, sometimes with success, and sometimes without any favorable effect upon the patient's condition.

#### *Paraplegias.*

These are not less frequent than hemiplegias, and here we find, after labor, the two chief ancient theories regarding suppression of the lochia and milk metastases. The causes are numerous, as in hemiplegia, but we find here two new and important causes; reflex action, which we admitted with some reserve as a cause of hemiplegia, and traumatism. We mention, therefore, in the first place:

1. *Paraplegias from medullary Lesions.*—In this case the medullary lesion sometimes exists before conception, and pregnancy only modifies its original action. On the other hand, the lesion may be developed under observation during pregnancy, the physician thus witnessing the series of morbid results terminating in death, and ascertaining the existence of the lesion, *post mortem*.

2. *Paraplegias from Albuminuria.*—Some authors admit this cause, without reserve, while others regard it as exceptional, and still others reject it. We reject it, in common with Lasègue, Fournier, Addison, Sée and Hervieux. Lasègue, in the *Archives de Méd.*, 1852, studying the cerebral disorders which occur in Bright's disease, mentions coma, convulsions, delirium, and disturbances of the senses, but insists upon the absence of coma, in the following terms: "The absence of paralysis and the peculiar condition of respiration almost suffice to banish doubt. No matter at what period of the disease the case is observed, or what the intensity of the stupor, we do not find the slightest paralysis. Whenever concomitant paralysis is reported, it may be referred to a local cause, and is not due to Bright's disease. Bright himself emphasized this distinction, which experience fully confirms."

3. *Paralyses from reflex Action.*—These are the functional paraplegias of Jaccoud, which were formerly called peripheral paraplegias. This is the prevailing cause of puerperal paraplegias. The relation between paraplegia and certain morbid conditions of the genital organs was mentioned by Churchill, Romberg, Hunt, Stanley, Lisfranc, Esnaut, thesis 1857, Vallin, thesis 1858, and Nonat. Now, as Hervieux remarks, "if the diseased uterus is capable of producing paraplegias, why may not the gravid uterus or the uterus in its *post-partum* state, exert the same pathological influence?" Jaccoud gives the name of functional paraplegias to

all those whose distinctive feature is the absence of all material conditions producing paraplegias of his first three classes (spinal lesions, ischæmia and dyscrasiæ), and he classifies functional paraplegias as follows. 1. The paralysis results from a more or less prolonged abnormal excitation transmitted to the medulla by the peripheral nerves, from the genito-urinary organs, the abdominal viscera or the skin. This is peripheral paraplegia. 2. Paraplegia follows pyrexia and acute diseases. 3. Paraplegia appears during the coma of a constitutional or cachectic disease. 4. Paraplegia develops from a neurosis.

For him, therefore, puerperal paraplegia does not belong among reflex paralyzes. Making a careful distinction between the paralysis of pregnancy and puerperal or post-puerperal paralysis, he places the former among the paraplegias due to anæmia, attributing it to chloro-anæmia and to a nervous state, and the second class of cases among organic paraplegias, from compression of peripheral nerves, thus attributing a predominating influence to traumatism. Jaccoud, disputing the propriety of the term reflex paralysis, insists that the paraplegia is not reflex, but due to the contraction of the medullary vessels, and that we should designate the paralysis as paraplegia by reflex vascular contraction or reflex ischæmia. But he does not even admit this contraction, for then it should be permanent, or ought, at least, to last as long as the paraplegia, *i.e.*, weeks or months, which is contrary to all the principles of nervous action, for passive dilatation tends always and everywhere to active contraction of the vessels. If there really existed a permanent ischæmia of the medulla, the organ ought, after a time, to present the material lesions characteristic of ischæmic degeneration. Rejecting, therefore, the opinion of Willis, Whyth, Prochaska, and Brown-Séguard, he formulates the following theory: "An abnormal excitation is transmitted to the medulla by the sensitive nerves of the uterus, the kidneys, the bladder, the bowel, etc. It exhausts, at the end of a variable time, the peculiar excitability of the corresponding region of the organ, and the inertia of these nervous elements under encephalic stimulation, interrupts the channels of the motor impulses. The paralysis of all the parts situated below the affected point is the necessary result." Frogé, thesis 1868, admits that, in certain cases, the gravid uterus may react upon the nervous centres by the physiological phenomena located in it, to such an extent as to precipitate disturbances of innervation, among which is reflex paralysis. Hervieux adopts the theory of reflex paraplegia outright, and the observations cited in our own monograph seem to leave no doubt on the subject.

4. *Chloro-anæmic and post-hemorrhagic Paralyzes.*—These two forms of paralysis may, we think, be arranged under one heading, the anæmic paraplegias. They embrace what Jaccoud describes under the title dyscrasic and ischæmic paraplegias. Some paraplegias from dyscrasiæ depend on a qualitative alteration of the blood, *i.e.*, are produced by modi-



fications in the normal elements of the blood, as regards proportions and quality. Some are due to the presence, in the blood, of some foreign substance. Now, the composition of the blood is changed during pregnancy, and hemorrhages occurring during or after labor, and even during pregnancy, alter the blood by reducing its quantity, and thus themselves sometimes cause paraplegias.

5. *Paraplegias from Blood-poisoning, in puerperal Septicæmia.*—These are admitted by Hervieux, but we think that they should be included among paraplegias due to organic lesions. They are usually secondary to inflammatory lesions, of which they are only the results.

6. *Traumatic Paraplegias.*—These will be separately studied, and will serve as transitional forms between complete and partial paraplegias.

*Frequency.*—Paraplegias seem less frequent than hemiplegias, since we found only twenty-five among our one hundred and forty-nine cases. They therefore bear to hemiplegias the approximate relation of one to two.

*Age.*—They are encountered, most frequently, between nineteen and thirty years, but we have noted six cases between thirty-one and fifty years. The number of pregnancies is indicated in only a few of the cases:

|                |            |                |           |
|----------------|------------|----------------|-----------|
| 1st pregnancy, | . 6 cases. | 4th pregnancy, | . 1 case. |
| 2d “           | . 2 “      | 6th “          | . 1 “     |
| 3d “           | . 3 “      | 10th “         | . 1 “     |

In four cases, a paraplegia which existed before pregnancy, or during a preceding pregnancy, relapsed owing to conception. In the cases of Rivière and of Etcheveria, paraplegia followed abortions.

*Time of Appearance.*—Like hemiplegias, they may appear before or during pregnancy and during or after labor.

|  |                                |
|--|--------------------------------|
| Paraplegias existing before pregnancy, | 2 cases, six years before.     |
| “ beginning during “                   | 5 “ at 2, 4, 7, and 8 mos.     |
| “ during labor, . . . . .              | 1 case.                        |
|  | { A few hours after, 1 case.   |
|  | { 31 hours, . . . 1 “          |
|  | { 7 days, . . . 1 “            |
|  | { 8 “ . . . 1 “                |
| Paraplegias after labor, 14 . . . . .  | { 11 “ . . . 1 “               |
|  | { 17 “ . . . 1 “               |
|  | { 1 month, . . . 1 “           |
|  | { 7 months, . . . 1            |
|  | { Date not given, . . 6 cases. |

Paraplegias are thus much more frequent after labor than during pregnancy.

*Symptoms and Course.*—These paraplegias do not differ from those not dependent upon the puerperal state, and may be either complete or incomplete. There are three types of the latter variety: “1. The patient cannot take a step, nor even stand upright, but, when she is lying down,

she can either move the whole limbs or execute partial movements. 2. The patient can stand without support, and can even take a few tottering steps, but walks without raising the feet. She executes this kind of progression by the alternate gliding of the whole sole upon the ground, or the heel being lifted, it is only the anterior extremity of the foot which glides along the ground. 3. The patient may sometimes walk quite a long time without support, except that of a cane, but she feels early and unusual fatigue, which is, most frequently, not in accord with the development of the muscular system." (Jaccoud.)

These three types generally succeed each other, the disease rarely suddenly reaching its maximum intensity. It is, at first, an awkwardness and an enfeeblement of the limbs, or of one limb, succeeded by complete paralysis after a variable time. Paraplegia shows another peculiarity in some cases. It oscillates, as it were, in such a way that if, for example, the left leg were first attacked, the right leg would be in turn affected after a few hours or days. In the meantime the left leg might have partly or entirely recovered. A few days later the latter would be again attacked, and from this time on the affection, being equally or unequally developed in the two legs, would pursue its regular course. Sometimes paraplegias, limited to the lower extremities, seem to have no effect upon the general system. Sometimes, however, they prostrate the patients considerably, and are attended by bladder and rectal disturbances, particularly the former. Sometimes the urine is slowly expelled, and sometimes there is complete retention, followed by incontinence from paralysis, with erythema and eruptions. The rectum is more or less paretic, which occasions constipation, or, if diarrhoea exist, involuntary defecation. Again, the paralysis involves even the abdominal muscles, and the women, not feeling foetal movements, and thinking the child dead, can only persuade themselves that it is alive by seeing the movements.

Sensibility is differently affected. In some cases there is slight, but in others, profound anæsthesia. There are, sometimes, sensations of tickling, prickling and creeping in the paralyzed limbs. In spinal paraplegias there is, at the seat of the lesion, constant pain, which may radiate either toward the pubes, the thighs, the legs or the loins, or may encircle the body, producing cramps and sensations of heat and cold. But these sensations have nothing characteristic, and motility may be alone affected.

These paraplegias pursue a special course. Beginning in a gradual fashion, they rapidly become complete, but generally disappear quite rapidly. This is not always true, and sometimes there is a sort of transition in the disease, which Jaccoud has well described. Anæmia of the spinal cord may lead to more or less severe organic lesions. Then paralysis persists, or, becoming general, it kills. In these cases other symptoms appear, which prove that it has changed.

These symptoms are spinal pains, spasms, pains in the paralyzed limbs,



which radiate to different points, and sometimes give the patients no peace. The muscles are wasted, and even complete atrophy may occur. Under the influence of repeated pregnancies, these paraplegias increase in extent and in gravity.

*Prognosis.*—This varies with the cause. If the paraplegia is reflex, anæmic or post-hemorrhagic, the cause being transient and capable of entirely disappearing under proper treatment, the prognosis is favorable, and we may expect a cure, unless a transformation in the type of the disease appears. If the paraplegia be organic, the importance and the gravity of the lesion will decide the prognosis. If the cause is a congestion or a slight hemorrhage, we may hope for a cure, although it may be tardy. If the case involves vertebral caries, myelitis or medullary softening, the lesion will be grave in proportion to the extent of the disease.

*Diagnosis.*—The chief point in the diagnosis is to decide whether the cause of the paraplegia be organic, or functional and reflex, and this is not, generally, difficult. If the paraplegia is of organic origin, it is generally slowly progressive, accompanied by radiating pains in the spine, by formication, numbness in the legs, cramps, spasms, veritable contractures, analgesia and anæsthesia, or marked hyperæsthesia, vesical and rectal disorders, all of which are persistent. The puerperal state is lost sight of in these cases, and the organic lesion is the dominating pathological feature. When paraplegia begins after labor, and is not due to traumatism, which plays a special rôle, this paraplegia is only developed after puerperal diseases, and is due to disease of the lumbar and sacral plexuses, dependent on inflammatory changes in the soft or the bony tissues of the pelvis. In this case inflammation is propagated from these tissues to the nervous plexuses. The resulting paraplegia follows in its development the evolution of the original disease, and, if the patients recover, the paralysis disappears, either at the same time as the disease which occasioned it, or at the end of a longer period. In such case, the paraplegia, although organic, is dependent upon a local condition which owes its origin directly to the puerperal state. Our view is thus quite different from that of Hervieux, who considers these paraplegias to be the result of a real poisoning by what he calls the puerperal miasm.

Reflex paraplegias are never accompanied by spinal or lumbar pains. Beginning insidiously, *i.e.*, with simple enfeeblement, perhaps of a single limb, they do not fail to speedily attack the other limb, and to become more or less complete (sometimes in a few hours). The peculiar changes of sensibility noted among the symptoms, are particularly prominent in these cases. The bladder and the rectum are, most frequently, unaffected and the paralysis supervenes, sometimes without known cause, and sometimes as the result of an exposure to cold, of a hemorrhage, or of pregnancy alone. It occurs just as readily after an easy as after a difficult labor, and is generally of short duration. If it persists, it is because its

type has been transformed. Although these paraplegias have no effect upon pregnancy, it is not so with labor, although this influence varies with the cause and the intensity of the paraplegia. If the disease, for example, is slight, and limited to the legs, its influence upon the course of labor is of no moment, but it rather seems to hasten labor by diminishing the susceptibility to pain. The same does not hold when the paraplegia extends to the abdominal muscles. In this case, labor is arrested at the very end, by failure of the expulsive power of the abdominal walls. (Gamet, Depaul, Brachet.)

*Treatment.*—This varies with the nature of the disease. In the former case revulsives and stimulants to the legs, and nux vomica, meet the indications. In the second case, a tonic regimen and rest will usually suffice to cure a disease, the natural tendency of which is toward recovery. If the disease, even in the second instance, proves a little rebellious, electricity and baths, particularly sulphur baths, may be useful.

#### *Traumatic Paralysis.*

There is another class of paralyzes, not less interesting, *viz.*, those in which the lesion affects only a single limb, the upper or the lower, and among these paralyzes, traumatic paralyzes merit particular attention. Incidentally mentioned by Campbell, Ramsbotham, Scanzoni, Romberg, Jacquemier, Imbert Goubeyre, Bedford, Burns, Tarnier, Siredey, Jaccoud, Axenfeld, Simon, Hervieux, Depaul, Maringe, Rosier and Frogé, these paralyzes were carefully studied by Bianchi in his thesis of 1867, and we were able to collect eleven cases. Since then, in 1867, Lefèbvre has cited four new examples, and Brivois, thesis 1880, two new cases, one personally observed and one borrowed from Winckel. The total number is seventeen, not great to be sure, but important in view of the clearness and precision of the facts. Bianchi, first recalling the cases of paralysis produced by tumors pressing against sacral nerves at their origins, compares the foetal head to a hard, voluminous tumor, which exerts energetic, although brief pressure, causing paralysis, generally temporary, but sometimes persisting after delivery. Reducing the question to a mechanical problem, he states that there exists: 1. An active agent or force (uterine contraction). 2. A compressing body (foetal head). 3. A resisting surface (maternal pelvis). 4. Organs exposed to compression. These are the foetal head, the pelvis, the perineal muscles, the hypogastric vessels, the bladder, the rectum, the nerves, particularly the obturator, and the sacral plexus, particularly the great sciatic nerve. Incompletely protected against puerperal traumatism, this nerve is necessarily compressed in all labors, but to a variable extent. Generally, the only results are, at the end of labor, cramps in the calves and the great toes. If the nerve is, however, too long and too forcibly compressed, bruised by the foetal head or by instruments, disturbances which are often serious



and lasting, or even true paralyzes, may develop in the inferior extremities, where the terminal branches of the nerve are distributed. To-day these traumatic paralyzes are universally admitted, and with Bianchi we may cite among their determining causes all conditions augmenting the duration and the intensity of the compression. Thus: the length of labor, whether due to weakness of uterine contractions or to considerable resistance, large size of the child, posterior positions, pelvic deformity, perineal resistance, first labors, particularly the use of forceps, and finally the patient's age. The majority of cases occur in women over thirty years old, and especially in primipare. These paralyzes are, nevertheless, rare, and one might assume a certain individual predisposition, which would be favored in some cases by the patient's age, the fact of not having borne children, and the situation of the fœtus.

*Symptoms and Diagnosis.*—These paralyzes always occur after labor, but, in certain cases, are preceded by some phenomena which we might consider precursors almost like the first stage of a disease. These are very violent pains, which some patients experience in the sciatic nerve, during labor. Noted by all obstetricians, these pains, which occasion in many women cramps, formication and numbness of the limbs, are sometimes so pronounced as to give the labor a pathological aspect. Generally moderate, they assume, in some cases, an extreme severity and impede labor. Sometimes they specially affect the crural nerve (then they are felt on the anterior surface of the thighs), sometimes the obturator (and then they are felt on the internal aspect of the thighs), most frequently the great sciatic nerve, occasionally all the nerves at once, but, generally, various nerves in succession, thus indicating the progress of fœtal engagement. Thus, the pains due to compression of the crural and of the obturator are felt before those of the sciatic nerve, and at an earlier period of labor. It is, in fact, upon this last nerve that all the compression exercised by the fœtal head is concentrated, and this is particularly true at the end of labor. If this compression has been too long continued or too energetic, these pains, which generally disappear very rapidly after labor, may last a longer or shorter time and paralyzes may succeed them. This particularly happens when this contraction has been farther augmented by tractions upon the forceps, especially when these tractions are wrongly directed and either too violent or too long continued. Whether these original pains exist or not, paraplegia is developed in all the cases, very nearly at the time for labor. Paralyzes appear after twenty-four or forty-eight hours, or after some days, at the latest. They might appear later without our being able to deny that they were due to traumatism, (Niemeyer, Follin, Velpeau, Bastien, Tillaux.)

Sensation may be abolished, diminished, augmented or perverted. This abolition of sensation may be complete or partial, and may consist of analgesia, anæsthesia or, most frequently, of the two combined. There may

even exist thermo-analgesia, *i.e.*, insensibility of the skin to different temperatures. Sensibility may, on the contrary, be augmented, now constituting a true, traumatic, diffuse, disseminated neuralgia, without determinate limits, and often extremely severe, now corresponding to the course of the compressed nerve, or localizing itself in certain points. Sensibility may be perverted, and then the patients experience prickling, tickling and painful formication, symptoms which may announce the beginning of a true hyperæsthesia, and may only be transitory, or may lead to a paralysis of sensation. Motor disturbances may, in the same way, vary from a simple impairment of motility, awkwardness, torpor or weakness, up to complete loss of motility. The prolonged absence of innervation results, generally after a long time, in a certain amount of muscular atrophy. The disturbances of secretion and vital heat are more directly dependent upon the sympathetic system. The lowering of the temperature in the diseased limbs is referable to local retardation of the circulation, due to paralysis of the vaso-motor filaments derived from the cerebro-spinal system, which results in vascular contraction.

This description, borrowed from Vulpian, Bastien and Tillaux, is perfectly applicable to traumatic paraplegias. Commencing moderately, the disease progressively reaches its maximum, but is almost always unilateral, which shows that the compression has been more strongly exerted on one of the sacral plexuses. The paralysis is generally incomplete and limited, for, since the compression affects particular nerves, the paralytic symptoms show themselves in the muscles which these nerves supply. Thus, in one of Bianchi's cases, paralysis was especially well marked in the muscles supplied by the external popliteal nerve. Limited to one limb, or to one part of a limb, the paraplegia never invades the rectum or the vagina, which remain intact and preserve the integrity of their functions. Electrical excitability is diminished or even abolished.

The only conditions which are liable to be mistaken for these paraplegias, are the pseudo-paraplegias of Jaccoud, and the relaxation of the pelvic symphyses, succeeding a difficult labor, but the differential diagnosis is easy. Schmidt had a curious and rare case, in which paraplegia developed in the course of an extra-uterine pregnancy. These paraplegias always disappear, but sometimes only after months or even years, and in these tedious cases, we find atrophy of the diseased limbs.

*Treatment.*—This is preventive, consisting in wise intervention, calculated to prevent compression of the nerves from prolonged contact with the head, and curative, consisting in efforts to retain the remaining excitability of the injured nerves, and to prevent or to arrest fatty degeneration of the muscles. Electricity, locally applied, cutaneous revulsion, dry or wet frictions, mineral waters, baths and sulphur douches are indicated, besides a tonic and roborant treatment.



*Partial Paralyses.*

These paralyses, whether hemiplegic or paraplegic, may affect now an upper and now a lower extremity, and may either simultaneously invade the face and one upper limb or be limited to the face. Again, they may involve a limited muscular area. Although the causative influence of the puerperal state is evident in some cases, yet these paralyses may accidentally develop in a pregnant woman without there being an evident connection between the palsy and pregnancy. Aside from traumatic paralyses, we have collected the following twenty-one cases:

|                                   |           |          |
|-----------------------------------|-----------|----------|
| Crossed hemiplegia,               | . . . . . | 1 case.  |
| Paralysis of the upper extremity, | . . . . . | 5 cases. |
| “ “ lower “                       | . . . . . | 2 “      |
| “ “ face “                        | . . . . . | 8 “      |
| “ “ “ and arm,                    | . . . . . | 1 case.  |
| “ “ shoulders,                    | . . . . . | 2 cases. |
| “ “ extensor muscles of the neck, | . . . . . | 1 case.  |
| Hemiplegia with contractures,     | . . . . . | “ “      |

One striking fact is the comparative frequency of facial paralysis. Next to this comes paralysis of the arm. The hemiplegic type largely predominates over the paraplegic in these cases of partial paralysis, and these palsies are rarely isolated, *i.e.*, they are complicated by impairment of the senses, as of hearing and sight. Amaurosis, most frequently partial, may exist. Instead of always assuming a typical course, these paralyses tend to develop in one single region, as in the muscles of the face, the shoulders, or the neck. They therefore belong to the class designated as rheumatic. On the other hand, all authors have noted the relation existing between albuminuria and rheumatism. Among our twenty-one cases, in six albuminuria existed, and in four others, the paralysis coincided with a more or less complete amaurosis. These usual impairments are among the most frequent complications of albuminuria. We, thus, believe that partial paralysis are due to three chief causes: 1. Albuminuria; 2. Rheumatism; 3. Reflex action.

*Frequency.*—Rare as regards absolute frequency, partial paralyses are frequent as compared with complete paralyses. Thus, if we add these twenty-one partial paralyses to the seventeen traumatic paralyses, we obtain the following figures: Hemiplegias, 57; Paraplegias, 25; Partial paralyses (traumatic or otherwise), 38; total 120.

After hemiplegia, this is, therefore, by far the most frequent form. Partial paralyses may occur as well during pregnancy as after delivery, after an abortion as well as after labors at term, and may be recurrent. This happened once in three, once in four, and once in eight successive pregnancies. Motility and sensibility are alike affected, and we may have all the varieties noted above. Sometimes the palsies begin suddenly, and, sometimes, are preceded by discomfort, head-ache and visual

troubles. Occasionally the paralysis has been preceded by weakness, numbness and pains in the limbs, and has slowly and progressively grown more marked until sensation and motion have been entirely lost. Occasionally, however, it has begun suddenly without premonitions. It may present the same varieties mentioned under the head of complete paralyzes, which enable us to make the diagnosis, to which we need not revert at present. Let us only mention hysterical paralyzes, which are distinguished by the concomitance of other hysterical phenomena which render the diagnosis clear.

#### *Paralyzes of the Senses.*

These paralyzes are almost always dependent, it is true, upon albuminuria, but they may, in rare instances, be attributed to hysteria, anæmia or dyscrasiæ. The fact of their persistence shows that albuminuria is not their only cause. Rarely isolated, they are often accompanied by paralyzes of several other special senses, particularly of hearing and sight. Again, they may coexist with paralyzes of the face or of the limbs. Disturbances of vision are by far the most frequent. These troubles may present various degrees. Sometimes the sight is, at first, clear and only grows dim after use. Sometimes there is complete loss of vision. Some patients become color-blind, others become myopic, and others present, at the same time, exophthalmos, strabismus and prolapse of the lids. The cornea and the sclerotic are healthy, the pupils are not very contractile and are often dilated. The retina and the choroid may present numerous and varied alterations, but often are in a normal state. In certain cases, the amaurosis coexists with lesions of motility and of sensibility in the limbs. Besides these visual troubles, referable to albuminuria, we must mention those following large puerperal hemorrhages, those due to toxic doses of lead or quinine, (we have seen one such case which lasted four months) and those referable to syphilis or to other cachexiæ. We, finally, see these impairments of sight accompanying the diseases of the *post-partum* state, whether inflammatory or not. Lastly, in Lebreton's, Bouley's and Landry's cases of hysterical paralyzes, there were marked visual difficulties. We believe albuminuria is the chief pathological agent. The same applies to deafness, although it may be more generally connected with general depression of the system. Although, indeed, deafness sometimes depends upon albuminuria, it is oftener due to the adynamia attending puerperal septicæmia, and, in one of our own cases, we found albuminuria to be wanting. The observations of Capuron, of Liegey and of Prestat regarding paralyzes of smell, of taste and of the voice, seem to us at least doubtful.

Must puerperal mania, which Imbert Gourbeyre considers to be a paralysis of the intellect, be classed with these? We do not think so, and we hold that the following *resumé* from our monograph states the essential points regarding puerperal paralysis:



1. Puerperal women are subjected to the same causes of paralysis as non-puerperal subjects.

2. The puerperal state, nevertheless, constitutes with them a predisposing and, in certain cases, even an exciting cause.

3. These palsies may occur at any period of the puerperal state, whether during pregnancy, labor or the puerperium, but are much more frequent in the first and the last named periods.

4. There are three forms of these paralyzes: hemiplegia, paraplegia and paralysis of the special senses. Each of the first two may be accompanied by the third, particularly the first.

5. These paralyzes may be complete or incomplete, partial or general, *i.e.*, they may affect one side (hemiplegia) or only the lower limbs (paraplegia), and involve either one member or both simultaneously.

6. These palsies may exist in clearly distinct forms by themselves, or may be accompanied by paralysis of the special senses, as of sight and hearing, which latter may, of themselves, constitute the sum total of paralytic symptoms.

7. The hemiplegias and the disorders of special senses are often accompanied by facial paralyzes, which are rarely isolated, but generally combined with either partial paralysis of the limbs or with paralysis of the special senses.

8. These palsies, of whatever form, affect both motility and sensibility, and present every possible variety from simple paresis to complete paralysis.

9. These paralyzes may be separated into two chief groups: A. Paralyzes from organic lesions; B. Paralyzes from reflex action. The paralyzes from organic lesions may be subdivided into two classes: *a.* Primitive organic lesions; congestions, hemorrhages, meningitis, and lesions of the cranial bones or of the vertebræ; *b.* Secondary or consecutive organic lesions; congestion, hemorrhage, meningitis, heart affections, cerebral thromboses, albuminuria, uterine affections and compressions of the nerves. Reflex paralyzes are due to peripheral irritation.

10. The puerperal state not only does not protect women against the causes of paralysis other than those which we have mentioned, as rheumatism, chloro-anæmia and hysteria, but seems to predispose the patients to palsy from these causes, by producing abnormal hæmic conditions.

11. Puerperal paralyzes are generally slight and transient, but this is particularly true of reflex paralyzes, for hemiplegias, paraplegias and paralyzes of the special senses may be of indefinite duration.

12. Organic paralyzes borrow their character, as regards gravity, from the nature of the causative conditions, being either temporary, permanent or even fatal, as the case may be.

13. The lesions most frequently reported are: cerebral hemorrhage, cerebral or spinal meningitis, whether alone or accompanied, as they frequently are, by renal degenerative changes.

14. The frequent coexistence of these renal lesions, and of cerebral or medullary lesions, shows how important albuminuria is in the pathogeny of puerperal palsies.

15. It is possible, within certain limits, to establish a precise diagnosis of the cause of these puerperal paralyses, and this cause once being known, to establish a prognosis which will be surer in proportion as the cause of the paralysis is better known.

16. The treatment must depend on the causes, some of which are permanent, the others being transitory and temporary.

#### *Intellectual Disturbances.*

These are, as Marcé says, of two kinds. One consists in simple moral tendencies, which do not deprive the patient of free-will, but impart a peculiar character to her manner and her physiognomy. The other is a state of mental alienation, variable in type but well-marked. In the first instance, the disorders are very different, as caprices, whimsicalities, changes of disposition, variable moods, new tastes, unreasonable antipathies—disorders, in short, affecting either the whole of the mental faculties or only one of them, (understanding, sensibility, will. Boudrie.) Thus, one sees women who, having been remarkable for the sweetness and amenity of their character, become sad, morose, sour, violent even, and unable to endure the presence of persons hitherto dear to them. Others, inclined to be naturally sad, melancholy, grave or serious, develop an activity and a gayety surprising to their friends. Still others, particularly primiparæ, await their confinement with terror, and are persuaded that they will not survive the trial which is before them. Hence they grow melancholy, and conceive fears regarding the proper development of their children. Marcé quotes, from Vandermonde, the history of a woman who had a horror of water during the first four months of each of her eleven pregnancies. In certain cases, the nervous disturbance eventuates in true mental alienation, or puerperal mania. On this subject, however, authors do not agree. Insanity may, indeed, manifest itself, not only in pregnant women, but during labor in the puerperium, and even in lactation. So, while some authors describe the mental alienation occurring at these different periods under the generic term, puerperal mania, others reserve this name exclusively for those cases of insanity developed during the puerperium. Others add the insanity of lactation, making the mania of pregnant women a variety by itself, *viz.*, sympathetic insanity. Aside from the emotional character peculiar to pregnant women, there is an undeniable sympathy between uterine disturbances and intellectual disorders.

These conditions have been found by Lisfranc, Azam and others when pregnancy did not exist. Much more should they obtain when there exists a long-continued irritation, such as is produced by the presence of



the fœtus in utero. But this sympathy, existing in pregnancy, is not understood in the same way by all authors, and is even rejected by some. Thus, while Falret, Georget and Scanzoni deny it, Le Grand du Saule, Tarnier, Dagonet and Rocher positively admit it. Others, like Marcé, Brierre de Boismont, Baillarger and Morel admit it with certain reservations, and although they admit the sympathy, consider it to be imperfect. Marcé expresses himself thus: "If we consider it proper to exclude from the class of sympathetic manias, (taking this term in its strictest acceptation), those which are developed after labor, during lactation or after weaning, we reserve the term for those causes of transient insanity occurring during labor, and disappearing so soon as confinement is terminated; for those mental affections which, beginning at conception or during the early days of pregnancy, cease after the termination of the puerperal state; and, finally, for those rare cases in which a delirium of a few hours' duration accompanies the milk fever and disappears with it."

This sympathy cannot be absolutely denied, and the material proof of its existence has been furnished by Voisin, who discovered, by the aid of the microscope, a large number of embryoplastic nuclei, particularly in the semilunar ganglion, and at a more advanced period, fusiform bodies and distortion of the nerve-cells, which, filled with fatty and pigmentary granules, are mingled with healthy cells or with other atrophied cells.

Nor do authors agree as to the significance of the term *puerperal state*, or as to the limits which should be assigned to the term *puerperal mania*. While Griesinger reserves this title for intellectual derangements manifested during and after labor, Monneret and Marcé consider all derangements occurring from conception to weaning as puerperal insanity. We think that the puerperal state includes, at once, both narrower and broader limits, and while admitting Raymond's classification of minor puerperal state, (pregnancy) and major puerperal state (*post-partum* state) we believe that the true puerperal state begins with pregnancy and terminates with the *post-partum* state. It is unnecessary to include lactation, but since some authors compare the mania of women just delivered with those of nursing women, we think that the insanity of pregnant women should be included in the same category, and that the phenomena of mental alienation occurring in pregnancy, labor, the puerperium, and lactation are all intimately connected. Sympathy, if one will, but the puerperal state and the exhaustion due to lactation, impress peculiar characters upon this alienation. We might, perhaps, make three special chapters of the subject, as Marcé does, but to our mind, Rocher went too far when he said: "It is well enough to treat of the mania of women who are pregnant, but it must not be called puerperal mania." True puerperal mania, we admit, will manifest itself three or four weeks after labor, but it seems impossible to us to separate it entirely from the insanity of pregnant or of nursing women. We therefore include these forms in our study.

*Frequency.*—It is difficult to collect trustworthy statistics regarding puerperal mania, for it often does not appear until after the patients have left the hospital. The following figures have, therefore, only a relative value. Thus:

## WOMEN DELIVERED.

|                         |  |           |
|-------------------------|--|-----------|
| Reid, among 3,500 found | . . . . .  | 9 cases.  |
| Gream, " 2,000 "        | . . . . .  | 11 "      |
| Behier, " 1,000 "       | . . . . .  | 1 case.   |
| Leidesdorff, " 200 "    | { during pregnancy, 6 }<br>{ " puerperal state, 14 } | 20 cases. |

Among the fourteen cases occurring in the puerperal state, Leidesdorff saw eight develop from the sixth to the tenth day, five from the third to the eighth week, one at the twelfth week.

On the other hand, the proportion of cases of puerperal mania compared with the total number of the insane, furnishes much more positive data. Thus:

|                      |                           | Puerperal origin. |
|----------------------|---------------------------|-------------------|
| Esquirol, . . . . .  | among 1,119 insane, found | 92 cases.         |
| " (private practice) | " 144 "                   | " 21 "            |
| Reid, . . . . .      | " 899 "                   | " 111 "           |
| Haslain, . . . . .   | " 1,644 "                 | " 84 "            |
| Hanwell, . . . . .   | " 703 "                   | " 79 "            |
| Macdonald, . . . . . | " 691 "                   | " 49 "            |
| Parchappe, . . . . . | " 596 "                   | " 33 "            |
| Zeller, . . . . .    | " 97 "                    | " 11 "            |
| Webster, . . . . .   | " 282 "                   | " 17 "            |
| Kirkbride, . . . . . | " 2,752 "                 | " 116 "           |
| Marcé, . . . . .     | " 242 "                   | " 9 "             |

Hence, " 9,179 " there are 622 "

That is, about 1 out of every 14.7.

The following table shows the relative frequency of the cases in pregnancy, in the puerperium, and in lactation.

|                        | Number of cases. | Pregnancy. | Puerperium. | Lactation. |
|------------------------|------------------|------------|-------------|------------|
| Palmer, . . . . .      | 19               | 1          | 6           | 12         |
| Esquirol, . . . . .    | 92               | 0          | 54          | 38         |
| Hanwell, . . . . .     | 43               | 4          | 26          | 13         |
| Macdonald, . . . . .   | 66               | 4          | 44          | 18         |
| Marcé, . . . . .       | 310              | 27         | 180         | 103        |
| Tuke, . . . . .        | 155              | 28         | 73          | 54         |
| Leidesdorff, . . . . . | 20               | 6          | 14          | 0          |

Insanity during pregnancy is, therefore, much the most rare.

*Causes.*—In the first place: 1. Heredity, *i.e.*, a predisposition which Griesinger calls a psychopathic diathesis, transmitted by ancestors affected



by insanity, diverse neuroses, hysteria, epilepsy, etc., in brief, by phreno- and neuro-pathies. Thus:

|                             |   |
|-----------------------------|---|
| Esquirol, . . . . .         | among 28 cases, found 10 hereditary ones. |
| Helft, of Berlin, . . . . . | “ 131 “ “ 51 “ “                          |
| Weill, . . . . .            | “ 30 “ “ 14 “ “                           |
| Marcé, . . . . .            | “ 56 “ “ 24 “ “                           |
| Robert Lloyd, . . . . .     | “ 63 “ “ 13 “ “                           |
| Reid, . . . . .             | “ 111 “ “ 45 “ “                          |
| Webster, . . . . .          | “ 131 “ “ 51 “ “                          |
| Macdonald, . . . . .        | “ 66 “ “ 26 “ “                           |

2. *Altered blood states—the Dyscrasie.*—*a.* Anemia, which may antedate pregnancy or be its result. Its causes may be repeated pregnancies, hemorrhages either during pregnancy or during and after parturition; exhaustion from lactation, and, in the poorer classes, bad or inadequate food, fatiguing work, unhealthful dwellings, lack of sleep—in brief, all the causes of debility. *b.* Hyperæmia; active or passive congestions; Laserre's serous congestions.

3. *Repeated Pregnancies.*—Thus:

|                        | Patients. | Primiparæ. | Multiparæ. |
|------------------------|-----------|------------|------------|
| Marcé, . . . . .       | among 57  | 14         | 43         |
| Tuke, . . . . .        | “ 101     | 17         | 84         |
| Robt. Lloyd, . . . . . | “ 63      | 10         | 53         |
| Macdonald, . . . . .   | “ 66      | 29         | 37         |
|                        | 287       | 70         | 217        |

Thus, among 287 patients, 70 were primiparæ and 217 multiparæ.

4. *Age.*—Marcé, among 55 cases, found: At 18 years, 1 case; from 30 to 35 years, 13 cases; from 20 to 25 years, 13 cases; from 35 to 40 years, 5 cases; from 25 to 30 years, 17 cases; at 40 years and upward, 6 cases.

Reid, among 1771 cases, found: Under 20 years, 69 cases; from 40 to 45 years, 54 cases; from 20 to 30 years, 1,100 cases; from 45 to 50 years, 6 cases; from 30 to 40 years, 542 cases.

Tuke found, among 155 cases:

|                                    |    |                                  |    |
|------------------------------------|----|----------------------------------|----|
| Pregnant women, . . . . .          | 28 | { From 15 to 29 years, . . . . . | 17 |
|                                    |    | “ 31 “ 44 “ . . . . .            | 11 |
| Women already delivered, . . . . . | 73 | { From 20 to 30 years, . . . . . | 44 |
|                                    |    | “ 31 “ 43 “ . . . . .            | 29 |
| Nursing women, . . . . .           | 54 | { From 19 to 30 years, . . . . . | 39 |
|                                    |    | “ 31 “ 42 “ . . . . .            | 24 |

5. *Consanguinity.*—This cause has no effect, according to Brierre de Boismont, Lagneau, Peter and others, unless the related parents are themselves insane or suffering from the psychopathic diathesis. In this case, they transmit to their progeny a double predisposition.

6. *Sex.*—A certain influence is attributed to the generally fuller development of boys, but this is not proven.

7. *Moral Causes.*—These are beyond question, and act both as predisposing and as exciting causes, particularly the latter. Rocher, although he attributes to them an important part, yet makes this reservation, that one ought always to assign to the temperament its share of the responsibility. The emotional nature of the pregnant women justifies the fear that her extreme nervous excitability may, under the existing special physiological circumstances, be the avenue for the entrance of intellectual disorders. He, however, willingly admits that this nervous state is not the indispensable auxiliary of moral shocks, and that a sudden, violent emotion, may immediately precipitate an attack of mania.

Bérard, Esquirol and others, have noticed that moral causes exercise their pernicious influence, particularly among the higher classes of society. The lower classes are more affected by physical causes. Nevertheless, the part played by moral causes in the evolution of puerperal insanity, is perceptibly greater than that of the physical causes. Esquirol estimated the relation as 4 to 1; Weil as 12 to 6. Marcé alone reverses the proportions.

8. *Physical Causes.*—Writers have mentioned dystocia, obstacles to delivery and obstetrical operations. Marcé, however, remarks that insanity shows itself as frequently after prompt and easy labors as after long and painful ones.

*Return of Menstruation.*—The mania may appear before or during the first menstruation, or hemorrhages. There is another cause, the influence of which cannot be disputed, in view of the frequency with which puerperal mania succeeds it, *viz.*, eclampsia. All authors agree in considering puerperal mania as a relatively frequent termination of eclampsia. Chloroform has been accused, but authors do not agree about it. Webster admits this cause, basing his views upon five of his cases, while Simpson opposes to these cases three of his own, where the women, being predisposed by heredity, had most happy deliveries after the use of chloroform, but were attacked by mania in their next confinements when chloroform was put aside. Waters not only does not regard chloroform as a cause of puerperal insanity, but proposes it as the best means of preventing and curing mania. Finally, we should mention prolonged lactation, forced weaning and abscesses of the breast, and will recall, as matters of historical interest, the old theories of the suppression of lochia and of milk metastases, besides Esquirol's view regarding the etiological effects of cold, which, in ten of his cases, is said to have been the cause of insanity.

## 2. MANIA OF PREGNANT WOMEN.

Melancholia is the most frequent of all the forms of insanity in pregnant women. Mania is the next most frequent. The insanity may begin at any time, from the commencement of conception, which is rare, up to the end of the ninth month, *i.e.*, up to some weeks before delivery. The number of cases increases after the eighth month, attains its maximum



frequency at about the seventh or eighth month and then diminishes. Sometimes the disease bursts out suddenly, which is rare. As a rule, it appears slowly and increases gradually. The intellectual disturbances which attend pregnancy grow more and more marked, and disorders of volition and of observation are soon added. The disposition is altered, sleep first becomes agitated and then is replaced by insomnia, and the patients complain of head-ache and digestive troubles. Then true mental alienation, generally of the melancholic type, makes its appearance. In other cases, the maniacal form predominates, and then generally suddenly explodes, either without prodromata or after attacks of eclampsia. Sometimes there is simply weakness, languor and inertia, a sort of stupor with suicidal ideas, and, sometimes, there is excitement with ideas of murder and hallucinations. Again, there may be, in the maniacal form, excitement, insomnia, irritability and paroxysms of furious mania. There is, sometimes, albuminuria, but this is sometimes absent. Garcia Rijo has reported inequality of the pupils.

*Prognosis.*—Generally, the insanity disappears after labor, but it is not always so. Among the nineteen cases of Marcé, the disease proved incurable in nine, or only disappeared long after labor; in seven cases, labor was the point of departure for the cure. In two of our own cases the insanity ceased abruptly, once with the expulsion of the child, even before the expulsion of the placenta. In the second case insanity appeared at the sixth month, disappeared at the ninth, reappeared five weeks after labor, lasted six months, and then disappeared but not completely. In one case, Marcé saw the insanity aggravated by labor, and death rapidly supervene during the confinement.

Among Leidesdorff's six cases were four women who had presented psychical troubles before marriage. The insanity became serious during pregnancy, and melancholia followed labor. Of the two others, in whom insanity began during pregnancy, one saw her mania augmented by labor, and one recovered immediately after delivery. Esquirol saw one case in which insanity reappeared in five consecutive pregnancies, disappearing each time after confinement.

Among the twenty cases of Leidesdorff, during pregnancy and the puerperal state, there were ten cures and one fatal case. In eight cases insanity remained. Esquirol saw only six deaths in ninety-two cases; Webster five in one hundred and eleven cases. After labor the insanity seems much more serious and the maniacal form has by far the worst prognosis. Thus, there were, among fifty-seven patients seen by Burrows: Cures (28 in the first six months), 35; deaths, 10; incurables, 1; suicide, 1.

Among eight cases of insanity developed during labor or after delivery, seven of which had hereditary antecedents, Burrows saw: Melancholia and homicidal monomania, 1 case, cure in 9 months; mania and melancholia, 1 case, cure in 14 months; melancholia, 1 case, cure in 1 year; mel-

anicholia, 1 case, cure in 6 months; melancholia, 1 case ended in incurable dementia; abortion at four months, 1 case, suicide; abortion at three months with six attacks of mania before marriage, 1 case; incurable insanity developed at four months. Among Leidesdorff's twelve cases during the puerperal state, from twenty to twenty-nine years, there were: Melancholia, 8 cases; mania, 3 cases; dementia, 1 case. There were eight cures: five in four months; two in six months and one in a year.

It, therefore, appears that sometimes the cure follows closely upon labor, but that it sometimes occurs only after a certain number of months. In general, there is notable improvement after the first weeks following confinement. It is rare to see insanity develop and disappear during pregnancy. Sometimes the patient is improved considerably, and a happy termination is expected, when a sudden relapse destroys this hope, and only confinement can change the aspect of the disease. In the majority of cases, labor has no influence or a very doubtful one. Finally, acute mania may develop, and death result more or less speedily.

*Treatment.*—This should be, above all, hygienic, and, with Marcé, we absolutely reject the induction of premature labor and of abortion. What is, then, the influence of insanity upon pregnancy and of pregnancy upon insanity? The effect of insanity upon pregnancy is *nil*, and women affected by puerperal insanity carry their children to full term. Burrows, however, has cited the two cases of abortion alluded to before. Does the same statement hold true regarding the influence of pregnancy upon insanity? What are the consequences of pregnancy occurring in an insane person? It is a popular notion that pregnancy cures insanity, but this view has no actual basis in fact, and if, in exceptional cases, pregnancy and labor happily modify insanity, there are innumerable cases in which there is no such modification. One cannot too strongly condemn the practice of some physicians in recommending pregnancy for insane women, not amenable to the ordinary therapeutic agents. In some rare cases, however, pregnancy has had the singular effect of checking the advance of mental alienation, but, labor being once completed and the patient restored to her ordinary condition of health, the nervous troubles reappear with equal intensity. There are still other cases in which parturition has had a plainly beneficent influence in aiding the cure of a paroxysm of insanity. Marcé has collected five such cases. Generally, the course of pregnancy is not interrupted by distressing incidents. A remarkable feature, observed in our two patients, was the slight intensity of the labor pains. In certain cases, several of which Marcé mentions, the patients are not aware of their delivery. There seems to be a difference between the children whose mothers were insane at the time of conception, and those whose mothers became insane during pregnancy. In the former case, the children are born healthy, but in the second case, they are often still-born or die soon after birth. In our two cases the children were born



in perfect health. In these cases, the children are certainly subjected to that hereditary influence which plays so important a rôle in the etiology of mental diseases, but it is not true that their intellectual condition need, necessarily, be affected by that of their parent.

Even in 1826 Bouchet noted, in twenty-two cases, this absence of amelioration in the mental state from pregnancy and labor, while Seé and Montgomery reported a temporary aggravation during cervical dilatation.

*Temporary Insanity at the Time of Delivery.*

Sometimes labor does not limit itself to the production of the agitation, anxiety and irritability which all accoucheurs have observed, but attacks the intelligence or even leads to the development of maniacal delirium. These cases, which are rare, may be classed in two categories, as Marcé has done. "In one variety, the actions and words are of constant incoherence, while in the other, the delirious actions instigated by the severe pains of labor are logically related to their point of origin. Thus, some women, in real frenzy, seek to inflict violence upon themselves or the child, to abridge their sufferings. In many cases, the intellectual trouble assumes the characters of acute mania. There is complete incoherence; patients have no appreciation of their condition, and nothing in the symptoms betrays the physical and moral causes which occasioned the delirium." It is, therefore, a sympathetic phenomenon, encountered most frequently in difficult labors, but also, sometimes, in natural ones, when it coincides with the expulsion either of the fœtus or of the placenta. In spite of its apparent gravity, this delirium has no serious consequences. It ceases spontaneously when labor ends, and in the cases where it is prolonged after delivery, it rarely lasts more than a few days and hardly ever ends in mania. The most rational treatment consists in terminating labor as rapidly as possible, and in then adopting expectant measures.

*Insanity of Women just delivered and of nursing Women:*

The types of insanity observed in these cases are: Mania, melancholia, lypomania, partial involvement of the intellect, hallucinations, intellectual or instinctive monomania, alternate insanity or duplex insanity, and simple dementia. These forms are far from being equally frequent. Among forty-four cases Marcé found twenty-nine of mania, ten of melancholia, five of partial insanity, and only two cases of temporary intellectual enfeeblement. In nursing women melancholia is, at least, as common as mania. The number of monomanias is hardly equal to one-fifth of the cases of mania.

Among forty-four cases, the insanity appeared within the first ten days in thirty-three cases. Sometimes the delirium appeared on the first or second day, but most often did not develop or attain its maximum until the fourth or fifth day. The inception of insanity on the tenth day is

quite rare. In eleven cases insanity developed at about the sixth week, *i.e.*, at the return of the menses. (Marcé.)

### I. *Mania.*

The attack is sometimes sudden, but generally gradual, and accompanied by precursory symptoms, lasting from some hours to several days. The women are sad, morose, but more often excited. Their manners and behavior become modified, the senses grow more acute, the slightest noise or too bright a light causing suffering; the agitation is aggravated day by day, and violent mania develops. Insomnia becomes complete, the tongue is coated, the mouth slimy, the head more painful and the pulse, accelerated during the moments of agitation, beats more quietly so soon as the woman grows calmer. Hallucinations of sight and hearing are now developed, and put the patients into a state of violent agitation, during which they become dangerous to themselves, to those around them, and particularly to their child. Some of the most important symptoms are the fancies of the patients, the odor which they exhale, and the presence of albumin in their urine. Some observers, as Marcé, attach importance to the presence of erotic ideas. Puerperal mania, thus, has nothing peculiar to itself, either in the delirium or in the physical symptoms.

Mania terminates in recovery, incurability or death. Recovery is much the most frequent, and occurs more or less rapidly, within a few days or several months. Among the complications which may prove fatal, we should accord the first place to acute delirium, which sometimes begins with the attack, but sometimes is not developed until after several weeks, or after a paroxysm of duplex insanity. Instead of ceasing in a few days, acute delirium may be prolonged, entering a new stage. Then typhoid symptoms develop, syncope occurs and the patients succumb, either suddenly from syncope, or slowly with all the symptoms of profound nervous exhaustion. To recapitulate: Patients who die during acute puerperal mania, succumb either to an intercurrent disease or to violent agitation and acute delirium.

*Treatment.*—Authors have recommended venesection, nauseating doses of tartar emetic, prolonged warm baths, purgatives, narcotics, antispasmodics, camphor and the milk diet. Marcé advises prolonged baths, the expectant treatment, tonics and hydrotherapeutics.

### II. *Melancholia.*

This is less grave than mania. The moral state of the woman, during pregnancy, seems to exert a special causative influence. It begins, like mania, either within a few days after delivery or near the sixth week. It is rapidly developed, or occasionally sad ideas may precede the invasion of the delirium, and of the melancholic depression. In certain cases, there



is, for some days, a general excitement bordering on mania, and, later, the delirium becomes habitual. Ideas of persecution, fear of death, dread of punishment, and ideas of suicide form the basis of the delirious conceptions. There are hallucinations of sight and of hearing, and the patients may grow dangerous to themselves or to their children. Marcé reports analgesia, hysterical attacks and catalepsy among the symptoms.

*Prognosis.*—This is, generally, not very grave, but the duration is long, from one month to six months.

*Treatment.*—It consists in prolonged warm baths, cold affusions, opium, chloral, hygienic measures and constant surveillance.

Together with these two chief forms must be mentioned the partial lesions of intelligence, the hallucinations of sight and of hearing, impulsive religious monomania and homicidal monomania. Marcé mentions a special variety of intellectual enfeeblement, which is prone to follow abundant puerperal hemorrhages, may be general or partial, and particularly affects the memory. Dementia also occurs, and lastly, cyclical or duplex insanity, characterized by two regular periods, one of excitement, of mania, and the other of depression, of melancholia, the association of which constitutes a paroxysm. It sometimes follows mania, and may be intermittent. It is a secondary, chronic form of puerperal insanity.

### III. *Insanity of Nursing Women.*

This form of insanity develops during the first six or seven weeks after labor, or later, after eight, ten or twelve months of lactation or even a few days after weaning. The disease begins in two ways, either suddenly, after exciting events, chills, etc., or gradually. The prevailing types are mania, melancholia, monomania and duplex insanity. The prognosis is, generally, not bad. Marcé saw twenty cures among twenty-six cases. The cure may, however, be slow, occurring only after several months or years. The first indication is to stop lactation. To accomplish this, dieting, purgatives, the iodide of potassium, and after suppression of the secretion, a tonic regimen may be useful.

### DISEASES OF THE SKIN.

Besides the regular eruptions of pregnant women, there is often extremely severe itching of the skin, without visible lesion. This itching, which may commence at the beginning or not until the second half of pregnancy, may reappear during consecutive pregnancies, (cases of Maslieurat Lagémard.) Sometimes temporary and passing, this itching is, in other cases, rebellious to all treatment, and only disappears after labor. Although not grave, it becomes the source of annoyance and even of weakness. Being aggravated by warmth and by rest in bed, it thus deprives the patients of sleep. In some cases, the suffering is so severe that the women scratch off the epidermis, thus adding to their torture. Often,

the itching is confined to certain regions and reappears with each pregnancy, so regularly that the patients recognize the beginning of pregnancy by this sign. Hebra cites the case of a woman who saw this itching develop upon her fingers after the fecundating coitus, in seven consecutive pregnancies.

The real cutaneous eruptions usually appear in the first months, and then either disappear before labor, which is the exception, or at variable periods after labor.

The most common of these skin diseases are the so-called chloasma of pregnant women—the mask, and pityriasis versicolor. The favorite seats are the forehead, the cheeks and the chin. The eruption consists of yellowish spots, more or less extended, but not reaching beyond the limit of the hair. Cazeaux believes that light is one of the chief necessities for their development, and that the shadow of the hair suffices to arrest their formation.

Hardy and Hebra separate these spots into two species: the ephelides and the pityriasis.

Hardy says that the ephelides are not projecting, and are not attended by pruritus or desquamation. They are composed of an accumulation of pigment in circumscribed areas. The ephelides often develop in women at the time of menstruation, and particularly during pregnancy. They generally disappear after labor, but not always, to the despair of the patients.

Hardy advises the application, twice daily, of the following solution:

|                             |           |              |
|-----------------------------|-----------|--------------|
| Aquæ destillat.             | . . . . . | fl. ʒ iv.    |
| Hydrarg. chlorid. corrosiv. | . . . . . | grs. vii ss. |
| Zinci sulphat.              | . . . . . | grs. xxx.    |
| Plumb. acetat.              | . . . . . | grs. xxx.    |
| Alcohol, qs. ad. sol.       |           |              |

If this is not sufficient, one may advantageously employ sulphur waters, particularly those of Luchon and Baréges, locally applied.

Pityriasis versicolor, although resembling the ephelides, differs essentially from them in that it is papular. The papules are covered by little scales. This eruption is always accompanied by slight itching, and is a parasitical disease occupying, according to Hebra, the hair bulbs. The microscope facilitates the diagnosis, showing some spores and numerous ramifications in the scales.

The treatment consists in sulphur lotions, douches, and sulphur ointments. Hardy advises sublimate lotions and citrine ointment. Jeannin believes in an intimate relation between menstrual troubles and this eruption. It is, according to him, due to the arrest of the menses, and pregnancy is not indispensable for its occurrence, since it is observed in women or girls who have not conceived, when their menstruation is disturbed. He does not believe that the parasite, *microsporon furfur*, is



indispensable, but it may be observed, which justifies the classification of Hardy. Parrot is opposed to Jeannin, in that, while he admits that chloasma may be related to menstrual disorders, he attributes it to a neuropathic condition, finding expression in certain general pigmentations of the skin.

Hebra mentions acne, or inflammation of the hair-follicles, or of the sebaceous follicles. It may be common acne or acne rosacea. The latter resists all treatment until after labor. In some women, the nose is the part attacked, and it becomes red, tumid and covered with the pimples of acne. Again, a true eczema may be developed in the early stages of pregnancy, and may become terribly severe, as in one case of our own.

Urticaria is another eruption affecting pregnant women, and may reappear at certain hours of the day, after meals or in the evening. We have seen a case which yielded to alkalies and quinine. Hebra has seen two cases of puerperal pemphigus. In one case it appeared two days after labor, and there was no relapse in later pregnancies. In the second case, the eruption appeared in three consecutive pregnancies, in the same woman. The first time it came at five months and disappeared after labor. The second time it appeared at three months, and did not disappear until a month after labor. The third time it became chronic and did not disappear. The woman was delivered of a dead child. Klein has seen a persistent pemphigus, which reappeared in two pregnancies. He also observed impetigo herpetiformis, which showed itself, in five cases, during pregnancy and labor. The eruption was pustular. The pustules appeared on the inside of the thighs, either discrete or in groups, and thence invaded the legs, the abdomen, the chest, the arms, the forearms, the hands, feet, neck, face and scalp. The eruption came out in crops and was attended by burning fever and great prostration. Before each eruption there was a chill with a pulse of  $104^{\circ}$  and a temperature of  $105^{\circ}$ , which then slowly subsided. There was diarrhoea which was once bloody. The urine was acid, dark-colored and contained a little pus, much urea but no albumin. Of the five women, three were delivered from two to five weeks before the eruption, two were attacked in the last months of pregnancy, and were delivered at the hospital. The symptoms remained unchanged after labor. Among the five women four died. They had no puerperal disease, and showed no trace of syphilis. Vrain reports one case of erythematotubercular scrophulide of the face, and one case of strumous lupus during pregnancy, and aggravated by subsequent pregnancies: Eczema of the face and hands, 3 cases; of the scalp, 2 cases; zona and eczema impetiginosa, 1 case.

The most common skin disease, with pregnant women, is certainly prurigo.

## LESIONS OF THE PELVIC ARTICULATIONS.

*Relaxation of the Symphyses.*

After having been admitted, then contested, then demonstrated by Sévérin Pinaud, in 1869, upon the body of a woman recently confined, the softening of the inter-articular cartilages and the consequent relaxation of the pelvic symphyses is to-day granted by all obstetricians. But this softening is usually moderate, and remains, so to speak, within physiological limits. Sometimes, however, it is so extreme as to become pathological. Going still farther, Zaglas has recently demonstrated that there is, in man, a perceptible movement of the ossa innominata, antero-posteriorly, or around an imaginary transverse line traversing the second sacral vertebra. So we may consider the sacrum as having a movement of rotation around an imaginary transverse axis, the promontory advancing forward and downward, while the apex moves in an opposite direction and *vice versa*.

Matthews Duncan calls attention to the presence, on the posterior articular surface of the iliac bones, of an irregular bony prominence, which often has the form of a massive angle in relief. There is a cavity corresponding to this eminence upon the opposite side of the sacrum, and the cavity is analogous, as regards some of its functions, to a cotyloid cavity. The movements of the iliac bones occur at the level of these surfaces, which are, generally, opposite the upper part of the second sacral vertebra. While they offer no resistance to the movements of flexion and extension of the ilia upon the sacrum, they oppose vertical movements between the bones, such as would necessarily be prejudicial to stability in the erect posture. In the latter half of pregnancy, the soft parts entering into the formation of the joints are always softened, and the articulations are consequently relaxed. The softening of these tissues is generally accompanied by increase in their thickness, which produces separation of the bony surfaces and widening of the pelvic diameters. In some cases, this thickening is extraordinary. Boyer, Chaussier, Bovin, Smellie, Dimerbroeck and Denman, have reported separations of the bones, even to the extent of from one-half inch to an inch. Matthews Duncan, thus regards the softening and thickening of the ligaments as the cause of separation of the joint surfaces, as a wedge of dry wood, becoming moistened by the absorption of water, splits stones into which it is driven. Lenoir thinks that, at a later stage, the relaxation depends solely on the serous infiltration of the pelvic ligaments, due to pregnancy. This does not produce separation of the articular surfaces, but renders it possible under the influence of an effort tending to produce it. In the late stages, a hypersecretion of synovia is added to the softening, distends the cavities and separates the bones. Then, the mobility is very great, and if, in the cadaver, one opens the joints, a viscid abundant fluid escapes, as Morgagni saw in one case.



Trousseau, Ferdinand Martin, and Tarnier have again called attention to this relaxation of the pelvic joints, and Bourhis and Dubois have studied it with care.

For Stoltz, this relaxation is either the effect of softening of the ligaments, or of violence exerted upon the tissues holding the pelvis together, during operations undertaken to deliver the woman: He thus makes two classes of relaxations. 1. The slow and progressive relaxation; 2. The violent and sudden relaxation. This latter also bears the name of rupture of the symphyses.

Korsch, in the laboratory of Professor Slavjansky, at St. Petersburg, examined thus forty-five pelves, of which there were: Pelves of women dead after labor at term, 18; before term, 8; after an abortion, 3; before labor, 1. Pelves with uterine and ovarian tumor, 4; pelves of women not pregnant, 6; pelves of men, 5. The following are his conclusions:

1. The influence of pregnancy and of large uterine and ovarian tumors manifests itself, not only by softening of the ligaments of the joints, but by enlargement of the dimensions of the inlet, and, particularly, of the outlet.

2. At the inlet, the greatest enlargement occurs in the transverse diameter. The reverse obtains at the outlet. The longitudinal diameter is less elongated than the transverse.

3. To produce enlargement of the superior strait, almost double the force is necessary as for the inferior strait.

4. The elongation of the transverse diameter of the inlet involves the shortening of the conjugate. However, the elongation of the conjugate does not modify the transverse diameter (in some cases we obtain a shortening of about one twenty-fifth of an inch).

5. The maximum elongation of the transverse diameter of the inlet always slightly enlarges the conjugate. But the maximum elongation of the conjugate does not, generally, enlarge the transverse diameter.

6. The simultaneous enlargement of both diameters of the inlet never elongates them so greatly as a successive enlargement of each diameter.

7. The widening of the outlet always slightly shortens the conjugate, and slightly elongates, or leaves intact, the transverse diameter of the superior strait.

8. The same holds true of the outlet when the inlet is widened.

9. In most of our cases we noticed greater mobility in the ligaments of the sacro-iliac and sacral articulations.

10. In the most mobile joints, the quantity of synovia was always increased.

11. The elongation of the longitudinal diameter depends on the mobility of the sacrum, but the mobility of the symphysis particularly aids increase of the transverse diameter.

12. The larger the crevice or cavity of the symphysis pubes, the greater the mobility of this articulation.

13. The number of labors seem to have no influence upon the mobility of the pelvic articulations.

*Causes.*—The temperament of the patients has been mentioned as a cause. Feeble and delicate women are supposed to be more predisposed than others (Munro, Smellie), and Roederer has even said that debility, rickets, venereal diseases and profound cachexiæ were themselves capable of producing relaxation of the pelvic ligaments. Morgagni opposed this exaggerated opinion. The influence of scrofula is not more manifest. Other assumed causes are extreme youth or age of the women, and the primiparous and multiparous condition. The contradiction of these opinions deprives them of value. Jacquemier holds that the relaxation of the symphyses is due to the development of the uterus, particularly when this development surpasses ordinary limits, as in large size of the foetus, twin pregnancy and hydramnion. (But there are cases in which the relaxation appeared in the second or the third month.)

Excessive exercise, bodily fatigue and ankylosis of the knee are causes. Too sudden getting up after confinement has been accused of an etiological relation.

All these causes are problematical, for one observes relaxation of the articulations in women belonging to all classes of society, and the etiology is, really, very obscure.

Relaxation of the symphysis always begins during pregnancy, and, in general, in the seventh, eighth and ninth months, but it may commence much earlier. Moreau has seen it in the second month and Désormeaux in the fifth. In two cases of our own, the disease began once at six months and once at seven and a half. The disease always begins insidiously, by a feeling of lassitude and weakness, accompanied by pains in the lumbar region, which, at first dull, soon grow more intense, and involve the buttocks, the groins, and the symphysis pubes. The patients at first only feel them when walking, then in the standing or sitting posture, and, finally, in some cases, they become so pronounced that they do not cease even when the patients assume the dorsal decubitus, and the least movements become so painful as to be almost impossible. The pains are always more marked at the sacro-iliac joints than at the pubic symphysis. They are often accompanied by numbness in the abdomen. When the patients rise, the pains become very violent and assume a peculiar character. It seems to the women as if the pelvis was spreading apart, their bones becoming dislocated, and as if they were sinking between their haunches. The gait becomes almost pathognomonic. It consists in a balancing from one leg to the other, a sort of oscillation. The women waddle like ducks. In walking, the women sustain their loins with their hands, now bending forward and now backward. At



such times we can feel the bones being displaced, and when we attempt to make them move upon each other, the woman resting on her back, this is successful up to a certain point. If we feel of the different joints, we excite a sharp pain in them, and sometimes can observe a notable displacement of the bones at the symphysis pubis. Trousseau related a case where one could introduce the end of the finger. When the separation is not appreciable to the touch, we may recognize it by a proceeding which we often saw used by Depaul before Budin again called attention to it at the Biological Society. It consists in placing the woman in the erect posture, against a resisting object, and in placing two fingers horizontally beneath the symphysis and therefore introduced a little way within the vagina. The woman is now made to stamp the feet or to walk a few steps, whereupon the fingers applied below the symphysis, distinctly feel the oscillation of the iliac bones at this level, and thus ascertain the mobility and the widening of the articulation.

When once begun, the relaxation of the joints goes on increasing until the time of delivery, but if the women keep quiet, they only have their movements impaired; their general health is unaffected. It is not always thus, for in one of our cases the pain was such as to deprive the patient of sleep, and thus to induce notable weakness and exhaustion. Generally, this articular relaxation disappears after labor, but sometimes it persists at least a short time, and, rarely, for months or even years. Courty quoted a case which lasted two years, and Baudelocque one of nine months' standing. Lenoir and Robert have seen the malady persist through life. In one of our cases the duration was eighteen months.

Sometimes the relaxation becomes complicated after labor, with inflammation of the joints. These results are rare in slowly progressive relaxation, but usual in the sudden relaxation of labor, where the so-called rupture of the symphyses occurs. Only one affection can be mistaken for relaxation of the joints. This is inflammation of the articulations, and we will soon revert to that subject.

*Prognosis.*—This should always be considered serious, although not absolutely grave, for the disease predisposes to inflammations of the symphyses, and to their rupture during labor. It may, moreover, persist a long time, thus constituting a real cause of infirmity.

*Treatment.*—This must not be neglected. Although rest suffices most of the time in slight cases, the patients should be carefully watched after confinement. To keep the patients in bed for a very long time, say one month, six weeks or two months, if necessary, and to maintain immobility of the articulations are the first indications. In many cases a towel, a body bandage, a roller bandage, suffice. In others, more energetic restraint is necessary. Boyer advised a leather girdle, and Martin a complete metallic girdle, quite strong and large enough to encircle the entire pelvis. The spring, the height of which is about one third of an

inch, padded and trimmed like those of trusses, is interrupted, anteriorly, and furnished on one side with a strong strap, and on the other with a buckle, by which means the two ends are approximated and firmly held in contact. We saw a so-called gymnastic girdle used with advantage in one case, and followed by a plaster dressing. But, as Cazeaux properly says, we must, above all, be certain that there is no inflammation of the joints, and must not resort to restraining measures until all inflammation has been dispersed by revulsives. It is well, afterward, to use sulphur douches, which rendered us great service in one case. Patients must be careful not to leave off their apparatus too soon, and must not incur fatigue by taking too much exercise.

*Inflammation of the Articulations.—Inflammation of the Symphyses.*

Although generally observed after labor, inflammation of the pelvic symphyses may appear during pregnancy, and to the cases cited by Hiller, Monod, Danyau, Hayn, Joyeux and Kiwisch, we can add two observed by ourselves. Dubois reported three more, in 1879, and we are convinced that it would be easy to find a larger number still.

*Causes.*—According to Fodère, these are, particularly, the puerperal state, scrofula, rheumatism, and traumatisms incident to labor.

*Symptoms.*—Generally, the disease begins a few days after labor, from the third to the tenth day, sometimes even earlier, in grave cases. In some cases, the characteristic symptoms of relaxation are observed toward the end of pregnancy, and inflammation manifests itself after delivery, and we may say as a result of it. Usually, a chill opens the scene, a fever follows and then the characteristic symptoms appear. The first is *pain*, which, slight at first, grows rapidly worse, is increased by movements and is localized in the joint attacked. Generally, the sacro-iliac joints are attacked, and the pain is then usually more violent and lasting. From the joint the pain spreads to the loins and the buttocks, radiating also into the legs. Sometimes it remains fixed in the articulation, or, at least, is augmented by slight pressure in this region or upon the iliac crests. When the symphysis pubis is attacked, the pains are less severe, and are located in the front of the pelvis. When the pain radiates into the legs, it there produces sensations of formication and of numbness, and the sensibility of the limb may be impaired (cases of Joyeux and Pigeolet). Sometimes the pain radiates into only one limb, and thus simulates sciatica. This happened in one of our cases. The urinary function is often impaired when the symphysis pubis is affected. Sometimes there is dysuria, and sometimes incontinence. The skin over the joint keeps its normal color for some time but often becomes red, tense and shiny. Soon, a little tumefaction and œdema appear, but these are not constant, and, generally, vaginal palpation is necessary to detect swelling of the articulation. In rare cases the tumefaction fluctuates, an abscess forms,



grows large and breaks its way into the pelvis or outward. In the former case death may result, and at the autopsy we find the articular surfaces altered and denuded of their cartilage.

*Prognosis.*—This is, thus, serious enough, although, even in these cases, a cure may be effected and the disease end in ankylosis. Generally, these inflammations cease after a time.

*Treatment.*—This embraces local revulsives and venesections, with absolute repose and opiates.

#### *Rupture of the Symphyses.*

Sudden relaxation of the symphyses may occur and constitute rupture of the symphyses.

As Bach said, in 1832, "In order that the separation of the symphyses may occur, there must be a great expansibility of the articulations. If this expansibility does not exist, and if the force causing the relatively large foetal body to pass through the pelvis is sufficient to separate the pelvic bones, rupture will occur. In ordinary cases, the pelvis resists longer than the head, but often, the overlapping of the cranial bones does not suffice, and we meet with many more cases of rupture of the symphysis in labor than of fractures of the skull. The symphysis pubes is less susceptible to rupture than the posterior articulations. We meet many more examples of rupture of the sacro-iliac articulations than of the symphysis pubes, while relaxation of the latter is oftener seen."

In rare cases, spontaneous rupture may occur (Duverney, An-siaux), but generally, rupture follows the use of the forceps. De Lamotte quotes a case of rupture from version, and Chaussier has cited a similar one. Bach does not believe that rupture can occur without predisposition, and it is also necessary that relative narrowness exist without which only separation would take place. Among the predisposing causes, he cites failure in the cohesion of the ligaments of the symphyses, found in cachectic persons and in rickets, osteomalacia, scrofula, scorbutus, gout and syphilis. Most frequently, the rupture takes place on the descent of the head into the pelvis, but it may occur at the time of the extraction or expulsion of the head from the inferior strait. When rupture occurs in the posterior symphyses, it is due to backward displacement of the sacrum. Hence the tendency of the pubic bones to approach each other in front, and to separate behind. When the rupture is at the symphysis pubes, the surfaces are separated, leaving an interval between them, and there is, also, always a separation of the sacro-iliac joints at their anterior part. The sudden stretching of the ligaments of the posterior symphyses, by the separation of their articular surfaces, the retrocession of the sacrum, the separation of the ilia, cause a rupture of the ligaments maintaining these bones in contact. The anterior ligament is raised and made tense,

but does not tear. A part of the posterior ligaments is torn or loosened, when the separation is sufficient.

When the symphysis pubes is involved, the inter-articular fibro-cartilage and the anterior ligament are torn, the posterior ligament is elongated; sometimes the cartilage of incrustation is separated from one of the bones, or is torn off. Bach, who has seen this arrangement at the symphysis pubes, does not consider it possible at the sacro-iliac joints.

*Signs and Diagnosis.*—If rupture occurs, the woman feels an acute pain, a sense of laceration, at the moment when the head passes through the inlet or outlet of the pelvis. Often, there is a cracking sound, perceptible to the assistants, and louder when the symphysis pubes is ruptured. This is not a pathognomonic sign, however, for this cracking sound is often heard without rupture, when the head passes a contraction of the pelvis. The obstetrician then, has an articular sense of resistance overcome, which is noticed when forceps are applied at the inlet, in pelvic contractions. It is then due to the depression of a parietal bone by the promontory. In rupture, there is always acute pain, which is lacking in the other cases. The separation is never so marked in the posterior articulations as at the pubic symphysis, but the pain is more severe. At the latter joint, the separation is often considerable. The pain is intensified by pressure and by movements of the legs. Sometimes there is a real crepitation. After from twenty-four to forty-eight hours, sometimes later, inflammatory reaction ensues, and the symptoms of inflammation of the symphyses, with their sequelæ, make their appearance.

#### PUERPERAL RHEUMATISM.

As early as 1866 and 1867, Lorain stated, in a communication made to the Medical Society of the Hospitals, that "there exists in pregnant women a morbid state of the genito-urinary passages, which may predispose to attacks of arthritis, analogous to blenorrhagic arthritis. There is a certain amount of urethritis as well as of cervicitis and vaginitis. The urethral pus, as well as the pus which escapes from the cervix and bathes the vagina, is the natural result of pregnancy. There is always disease of the genito-urinary organs in the pregnant woman. Genital rheumatism is, thus, as little surprising in her case as in that of a man who has just had the sound passed."

Lorain's ideas have been reasserted by two of his pupils, in their inaugural theses. Vachée gives the name of uro-genital rheumatism to this form of rheumatism, and states that it may occur in four forms: 1. As hydrarthrosis; 2. Rheumatism, proper; 3. The form characterized by vague pains; 4. The nodular form.

Vaille, in 1867, takes a broader view than Cruveilhier, who considers the rheumatism of pregnant women to be akin to puerperal rheumatism



proper (*i.e.*, the rheumatism which is developed a few days before or after labor), and adds to this class, menstruation, which he considers to be a sort of miniature puerperal state, and lactation. He describes two varieties of puerperal rheumatism—muscular rheumatism and articular rheumatism. Under the term muscular rheumatism he describes tetany or contracture of nursing women, and ordinary muscular rheumatism, which seems to have nothing special about it, excepting its causative relation to the puerperal state. The conclusions he arrives at are the following:

1. There is a rheumatism peculiar to the puerperal state, developed under its influence and modified by it. This rheumatism is, perhaps, constantly accompanied by leucorrhœal or other discharges, and is, therefore, analogous to blenorrhagic rheumatism. This is Lorain's genital rheumatism.

2. Puerperal rheumatism attacks the same organs as ordinary rheumatism. It may be muscular or articular and may provoke other arthritic diseases, cardiac affections, meningitis, ophthalmia, erythematata, etc.

3. During pregnancy it tends to follow the subacute course of gonorrhœal rheumatism. It is prone to produce hydrarthrosis, and may, rarely, end in suppuration or white swelling.

4. Immediately after labor, particularly when epidemic influences are prevalent, articular rheumatisms of exceptional gravity may be developed, and are remarkable for their tendency to suppurate and to produce articular changes.

5. Endocarditis may develop, sometimes, in the puerperal state, even when there is no joint trouble.

Braunberger, in 1870, stated that the puerperal state is only one of the phases of Lorain's genital state, and that the rheumatoid symptoms of pregnancy are localized in the joints and synovial sheaths, with or without the coincidence of cardiac affections. This local trouble is tenacious, rebellious, aggravated as time elapses after conception, and is not improved or cured until after parturition. These joint troubles of pregnancy have a special stamp. They are quite analogous to gonorrhœal arthritis.

Peter does not so absolutely admit the influence of these causes. "He thinks that everything is an exciting cause of rheumatism, as well cold, which is a general traumatism, as a contusion which is a local one; as well urethral gonorrhœa as uterine gonorrhœa; as well pregnancy as parturition."

Tison, in 1879, admits that pregnancy acts in two ways: 1. By the profound changes which conception produces in the general condition and in the woman's health; 2. By the discharges which exist in most cases.

We fully concur in Peter's opinion, and although we admit that rheumatism presents some peculiarities in pregnancy and the puerperal

state, we do not think that it can be regarded as identical with gonorrhœal rheumatism, and we believe, much more, in the general influence of the puerperal state than in a local influence brought about by the vaginal, urethral and uterine discharges of the pregnant woman.

*Symptoms.*—The disease often begins with chills, which may be several times repeated and which are generally slight. In some cases, on the contrary, they are very violent. At other times they are absent.

Pain generally succeeds the chill. Sometimes very intense, it is, so to speak, the initial symptom. Sometimes it is dull and only excited by movements or pressure. In cases of great intensity it has been observed to persist during several weeks, with the same severity, thus depriving the patients of all repose and of all sleep. It then corresponds to the painful form of Vachée and of Fournier. Now fixed in one joint, now migratory, it is soon accompanied by marked swelling of the affected joints, due to the serous effusion into these and to inflammation of the peripheral fibrous tissues and of the bones themselves. Generally, these pains are more migratory than the swelling, which, once fixed upon a joint, lasts much longer than the pain and seems to persist for a certain time after the cure.

*Seat.*—The disease may affect many joints, to a variable degree. It is, however, rarely erratic and generally fixes itself upon one joint, particularly the knee, the elbow, the wrist or the ankle. There is, ordinarily, neither redness nor heat, but the articulations attacked are swollen, pasty, shiny, of a pale or violet color, or sometimes devoid of color. There is a sort of characteristic obscure œdema, accompanied, where the serous effusion is pronounced, as in the knee, by an elevation of the patella and a real fluctuation. At the same time the febrile reaction, which exists at first, yields quite rapidly, and the disease more resembles a hydrarthrosis than a true rheumatism. The temperature rarely exceeds 102° F. The sweats are not profuse, and, although the patients lose some strength and grow pale, pregnancy still pursues its regular course, except in rare instances. Generally, the rheumatism of pregnancy is subacute, invading, at first, three or four joints and then settling in one of them, while the general symptoms disappear. The swelling and pain on pressure constitute the disease. Often, rheumatism is chronic from the first. The fever is hardly noticed; at first, the swelling and discomfort are confined to a single joint, the swelling is pasty, and the color of the skin unchanged. We have noted two or three examples. In these cases, the disease is indefinitely prolonged.

Among the twenty-three cases reported by Tison, the disease lasted from 1 month to 1½ months, 5 times; from 2 to 3 months, 4 times; from 4 to 5 months, 4 times; from 5 to 6 months, 4 times.

In one of his cases, Tison saw three attacks of rheumatism developed in the same woman, the first before, the second during and the third after



pregnancy. The first lasted fifteen days, the second five months with endocarditis, the third, also with endocarditis, several weeks.

*Terminations.*—Among Tison's twenty-three cases, there was only one death, and in that case there was metro-peritonitis. Recovery is the rule, but recovery with ankylosis. Tison has seen it eleven times out of thirteen cases, three of them with nodosities; in four cases, stiffness and swelling remained; three times the patients left the hospital uncured; in only five cases was the cure complete. Sometimes labor causes great improvement, but at other times it has no influence on the rheumatism. Whatever Vaillè says, the termination by suppuration is rare in pregnancy, but not rare after labor.

*Prognosis.*—This is grave, for although life be not endangered, ankylosis follows in two-thirds of the cases, and complete recovery occurs in only one-quarter of the cases. It is graver in proportion as the disease was localized, at first, and has lasted a long time.

*Treatment.*—This must be energetic, consisting of quinine, salicylate of soda, narcotics locally, and, especially, fixation in splints or immovable apparatus, perforated so as to allow of the application of medicinal substances. When the fever has passed, revulsives are to be used. The tincture of iodine, cotton saturated with iodine, vesicatories and the actual cautery may be employed. Trousseau used a poultice composed of four pounds of bread, six and a quarter ounces of camphorated alcohol and thirty grains of the extract of henbane. A poultice is thus made upon which is spread one hundred and fifty grains of the extract of belladonna, with which the limb, reposing on a splint, is enveloped. The poultice is only renewed once in eight days. To prevent it from drying, it is covered by a sheet of oiled silk. The whole is covered with cotton-batting and held by a bandage.

Alkaline baths and sulphur douches are useful, when swelling and stiffness of the joints are the only remaining symptoms. The patients are not to be kept quiet too long. It is, therefore, good, although the limb be left in the splint most of the time, to take it out morning and evening, when the acute attack has once passed, and to subject it to a few slight movements, limited to the joint.

One sometimes sees, in pregnancy, true gonorrhœal rheumatism, syphilitic rheumatism, such as Dubois and Fournier have reported, and white swellings. White swellings may exist before pregnancy, or, as in a case of Labbé, quoted by Dubois, the white swelling developed in the left knee during the puerperal state of a preceding pregnancy, pursued its course and necessitated amputation during a subsequent pregnancy. The patient, already pregnant three months, submitted to amputation and recovered without an abortion. In another case, quoted by Richet, there was white swelling of the wrist and of the right knee. Richet employed igni-puncture. A month later the patient was attacked with

acute tuberculosis. She was delivered at eight months and died forty-eight hours afterward.

*After Confinement.*—Braunberger is very wrong in uniting, under a single heading, rheumatoid symptoms occurring after labor, although he carefully divides them into three distinct classes: 1. Articular localizations in subacute infectious puerperal troubles; 2. Articular localizations in acute infectious puerperal troubles; 3. Localizations in non-infectious chronic puerperal troubles. Here we have incontestable confusion.

We must, indeed, carefully distinguish rheumatic disease—developed in the normal course of the puerperal state, and the arthritis of puerperal fever, which Lorain and Quinquaud have called the infectious puerperal state. This arthritis, we consider, as do Lorain and Quinquaud, as the manifestation of puerperal septicæmia which attacks the joints as well as the lymphatics, the veins, the serous membranes, the heart and all the other organs, and is either primarily or secondarily developed. But these symptoms have no relation to rheumatism. This arthritis may become purulent, the same as puerperal peritonitis and pleuritis, but has no connection with puerperal rheumatism. Rheumatism may, of course, be developed in the puerperal state, just as in pregnancy, and, when it does so, it has characteristic features. It may be muscular, which is rare, or articular, which is common.

#### *Muscular Rheumatism.*

This form attacks the muscles of the upper or lower limbs, localizing itself in the muscles of the arms or of the calves. To the two cases cited by Warmont and observed in Legroux's service, we can add two seen by ourselves, one of which is now under observation. Confined to the calf, in our two cases, the disease showed itself, each time, from the twentieth to the twenty-fifth day after labor, and we might have considered it *phlegmasia alba dolens* had not the absence of fever and of œdema, and the limitation of the disease to a small area, removed all doubt. We should prefer to call the trouble *myodinia* of puerperal women, as Warmont and Legroux do. In our first case every symptom disappeared at the end of five days, by the application of belladonna and indulgence in rest. Our second patient has only been sick three days. We have just seen a third case, where the rheumatism had settled in the muscles of the left shoulder after having affected the corresponding muscles on the right side for forty-eight hours. The patient had been confined twenty-four days before. The disease disappeared in eight days, under quinine and local narcotics.

#### *Articular Rheumatism.*

The characteristic of these cases is their tendency to suppuration. The joint symptoms, appearing from the second or third to the tenth or



fifteenth day after confinement, are generally accompanied by a claret red, a blue, or a pale rose color, disappearing on pressure, to soon return. The swelling, unlike that observed during pregnancy, is generally slight, although the effusion be more abundant. The pain is excruciating. The pulse is very rapid, from one hundred and ten to one hundred and thirty-two per minute. The temperature usually keeps pace with the pulse, rising to 104° or even 106° F. Chills are frequent and recurrent. In fatal cases, there is adynamia and delirium, while meningitis is a frequent complication. Pericarditis and endocarditis are, also, complications.

Fonsart and Bourdon have reported teno-synovitis, involving both the extensors and flexors of the fingers and toes. In many cases peritonitis, peri-metritis and metritis have been observed. It is not only after normal labor at term that puerperal rheumatism may manifest itself, for Peter has reported a fatal case which followed an abortion at three months.

The prognosis is rendered grave, of course, by the tendency to suppuration already alluded to, and the outlook is more serious in proportion as the disease has developed rapidly after labor. But, although the prognosis is more favorable in the cases occurring later than the tenth or twelfth day after labor, it is still very serious, for, in these cases, the arthritis tends to chronicity, and the termination by transformation into strumous arthritis is frequent. In the most favorable cases, ankylosis is the rule. This is not always the result, and in one case which we observed at the clinic, the patient recovered without suppuration of the articulations and without ankylosis.

*Treatment.*—This is often inefficacious. Quinine seems to have yielded the best results, thus far, but large doses must be used, as twenty-three grains *per diem*, and must be continued during the whole course of the disease. The treatment should not be suddenly but gradually suspended.

Revulsives and narcotics are only uncertain palliatives.

#### *Chorea.*

Chorea may occur during pregnancy or after labor, but is infinitely more common during utero-gestation, and this relation between chorea and pregnancy had been already noted in the eighteenth century when Borsieri advised the use of quinine.

*Frequency.*—The disease is rare, for Mosler, in 1862, had only been able to collect twenty cases. Barnes, in 1869, collected fifty-six, and Fehling, in 1874, sixty-eight cases. Schroeder and Spiegelberg consider it as very rare. The latter has only seen two cases, in a very large practice. Among 1600 patients, observed by ourselves at the clinique, we only discovered two cases, and we have recently seen our third case in a woman after labor.

*Causes.*—1. *Primiparous state.*—All authors agree on this point. Scanzoni, Dreyssig, Schneider, Bezold, Wirke, Bodo, Wenzel, Sieckel,

Weber, Russell and Spiegelberg are unanimous on this question. But the only authors who have given figures are:

|                                 |   |                           |
|---------------------------------|---|---------------------------|
| Mosler, . . . . . 20 cases,     | { | Primiparæ, . . . . . 8    |
|                                 |   | Multiparæ, . . . . . 7    |
|                                 |   | Unknown, . . . . . 5      |
| Barnes, . . . . . 56 cases,     | { | Primiparæ, . . . . . 28   |
|                                 |   | Multiparæ, . . . . . 15   |
|                                 |   | Unknown, . . . . . 13     |
| Fehling, . . . . . 58 cases,    | { | Primiparæ, . . . . . 33   |
|                                 |   | Multiparæ and unknown, 35 |
| Charpentier, . . . . . 3 cases, | { | Primiparæ, . . . . . 2    |
|                                 |   | Multiparæ, . . . . . 1    |

2. *Age*.—Mosler, among twenty-one cases, found sixteen in which the age was exactly known. This table exhibits the ages:

|                             |   |                                |
|-----------------------------|---|--------------------------------|
| 17 years, . . . . . 1 case, | } | From 17 to 20 years, 5 cases.  |
| 18 " . . . . . 2 cases,     |   |                                |
| 19 " . . . . . 2 "          |   |                                |
| 20 " . . . . . 5 "          |   |                                |
| 23 " . . . . . 3 "          | } | From 20 to 24 years, 11 cases. |
| 24 " . . . . . 3 "          |   |                                |

Barnes found among fifty-six cases:

|                              |   |                                |
|------------------------------|---|--------------------------------|
| 17 years, . . . . . 3 cases, | } | From 17 to 20 years, 11 cases. |
| 18 " . . . . . 4 "           |   |                                |
| 19 " . . . . . 4 "           |   |                                |
| 20 " . . . . . 10 "          |   |                                |
| 21 " . . . . . 1 case,       | } | From 20 to 24 years, 23 cases. |
| 22 " . . . . . 2 cases,      |   |                                |
| 23 " . . . . . 7 "           |   |                                |
| 24 " . . . . . 3 "           |   |                                |
| 28 " . . . . . 1 case.       | } | From 28 to 35 years, 3 cases.  |
| 32 " . . . . . 1 "           |   |                                |
| 35 " . . . . . 1 "           |   |                                |

Chorea is, therefore, most frequent between 20 and 25 years.

3. *Constitution*.—There is no uniformity. Sometimes the women are feeble, small and delicate, and sometimes are robust and strong.

4. *Heredity*.—Romberg has only quoted one case in which this cause can be really assumed.

5. *Previous Chorea*.—Mosler saw, among his twenty-one cases, five who had had previous attacks. This was noted by Senhouse Kirke, Elisærhe and Fehling, fifteen times among thirty-three primiparæ. Barnes reports nine out of his fifty-six cases. Spiegelberg, without giving statistics, insists on this point and the same is true of Franck and Duncan, whose patients had had chorea either during infancy, as in the preceding cases, or during previous pregnancies. Chorea may, however, appear suddenly during the second or third pregnancy, or as a relapse, having existed



during a first or a second pregnancy. Again, it may not appear until after labor whether at or before term. Pregnancy may commence during an attack of chorea, as in a case of John Hirks.

Among the seven multiparæ cited by Mosler, the previous pregnancies had been normal in three, and in two there had already been chorea during the first pregnancy. In the other cases there had been vertigo, intense headache, and marked anæmia.

6. *Emotions*, as anger, fright, mental trouble, delirium.

7. *Rheumatism*.—Spiegelberg insists on rheumatism, combined with cardiac affections. In some cases, albuminuria or glycosuria has been noted. In many cases the cause is not discovered, and Spiegelberg regards these cases as reflex neuroses, which, given a predisposition on the patient's part, suddenly develop under the influence of inadequate nutrition of the nervous centres by impoverished blood or under the influence of peripheral irritation of the genital system. It is, in fact, not rare to find choreic patients poorly nourished, feebly developed and anæmic. Barnes, Copland, Roger, Sée and Chambers also mention rheumatism, and Ogle embolism.

*Period of Development*.—Chorea may appear at any stage of pregnancy and after labor, but it is particularly in the earlier part of pregnancy that it is most often observed. It then persists, generally, until the beginning, or even to the end of labor. More rarely, it yields before labor, and more rarely still (only three times out of Spiegelberg's sixty-nine cases) does it persist during the post-*puerperium*. In our own case, the chorea did not appear until three weeks after labor. On the day following her confinement the patient, a multipara who had been four times pregnant, was seized with a left crural neuralgia which resisted quinine, injections of morphia and vesicatories for twenty-one days. On the twenty-second day, after a severe annoyance, the patient was attacked by left hemichorea of a typical character, involving the whole left side, more marked in the upper extremity and involving the muscles of the face. This attack disappeared at the end of thirteen days and gave place to genuine hysterical attacks, which were repeated two or three times daily, at first, but which are nevertheless now diminishing. There is now only one daily hysterical attack, and this is less violent, although accompanied by very plain erotic sensations, which lead to free secretion of the vulvo-vaginal gland, and they have tended, ever since their diminution, to be replaced by an incessant hysterical cough. Bromides, valerian, cold douches and chloral have been, hitherto, absolutely powerless, and the same has been true of quinine, arseniate of iron, etc. We may add that the patient has had an intense catarrhal metritis for some years, and an ulceration of the cervix for which she is now being treated. She had an attack of chorea in her infancy, but not in her other pregnancies.

Regarding the exact date of the attack, Mosler has seen, among twenty-one cases:

|                        |           |          |
|------------------------|-----------|----------|
| In the first 2 months, | . . . . . | 7 times. |
| “ “ 3d and 4th months, | . . . . . | 8 “      |
| “ “ 5th “ 6th “        | . . . . . | 3 “      |
| “ “ last months,       | . . . . . | once.    |
| Unknown,               | . . . . . | 2        |

Among fifty-seven cases, Barnes found:

|                   |          |                                       |
|-------------------|----------|---------------------------------------|
| In the 1st month, | 3 times. | } In the first five months, 30 times. |
| “ “ 2d “          | 3 “      |                                       |
| “ “ 3d “          | 10 “     |                                       |
| “ “ 4th “         | 7 “      |                                       |
| “ “ 5th “         | 7 “      |                                       |
| “ “ 6th “         | 4 “      | } In the last four months, 11 times.  |
| “ “ 7th “         | 3 “      |                                       |
| “ “ 8th “         | 2 “      |                                       |
| “ “ 9th “         | 2 “      |                                       |

41

Early, without exact date, 6; late, 3; unknown, 6.

Our three cases appeared as follows: Twice during pregnancy, at the fourth and the sixth month, and once, twenty-two days after labor.

In Fehling's fifty-five cases, chorea began in the first half of pregnancy in thirty-nine instances. In only three did the chorea persist during the puerperium. In only twenty-nine cases did pregnancy reach full term.

*Symptoms.*—These vary according as the chorea appears slowly or suddenly. If the inception is gradual, the friends of the patient, or the patient herself, first perceives involuntary movements of the limbs or of the face, and in some cases, such as Kiwisch, Scanzoni and Romberg have observed, there is also head-ache, vertigo, a queer facial expression, excited speech, and, rarely, excitement of the whole psychological system. Then these movements grow marked, and the chorea is progressively developed. At other times, the chorea begins rapidly, the incoördination of the movements is marked and rapidly extends to several parts of the body.

Among the twenty-one cases of Mosler, the disease began in the right arm alone, twice; in the left arm and leg, twice; in the legs only, twice. The attacks returned at a fixed time. In four cases the disease began in the face, and, in one case, in the tongue muscles.

When the attack is sudden, several parts of the body are simultaneously involved, as the face, limbs and tongue. There are evening exacerbations, delirium and insomnia (Helfft). In the majority of cases, the chorea is bilateral (Mosler, Fehling, Barnes). In sixteen of Mosler's cases, the disease affected besides the limbs, the face, the eyes, the tongue, and the muscles of the neck and trunk. Speech was affected. But even in these cases, the chorea is not always of equal intensity in all parts of



the body, and the movements are now violent, now quite slight. In many cases there seem to come crises or exacerbations of the disease. Almost always, save in two cases of Franck and Ingleby, the movements ceased during sleep, but often-times the sleep is disturbed, and accompanied by night-mare. The patients talk aloud and are restless. The movements reappear in the morning when the patients awaken, and sometimes it is the reappearance of the movements which puts an end to sleep (Scanzoni). There are, sometimes, diurnal remissions, of which Mosler has noted four distinct cases. Hand has observed an aggravation of the movements under the influence of movements of the child and of vaginal touch. Often, the chorea is accompanied by epileptiform convulsions and hysterical fits which seem to return at fixed hours (Mosler, Duncan). One of Duncan's patients, and one of our own, had ulceration of the cervix. Other complications are headache, sharp pains in one limb, cardiac and renal diseases. Generally, there is little or no fever, no digestive difficulties and no disorder of the intellect. In a case of Lever, however, there was weakening of the memory and the intelligence seemed impaired at the time of the crises.

*Course, Duration and Terminations.*—The influence of chorea upon pregnancy is very marked. Abortion or premature labor are common. The sooner the chorea begins, the greater the chances that pregnancy will end before full term.

Among twenty-one cases, Mosler observed four abortions, at four, five and six months. In three cases, the chorea had lasted three, four and five months, for it began in the first month. In three cases it disappeared immediately after abortion. Once, it lasted six weeks after labor (Romberg).

In three cases there was premature labor, twice at the beginning of the ninth month and once in the seventh. The chorea had persisted, in one case, nine months, in one case five, and, in one, only one month. In three cases the chorea ceased abruptly. Once (Aran), the patient had a still-birth and died delirious the next day.

Barnes, recapitulating his fifty-seven cases, reaches the following results:

|   |           |
|---|-----------|
| Spontaneous labors at term, . . . . .               | 22 cases. |
| Abortions at three months, . . . . .                | 1         |
| "    "    five    "    . . . . .                    | 6         |
| "    "    six    "    . . . . .                     | 1         |
| Premature labors at seven months, . . . . .         | 2         |
| "    "    "    eight    "    . . . . .              | 1         |
| "    "    date not given, . . . . .                 | 6         |
| Abortions, date not given, . . . . .                | 2         |
| Women dead before delivery, . . . . .               | 3         |
| Abortion induced, . . . . .                         | 1         |
| Premature labor, induced at seven months, . . . . . | 1         |
| Unknown, . . . . .                                  | 11        |

In five cases of Mosler, the chorea continued until the end of pregnancy; in three cases, from the third to the tenth month, and once, from the fourth to the tenth.

In Ingleby's case, (the fifth of Mosler,) the disease reached its maximum in five days, premature labor occurred, and the patient died twenty-four hours later. In some cases the disease ceased before labor.

On the other hand, in the cases of Barnes:

|   |           |            |
|---|-----------|------------|
| Recovery occurred rapidly,                      | . . . . . | in 1 case. |
| “ “ in 19 days,                                 | . . . . . | “ 1 “      |
| “ “ “ 37 “                                      | . . . . . | “ 1 “      |
| “ “ “ $2\frac{1}{2}$ months,                    | . . . . . | “ 3 cases. |
| “ “ “ $3\frac{1}{2}$ “                          | . . . . . | “ 1 case.  |
| The disease ceased before the end of pregnancy, | . . . . . | “ 8 cases. |
| “ “ “ after abortion,                           | . . . . . | “ 2 “      |
| “ “ “ “ labor,                                  | . . . . . | “ 2 “      |
| “ “ ended in an attack of rheumatism,           | . . . . . | “ 2 “      |
| “ “ continued during the whole of pregnancy,    | . . . . . | “ 12 “     |
| “ “ ended in mania,                             | . . . . . | “ 1 case.  |

Death occurred seventeen times in the days following delivery, the next day or the one following that. Twice mania occurred and once eclampsia. Among the seventeen cases, there were only six primiparæ against eleven multiparæ.

Among sixty-eight cases collected by Fehling, there were nineteen deaths. Among these, that of Senhouse Kirke is one of the most curious. A patient attacked with chorea at fourteen years had two miscarriages and one labor at term. In a fourth pregnancy she was attacked with severe chorea four days before her confinement, and died four days after labor.

When chorea develops late, it seems to be more severe as well as when it occurs in a second or third labor or when it relapses. When, on the other hand, it begins from the third to the fifth month or before, it rarely persists up to the ninth month. In these cases there is either abortion or premature labor and a cure generally results.

Chorea is more serious in multiparæ than in primiparæ. Spiegelberg, who among sixty-nine cases noted twenty deaths, saw pregnancy go to full term in only twenty-nine cases. Death of the child, however, does not always precede the interruption of pregnancy, even in cases of abortion. The child is often born alive and has never been seen affected with chorea. The disease has no influence on the *post-partum* state.

Mosler and Barnes find the causes of death in the complications, not in the chorea itself. Fehling has noted intestinal ulcerations and cardiac affections five times, albuminuria once, and cerebral affections (mania and eclampsia) ten times. Cerebral complications ought not to occasion surprise, if one accepts Barnes' opinion, which locates the disease in the *corpora striata*.



In his remarkable study on chorea, Germain Sée states that it has not been positively shown that chorea is more common with pregnant women than in others, but he considers gestation as more or less favorable to the development of nervous, choreic phenomena. Among the fourteen cases which he collected, he finds thirteen primiparæ. The chorea began three times within the first two months, seven times from the third to the fifth, three times from the fifth to the ninth. But he thinks that pregnancy is not the real cause, and that it acts only through the usual causes, the production of which it favors. In his view, the chorea of pregnancy depends on no cause save choreic antecedents. Five of his patients had already had chorea in their youth, and only relapsed during their pregnancy. With the others chorea was only secondary to rheumatism, chlorosis, chronic dysmenorrhœa, hysteria or hydræmia, which so often attend both chorea and pregnancy. The chorea of pregnancy is more stubborn than ordinary chorea, and if it is improved by labor, the cure is not generally effected for some days, or even for more than a month. Choreia does not produce abortion itself, nor does it demand artificial premature delivery.

*Treatment.*—This should embrace general tonic measures, narcotics, quinine, bromide of potassium, and particularly, chloral. Spiegelberg, in cases where the chorea gets worse and resists all treatment, advises artificial premature labor and even abortion. He especially recommends early interference.

#### DISEASES OF THE VULVA AND OF THE VAGINA.

##### *Pruritus Vulvæ.*

This disease, although not peculiar to pregnant women, sometimes assumes especial intensity with them. By the term is understood a severe itching of the external genitals, which sometimes extends to the introitus vaginæ, and amounts to real torture. Generally, there is no visible lesion. In other cases, the women produce erosions, superficial fissures, and sometimes redness by scratching and thus augment their sufferings. Hardy has seen some superficial ulcerations in these cases, from which serum exudes, as in eczema. Cazeaux has quoted a case in which the itching was such that the woman was in a state of general irritation almost producing convulsions. In another case the friction had been so often repeated that it had caused swelling and inflammation of the labia majora and minora, one of which was of twice its natural age. Although devoid of gravity, pruritus vulvæ gives so much suffering that it claims active treatment, which is often inefficacious. Rest, alkaline baths, separation of the inflamed surfaces, and lotions of vegetable and mineral waters sometimes succeeds, as do solutions of borax, chlorate of potassium and weak carbolized water. Meigs recommends ablutions of the parts with soap

and water, and then the application, thrice daily, of the following solution:

|                    |           |                    |
|--------------------|-----------|--------------------|
| ℞ Sodii borat.     | . . . . . | 3 ij.              |
| Morph. sulphat.    | . . . . . | grs. iv. ss.       |
| Aquæ rosæ destill. | . . . . . | fl ʒ x. fl ʒ ijss. |

We have often successfully used either just as hot water as the patient can endure, or tar water. In obstinate cases, we employ the following:

|                       |           |                |
|-----------------------|-----------|----------------|
| ℞ Hydrarg. bichlorid. | . . . . . | gr. xxii. ss.  |
| Aquæ destill.         | . . . . . | ʒ iv ʒ vss.    |
| Ammon chlorid.        | . . . . . | Q. s. ad. sol. |

Sig. One teaspoonful, in a glass of hot water, as a lotion, three times a day. If the case resists, we use the solution undiluted, applying it with a brush morning and evening.

[In any case of pruritus vulvæ, a very common cause must be borne in mind, and this is endocervical catarrh, and the resulting erosion of the external os. The diagnosis is readily made by the finger—patency of the external os and cervical canal, velvety softness of the external os, and these signs are confirmed by the examination through Sims's speculum, which reveals the eroded cervix and the gaping os. As for treatment, applications to the canal and the os, by means of cotton wrapped applicators, of a solution of nitrate of silver, 30 to 60 grains to the ounce, are the most effective, and if made gently, will not induce miscarriage. In case of vaginitis a similar solution should be swabbed over the entire vaginal mucous membrane. The most effective of all means for the relief of the symptom—pruritus—is painting the external organs, the skin of the thighs, nates, etc., with a solution of silver nitrate, gr. x—ʒ j.—Ed.]

Dubois recommended cauterization with nitrate of silver, which we have never employed. We have seen one case of marked pruritus, the patient being a young woman, at the beginning of her second pregnancy, which resisted all treatment, and ended at two months and a half by an abortion. During a third pregnancy, the pruritus reappeared during the first two weeks of the second month, but yielded to astringent lotions, (Goulard's extract) and to separation of the surfaces. The pregnancy pursued its regular course to full term.

#### *Leucorrhœa.*

Almost all pregnant women have leucorrhœa. Generally it is mild, but sometimes is severe, being then connected with granular vaginitis. A mass of granulations develop in the vagina, particularly during the latter half of pregnancy, forming a rough surface and coexisting with erosions and with superficial ulcerations of the cervix. In this case the discharge becomes very abundant, yellow or greenish, and, producing painful inflam-



mation and superficial ulceration of the external genitals, and of the inner aspect of the thighs, causes great suffering. The best means of relief consists in separation of the surfaces with bits of fine linen dipped in a solution of sub-acetate of lead, in careful injections, in alkaline baths, and particularly, in tampons of cotton. These tampons enclose equal parts of alum and sub-nitrate of bismuth, and are tied by a thread, which is allowed to hang between the legs, and serves to withdraw the tampon. We leave the tampon in place three days, at the end of which time the patient withdraws it, takes an alkaline bath, and during her bath, injects some of the alkaline water. A new tampon is then inserted, and so on.

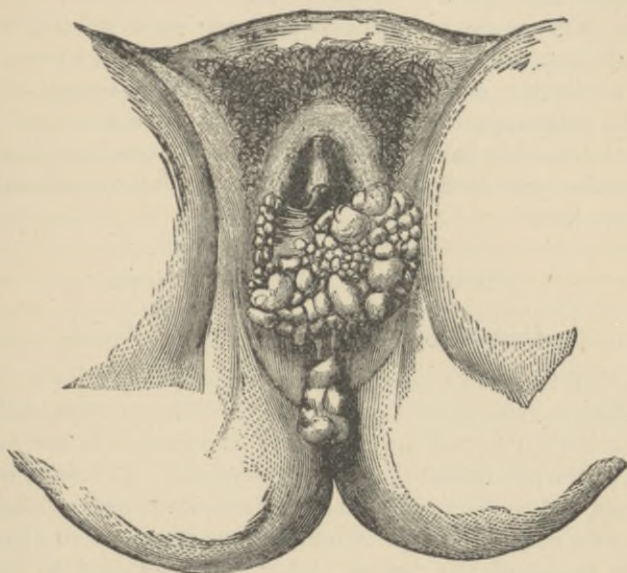


FIG. 8.—VEGETATIONS OF THE NYMPHE.—(McClintock.)

Generally after three or four tampons, notable relief ensues, if not a complete cure. We have never seen accidents due to the tampons. [Owing to the well-known property of the tampon, of exciting uterine contractions, we should not care to resort to it here. The means above described by us, for the relief of pruritus, will answer for the symptom leucorrhœa.—Ed.]

#### *Vegetations.*

These are common in pregnant women (Fig. 8). These vegetations, for a long time considered syphilitic, are not due to syphilis and are developed by pregnancy, as Thibierge has so well shown. Cullerier, Boys de Loury, Costilhes and Ricord, noted the coincidence of pregnancy and vegetations. They appear at all stages of pregnancy, in the shape of tufts,  
VOL. II.—13.

pediculated at the attachment and swollen like cauliflower. They are roseate, pale, red, brown or livid. Sometimes they are isolated, and sometimes aggregated into large masses. We have seen one case in which they were almost as large as a child's head. They have an odoriferous discharge, and occasion sharp pains and pruritus. Their favorite seat is the mucous membrane of the vulva, the borders of the labia majora and the space between these and the labia minora, which their growth separates, and through which they protrude between the thighs, partly obliterating the vulva. They may extend into the vagina and up to the cervix uteri. Again, they may extend to the furrow between the buttocks, to the anus and the groin. Although they constitute a source of great annoyance, they are not serious, and generally resist all treatment up to the time of labor, when they wither and fall off. In two cases, however, in one of which they were as large as an apple, we have seen them disappear during pregnancy, owing to separation of the surfaces and the use of compresses, dipped in Labarraque's solution. We consider more energetic measures useless, and strongly disapprove of all radical operations (excision, crushing, etc.).

#### ABDOMINAL AND UTERINE PAINS.

##### *Abdominal, Lumbar, and Inguinal Pains.*

These pains, to which Cazeaux has particularly called attention, hardly appear before the last months of pregnancy. They are generally circumscribed and limited to the lower part of the thorax, to the origins and insertions of the abdominal muscles or the groins. The pains are due, as Tarnier says, and as Beau had already remarked, to lumbo-abdominal neuralgia, and we may find the maximum point, as in all neuralgias, by following the course of the nerves. They generally yield to hypodermic morphine injections. Again, there are cramps or severe pains in the thighs and the legs. These may be due to compression of the sacral plexus by the foetal head, but as Tyler Smith says, there are cases in which this explanation does not serve. They are then attributed to irritation of the large intestine or of the uterus, and are considered reflex.

In some cases the uterus itself is the seat of pains which come on at variable intervals, and the nature of which can not be discovered. Now continuous, now irregularly intermittent, they occur in paroxysms which are excited by pressure, a cough or by foetal movements. They are almost always the manifestation of a uterine contraction which is appreciable to the touch. Finally, in some cases, the sensibility of the uterus is exaggerated by incessant, violent foetal movements. This sensibility is sometimes so extreme that each foetal movement is accompanied by acute pains, the repetition of which greatly exhausts the patients.



*Uterine Rheumatism.*

Cazeaux and Gauthier have particularly called attention to this disease. Cazeaux considers it true rheumatism, but Gauthier regards it as identical with uterine neuralgia, which may also occur aside from pregnancy. Gestation produces modifications, however, in its course. Spiegelberg and Braün do not believe in uterine rheumatism and consider it as a result either of endometritis or of metritis.

*Symptoms.*—Among twenty-nine cases collected by Gauthier, eighteen commenced during pregnancy, before labor, and eleven began during parturition. The attack is never sudden. Before the appearance of uterine pain the patient complains of pains and contractions in the limbs and the trunk, of vertigo, palpitations and of syncope. Shortly afterward, or at the same time, a continuous, dull pain, of variable intensity, is felt in the sacrum, the hypogastrium and the lateral abdominal regions. This pain is exaggerated by movements of the mother or of the foetus. At the end of a few hours or days, the pain becomes suddenly violent, sharp, lancinating, and lasts from a few seconds to several hours, beginning at the uterus, radiating into the lower limbs, and extending to the bladder and rectum. On applying the hand to the abdomen, we find that its walls are not the seat, and that the pain is uterine and not so limited as in ordinary neuralgias. Almost always one of the surfaces or sides of the uterus is the chief seat of the pain. The pain is generally fixed, but may be mobile, the fundus uteri being usually less affected than the other regions. The women experience a sensation of spasmodic constriction, due to uterine contraction, and perceived by the patients and the obstetrician during the earlier months. The uterus, in fact, grows hard. Sometimes it is smooth and sometimes nodular, from partial contractions. When the organ is large, we can appreciate these changes in form, which may, in certain cases, produce an annular transverse constriction. The latter may be partial, and involve different parts of the uterus, including the cervix, and may occasion, according to the case, either rigidity or rapid dilatation of the cervix.

Gauthier admits two forms, one acute, febrile, and one chronic, apyretic form. The former may succeed the latter or may present momentary acute exacerbations. Uterine rheumatism occurs most frequently at term and during labor, at which time it may become the cause of dystocia. It may be developed after labor, either immediately or after a few hours. It then causes spasmodic uterine contractions, which lead to retention of the placenta. Finally, it may occur later yet, after fifteen days, as in a case of Neucourt.

The usual complications are neuralgic or rheumatic pains in certain viscera, in the muscles or in different nerves, particularly the vesical and rectal nerves. Luroth has seen a case of rheumatic meningitis, and

finally, there may be muscular pains in the face, the neck, the arm, the shoulder, the thoracic walls and in the lower limbs.

Very prone to relapse, this affection may recur several times, during or after pregnancy. The intervals vary from two or three days to several weeks. An individual attack varies from a quarter of an hour to twelve days, at the longest, but in general, it does not exceed twenty-four or forty-eight hours. The disease may reappear in successive pregnancies. The disease may end in recovery, which is the rule, in a chronic condition, in metritis and in eclampsia.

1. *Influence upon Pregnancy.*—When the attacks have lasted a certain time, and have been violent, they are followed by uterine contractions, and may thus provoke labor. But it is not always so, and Wigand quotes a case where the cervix dilated, and the bag of waters formed; when everything was arrested, labor ceased, the os closed, the cervix regained its former length, and pregnancy went on its course. Sometimes the pains simulate labor without inducing it, and they may occasion faulty presentations.

2. *Influence upon Labor.*—Uterine rheumatism impedes labor, and sometimes even renders the spontaneous expulsion of the fœtus impossible by interfering with the pains, by producing spasm of the cervix, and by preventing the woman from making voluntary expulsive movements.

3. *Influence upon the Puerperal Functions.*—By causing tetanic uterine contractions, it may produce dystocia or may occasion hemorrhage by inducing uterine atony, which may be followed by metritis or by perimetritis.

*Causes.*—These are difficult of detection. The disease may appear under all circumstances and at any stage of pregnancy. Gauthier saw it begin in twenty-nine cases, as follows:

|                    |   |
|--------------------|---|
| In the 2d month, 1 | } In the first five months, 6 times.                                      |
| “ “ 3d “ 3         |   |
| “ “ 4th “ 1        |   |
| “ “ 5th “ 1        |   |
| “ “ 6th “ 2        |   |
| “ “ 7th “ 4        | } In the last four months (twelve occurring in the last month), 23 times. |
| “ “ 8th “ 5        |   |
| “ “ 9th “ 12       |   |

Meissner regards rheumatism as a neurosis of uterine sensibility and motility, caused by peripheral irritation, and particularly by cold.

The predisposition increases as the full term approaches, and is notably augmented near the time of labor.

*Prognosis.*—Although not fatal to the woman, uterine rheumatism is still serious because it may occasion abortion or premature labor, or by retarding and complicating labor it makes the condition of both mother and child much less favorable. It is particularly disagreeable when de-



veloped at the end of pregnancy, because of its tendency to recur several times before confinement, even when it does not interrupt pregnancy. In these cases it almost always recurs during parturition, which it renders long and difficult.

*Treatment.*—This consists, during pregnancy, in venesection, revulsion through the intestine and in narcotics, either internally, subcutaneously, or by enema. Chloral has proved very useful in these cases.

*During Labor.*—We give the preference to chloral and to chloroform, and we hasten the termination of labor as much as is compatible with the mother's safety.

*After Labor.*—We prefer to use laudanum enemata, twenty drops in three ounces of water, to be repeated two or three times in twenty-four hours. In a stubborn case, we pushed the dose to one hundred drops in twenty-four hours, without causing any results, aside from marked relief, except head-ache and somnolency.

#### DISPLACEMENTS AND DEVIATIONS OF THE UTERUS.

##### *Prolapse of the Uterus.*

Prolapse of the uterus, during pregnancy, may be either incomplete or complete. In the latter case the whole organ escapes from the genital

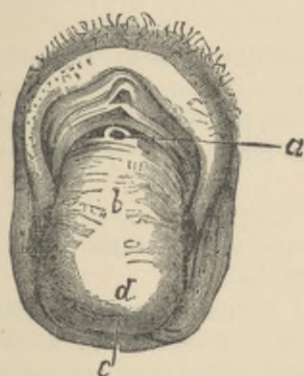


FIG. 9.

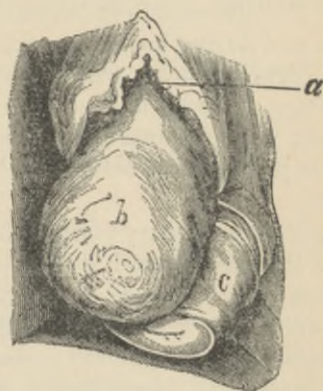


FIG. 10.

FIG. 9.—COMPLETE PROLAPSE OF UTERUS, THE RESULT OF ELONGATION OF THE CERVIX.—*a*, Urinary meatus. *b*, Invaginated ant. vag. wall. *c*, Ext. os. *d*, Vag. portion of cervix.

FIG. 10.—COMPLETE PROLAPSE OF UTERUS, WITHOUT CYSTOCELE. RECTOCELE AND ENTEROCELE.—*a*, Urinary meatus. *b*, Uterus. *c*, Rectocele.

canal, and hangs between the thighs. (Figs. 9 and 10). This form is very rare. These displacements may develop slowly or suddenly, in cases where prolapse pre-existed or not. Spiegelberg believes that a certain amount of prolapse always precedes the pregnant condition.

The accidents, according to Cazeaux, which result from this displacement, vary in intensity, according to the degree of displacement and the

period of pregnancy at which it occurs. When the pelvis is too roomy, but the straits of normal size, the uterus remains in the true pelvis much longer than under other circumstances. The uterus then presses upon the rectum and the bladder, irritating them. The woman experiences a sensation of weight at the anus and of painful traction at the groins, the loins and the navel. There is a fetid discharge. The patient can neither stand up nor walk easily, and she falls, gradually, into a state of marasmus. If pregnancy has just begun and the uterus is either very large or has descended to a greater extent, the accidents are more deplorable still. Complete retention of urine and obstinate constipation may result. The irritation resulting in the uterus itself may lead to abortion. These complications generally cease when, at the fifth month, the uterus is unable to develop farther within the pelvis and rises above the superior strait.

Hüter who, in 1860, collected all the cases up to his time, divides them as follows:

1. The gravid uterus being prolapsed, reduces itself during the first months, and pregnancy and labor follow their usual course; 5 cases.
2. The prolapse is not spontaneously reduced. Its artificial reduction and support must be undertaken; 8 cases.
3. Reduction cannot take place on account of incarceration; 3 cases.
4. The prolapse causes labor before term; 7 cases.
5. Prolapse occurs in the second half of pregnancy, and persists up to term and during labor; 3 cases.
6. Prolapse takes place shortly before, or during labor, at term. In this case, prolapse may not have existed before labor, or, having existed before, was spontaneously reduced during the first months of pregnancy, or the prolapse was reduced and the uterus maintained by a pessary; 16 cases.
7. Prolapse occurs during labor and delivery; 15 cases.
8. Prolapse existed before pregnancy, but only became pronounced during labor; 16 cases, making a total of 73 cases.

*Causes.*—It was impossible for Hüter to divide the cases into those of complete and incomplete prolapse. Among sixty-nine cases, there were ten primiparæ, twenty-seven multiparæ and thirty-two unknown. In thirty-five patients, seven of them being primiparæ, prolapse existed before pregnancy. In thirty-four patients, three being primiparæ, this was not noted.

Hüter concludes that antecedent prolapse is the cause of prolapse during pregnancy, since it exists in one half of the cases. Hüter states: 1. That in sixteen cases, the uterus prolapsed before pregnancy, remained prolapsed during *this* pregnancy. 2. That, in five cases, prolapse which did not exist during a certain period of pregnancy, resulted from efforts and traumatism.

Among twenty-four women in labor, eleven of them being primi-



paræ, the prolapse which existed before pregnancy recurred with it. Among fourteen women in labor, three of whom were primiparæ, the prolapse occurred for the first time during labor, owing solely to the uterine contractions; in eight cases it already existed before pregnancy. In two primiparæ it was due to traction with the forceps. One had already had a prolapse before pregnancy, the other not.

In two cases, the pelvis was extremely large, and in one case the vulva.

The most active causes, however, are the efforts of labor.

To recapitulate the causes: Multiparous state, pre-existence of prolapse, efforts, traumatism, uterine contractions, the forceps, justo-major pelvis, large vulva, efforts during labor.

Fritsch attributes a powerful influence to arrest of uterine involution, after first labors. The enlarged uterus will have a better chance to descend if the perineum has been lacerated. Labor has a particularly predisposing influence when the membranes are ruptured before complete dilatation of the cervix. The fœtus pushes forward the rigid cervix, which may thus be protruded through the vulva, dragging the vagina after it. If uterine involution is incompletely accomplished, the uterus will remain low down, for the over-stretched peritoneal ligaments will no longer sustain this organ.

*Course.*—Ordinarily, pregnancy proceeds undisturbed to full term. In only ten cases did premature labor occur. In two cases death resulted from incarceration of the uterus.

In thirty-four cases the child presented by the vertex; in nine by the pelvic extremity.

In five cases the feet were brought down by version. (Fig. 11).

In only six cases was labor normal, and four of these labors were premature.

In seventeen cases the presentation was not noted.

In two cases there were twins, which presented, in one instance, by the breech.

In all the other cases, save the six referred to above, intervention was necessary either because of tedious labor, due to slow dilatation in spite of good pains, or to inefficient action of the abdominal muscles, or because of serious complications (rupture in three cases, from excessively strong contractions and gangrene of a part of the prolapsed uterus).

*Prognosis.*—This is favorable, for the prolapse is almost always spontaneously reduced in the first months, and pregnancy and labor generally take their normal course. The prognosis is even good for the continuance of pregnancy, when artificial reduction and the introduction of a pessary are necessary (nine cases). But the outlook is much more serious when incarceration occurs (two deaths). Among the seven cases of premature labor or of abortion, there was one death.

For the child, the prognosis is bad in proportion to the rapidity of labor.

Among fifty-six women at term, six died, one in labor, and five during the puerperium.

Among the fifty-six children, nineteen were born alive, fourteen dead, and the fate of twenty-four was not noted.

*Treatment.*—This consists in favoring spontaneous reduction by appropriate postures on the patient's part. If it does not occur, the Germans, more audacious than Cazeaux, advise artificial reduction as early as possible, and support by means of a pessary. Hüter, going still further, recommends these measures even at eight months.

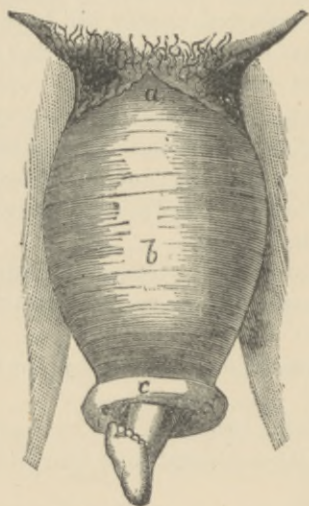


FIG. 11.—COMPLETE PROLAPSE OF UTERUS AT TERM.—Presentation of a foot: (multipara, aged thirty-eight.) *a*, Meatus urinarius. *b*, Prolapsed uterus. *c*, Cervix at term, through which a foot projects.

If reduction fails, the uterus is to be sustained by a suspensory bandage and removed from all causes of irritation.

If symptoms of incarceration are developed, artificial abortion is justifiable. When labor is protracted, artificial delivery is to be carefully performed by the forceps or version. The uterus is subsequently reduced.

#### *Uterine Deviations.*

The uterine deviations are lateral, the obliquities of the older writers; anterior, or anteversions; posterior, or retroversions. That is to say, there are deviations *en masse* or partial deviations; anteflexions, retroflexions, latero-flexions. All are not of equal importance.



1. *Uterine Obliquities; Lateral Deviations.*

The older writers attached great importance to these, but in reality they are not well-marked and never cause serious complications. They only affect labor, and this by retarding cervical dilatation. We shall return to them in the chapter on Dystocia.

2. *Partial Deviations; Flexions.*

Conception is, according to Holst, not so rare as it is thought to be in cases of uterine flexion. He collected eight cases in point, and it must not be supposed, because conception occurs while the flexion is being treated, that the flexion is cured. If flexion often induces sterility, it is because the flexion is generally complicated by chronic inflammations of the mucous membrane and of the parenchyma; by cervical catarrh, by erosions, by granulations and by amenorrhœa. But these are not positive obstacles. When the flexed uterus is healthy, the cause of sterility resides in the faulty position of the cervical orifice, which is directed either backward or forward. It is, therefore, no longer in contact with the end of the urethra at the moment of ejaculation, and, moreover, the bend in the uterus prevents the penetration of the spermatic fluid. Holst justly objects to this latter cause, as there should, otherwise, always be retention of the menstrual blood, which does not occur. That which renders conception possible is the disappearance of complications, the ability of the cervix to retain its normal position and the preservation of the uterine cavity.

[The shape of the cervix is more likely to impede conception than the mere fact of flexion. The conical shape, usually accompanied by pin-hole os, is a frequent accompaniment of sterility. To refer only to the data of the late James Marion Sims, he found this conical shape in nearly 85 per cent. of the cases of sterility which he investigated.--Ed.]

When conception has taken place, pregnancy has little chance of reaching an end, as abortion very frequently occurs.

Hüter reverts to the frequency of abortions in uterine flexions, and considers the larger part of those abortions, which take place in the early months of pregnancy, and the cause of which escapes observation, to be occasioned by these flexions. He thus explains the occasionally frequent recurrence of abortion, without known cause, in the case of certain women. He cites three cases in point, the first one being extremely interesting:

|                 |                          |
|-----------------|--------------------------|
| First abortion, | tenth week of pregnancy. |
| Second " "      | " " " "                  |
| Third " "       | seventh " " "            |
| Fourth " "      | tenth " " "              |

All these abortions occurred without appreciable cause. Anteflexion

was found to exist when pregnancy did not. In a fifth pregnancy there was ante flexion and ante version. The uterus was replaced at times corresponding to the second and third menstruation. The pregnancy was not interrupted. Labor occurred at term and the *post-partum* period was normal. [We believe it very doubtful if abortion was ever produced by simple flexion. There are so many, often latent, causes of miscarriage, that we are scarcely warranted in laying this to flexion. We do not refer here, of course, to cases where version accompanies flexion.—Ed.]

He concludes from his observations, that this supposed predisposition to abortion does not, in reality, exist, and that abortion is always occasioned by a cause which may momentarily escape observation because it is not always easy to discover at once.

Flexions disappear during abortions, so that the diagnosis of these cases is only possible before the beginning of abortion or some time after its termination.

It is not uterine flexion itself which produces abortions, but the ante- or retro-versions which accompany them.

Treatment must, therefore, be directed against anteversions and retroversions.

Philips adopts, without reserve, the opinion of Hüter as regards the frequent recurrence of abortions.

### 3. Anteversion.

Uterine anteversion is merely an exaggeration of a normal state, and becomes really pathological only when it exceeds a certain limit or when it occurs in the true pelvis, *i.e.*, in the first months of pregnancy. During the last months, it constitutes what is called pendulous abdomen, and it is well known under what circumstances this is produced. The multiparous state, relaxation of the abdominal walls, eventration and rachitis are causes. It is not rare, in these cases, to find women whose abdomens rest, as it were, upon the thighs, the fundus uteri forming the lowest part of the abdomen, the cervix being carried upward and backward. The patients, of course, suffer from renal pains and dysuria. The fœtus is not within reach and delivery is difficult.

But anteversion may occur during the first months of pregnancy (Fig. 14,) before the uterus has risen from the true pelvis, and it is in these cases that it really becomes pathological.

Hüter has examined it, particularly from this point of view.

Recalling the observations of Baudelocque, Chopart, Ashwell, Boivin, Hachmann, Welcke, Godefroy and adding two cases of his own, he distinguishes three degrees of anteversion.

*First Degree.*—This is about the normal state. The longitudinal uterine axis forms a very acute angle with the pelvic axis.



*Second Degree.*—The fundus approaches the symphysis but does not reach it. The angle formed by the two axes is less acute.

*Third Degree.*—The fundus reaches the symphysis. The angle is almost a right angle. The portio vaginalis of the cervix is carried more or less backward toward the posterior pelvic wall. It is very rare to see the

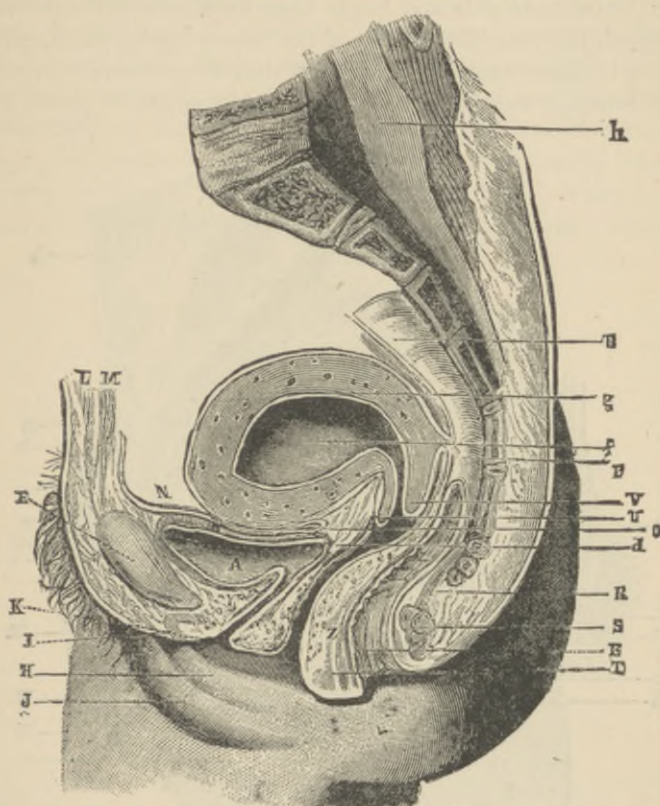


Fig. 12.—ANTEVERSION OF THE UTERUS. (After Legendre.)—A, Bladder. B, Rectum. C, Body of uterus. D, Vaginal orifice. E, Symphysis pubis. F, Anus. G, Sacrum. H, Left labium minus. I, Clitoris, root of corpus cavernosum, cut across. J, Left labium majus. K, Meatus urinarius. L, Pyramidalis muscle. M, Rectus abdominis. N, Anterior peritoneal *cul-de-sac*. O, Vesico-uterine *cul-de-sac*. P, Retro-uterine *cul-de-sac*. R, Levator ani. S, External sphincter. T, Internal sphincter. U, Anterior lip of cervix. V, Posterior lip. X, Coccyx. Y, Venous plexus of Santorini. Z, Venous plexus of vagina. a, Muscular tunic of the bladder and urethra. b, Muscles of rectum. d, Fibro-cellular vaginal tunic. e, Fifth lumbar vertebra. f, Uterine cavity. g, Section of uterine veins. h, Rachidian canal.

cervix remaining in front, except in the case where there is, simultaneously, anteversion and ante flexion. It is, usually, during labor that this result is brought about by the influence of the pains. At the same time that it inclines forward, the uterus undergoes a torsion upon its transverse axis. As a result, the anterior vaginal wall is distended by the uterus and pushed forward. The posterior wall does not look directly toward

the rectum but becomes oblique and almost horizontal. The uterus compresses both the rectum and the bladder, causing difficulty in micturition, in defecation and in the introduction of the sound.

*Causes.*—Lohmeier, Kiwisch and Scanzoni do not believe in primary anteversion. Hüter shows that, the uterus being already normally anteverted, if the pelvis is wide and larger than usual, and if the pelvic axis is more inclined, the posterior surface of the uterus has a greater and greater tendency to become superior. It follows that the pressure exerted by the intestines becomes more considerable and thus tends to produce and to

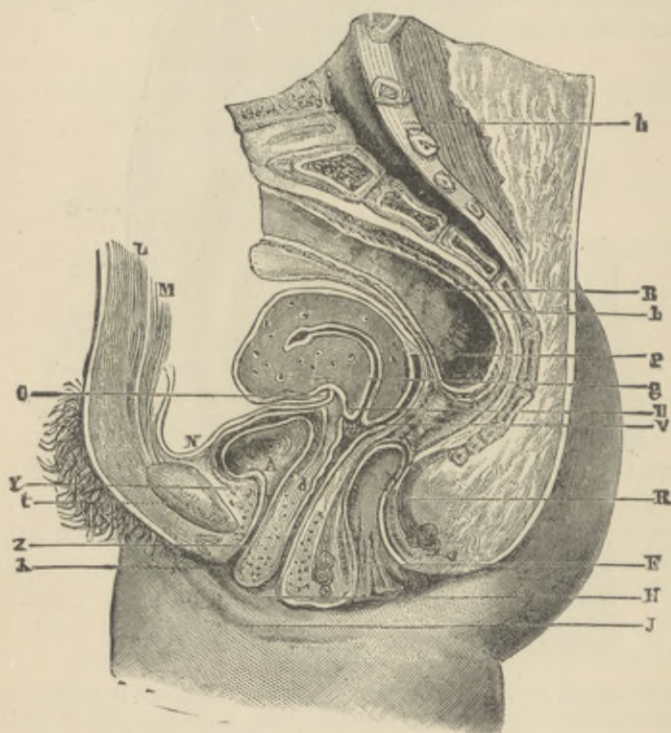


FIG. 13.—ANTEVERSION OF THE UTERUS. (After Legendre.)—A, Bladder. B, Rectum. C, Body of uterus. D, Vaginal orifice. E, Symphysis pubis. F, Anus. G, Sacrum. H, Left labium minus. I, Clitoris, root of corpus cavernosum, cut across. J, Left labium majus. K, Meatus urinarius. L, Pyramidalis muscle. M, Rectus abdominis. N, Anterior peritoneal cul-de-sac. O, Vesico-uterine cul-de-sac. P, Retro-uterine cul-de-sac. R, Levator ani. S, External sphincter. T, Internal sphincter. U, Anterior lip of cervix. V, Posterior lip. X, Coccyx. Y, Venous plexus of Santorini. Z, Venous plexus of vagina. a, Muscular tunic of bladder and urethra. b, Muscles of rectum. d, Fibro-cellular vaginal tunic. e, Fifth lumbar vertebra. f, Uterine cavity. g, Section of uterine veins. h, Rachidian canal.

increase the anteversion. Ovarian or other tumors, ascites and peritoneal adhesions act in the same way. If there be superadded to this a relaxation of the vaginal wall and of the uterine ligaments, particularly of the round ligaments, and, finally, vaginal cystocele, it is plain how the accu-



mulation of urine in the bladder will produce ante-version. It may be developed slowly or suddenly and be particularly favored by a sudden and exaggerated pressure of the bowels, by sudden contractions of the abdominal muscles and by sudden depression of the diaphragm. When the anteversion has reached a certain degree it may thus pass to a more advanced stage from the slightest cause.

*Signs.*—So long as it is moderate, anteversion passes unnoticed, but, when it is exaggerated, there soon follow dysuria, frequent micturition, constipation, tenesmus, and pains in the loins and sacrum, which attain their maximum in the third degree of anteversion. The lumbar and sacral pains are constant, and are due to traction upon, or, according to Hüter, even to laceration of the retro-uterine folds. Constipation becomes complete, and there is a constant desire to urinate, although the

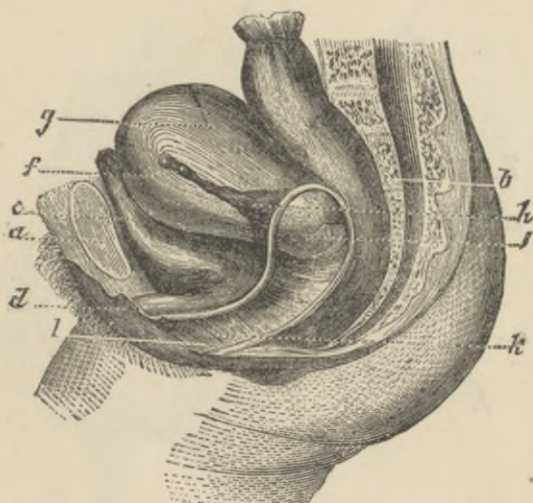


FIG. 14.—VERTICAL SECTION OF THE PELVIS, REPRESENTING ANTEVERSION OF THE UTERUS IN THE EARLY STAGES OF PREGNANCY.—*a*, Right pubis. *b*, The sacrum, *c*, The bladder. *d*, The urethra. *e*, The rectum. *f*, Section of the tube and of the left broad ligament. *g*, Body of the uterus. *h*, Lateral portion of the uterus, not covered by peritoneum. *i*, *Os tinæ*. *k*, The vagina. (Boivin & Dugès.)

bladder contains very little urine. The patients feel a sense of weight in the pelvis, as if there were something to be expelled by the anus. The abdominal walls and the diaphragm accordingly contract, and, tending to further depress the fundus uteri, increase the trouble. Then follow fever, nausea, emesis and spasms.

Authors do not agree about the condition of the bladder. While Godfroy and Hüter have always found the bladder empty, Kyll, Hachmann, Boivin and Dugès admit that urine may accumulate in that part of the bladder which is above the point compressed by the uterus.

*Course and Prognosis.*—Most cases pass unobserved, and the grave

symptoms disappear when the uterus rises out of the pelvis, between three and a half and four months. If it remains incarcerated in the true pelvis serious symptoms may appear, and first pregnancy and later the life of the mother may be endangered. But this is not absolute, for the incarceration is never complete as in retroversion.

When anteversion occurs suddenly, pregnancy is less secure, but all depends, in this case, on the time which elapses before the reduction of the uterus. Generally, all the grave symptoms disappear when the uterus is once replaced, and pregnancy pursues its regular course.

*Treatment.*—This consists, first and foremost, in reduction of the displaced organ. Complications must then be met by appropriate means, but especial care must be exercised in providing for evacuation of the bladder and of the rectum.

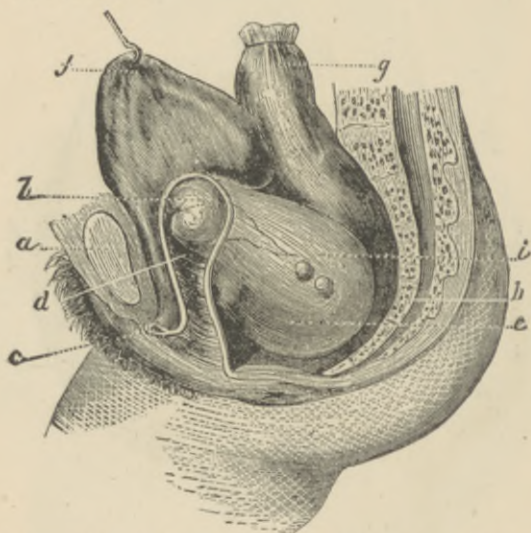


FIG. 15.—RETROVERSION OF THE UTERUS, EARLY IN PREGNANCY.—*a*, Right pubis. *b*, *Os tinea*. *c*, Canal of the urethra. *d*, Vagina. *e*, Body of the uterus. *f*, The bladder at its maximum development. *g*, The rectum. *h*, The sacro-vertebral angle. *i*, Section of the tube and of the left broad ligament. (*Boivin & Dugès*.)

[A so-called supra-pubic pad abdominal supporter, will ordinarily correct the anteversion after the uterus has risen above the brim. Before this period, the symptoms are rather due to downward sagging of the uterus, and traction, in consequence, on the neck of the bladder. In this case, the open cup-pessary of Thomas may be tried, often with relief to the main symptom—vesical tenesmus.—Ed.]

#### 4. *Retroversion.*

Uterine retroversion consists in the complete displacement of the organ in the pelvic cavity, so that the fundus is contained in the hollow of the



sacrum while the cervix is carried forward beneath the symphysis pubis (Salmon) (Fig. 15).

We thus at once eliminate what the Germans call a partial retroversion, and what Depaul styles a sacriform dilatation. This we will study in the following chapter.

*Frequency.*—"Although one cannot say that retroversion is a very rare accident, the cases are still so few that it is difficult to collect more than forty or fifty examples from all medical literature. For my part, during a practice of thirty years, which has afforded me the opportunity of observing nearly everything unusual in obstetrics, I have only seen eight or ten cases of retroversion during pregnancy. P. Dubois had hardly seen more, and his father had never seen a case in his long practice." These are the words of Depaul.

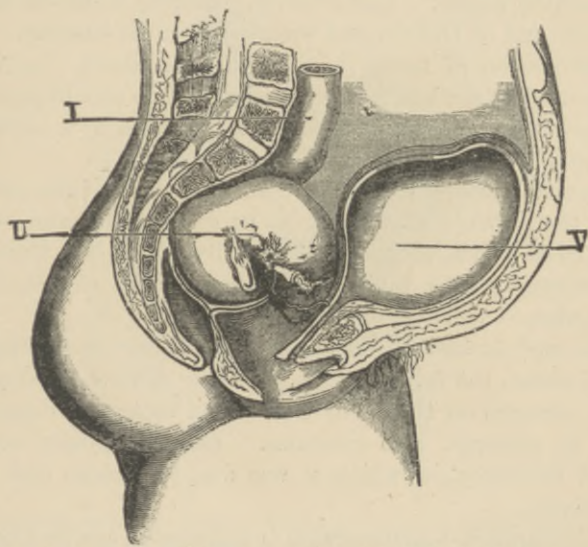


FIG. 16.—RETROVERSION OF THE UTERUS. (After Schultze).—I, Intestine. U, Uterus. V, Bladder.

Since Baudelocque, two kinds of uterine retroversion are described and based upon their respective causes.

The first form is slow and progressive, the second form sudden and accidental.

*Causes.*—1. *Gradual Retroversion.* All authors admit that the uterus is lowered in the first months, and that it is originally developed at the expense of its fundus and of its posterior wall.

But, while Denman, Merriman, Desormeaux, Paul Dubois, Danyau and Jacquemier consider the retention of urine to be the occasional cause of retroversion, William Hunter, Burns, Moreau and Cazeaux think that the retention of urine is the effect and not the cause of retroversion, which

is, itself, produced by another mechanism. Depaul, in 1853, resolutely took his stand with the former class of authors. He held that retention is an occasional cause of retroversion (Fig. 16), and he is the more justified in holding this opinion as he has seen the bladder distended by an enormous quantity of urine in cases of retroversion not occurring during pregnancy. Jacquemier had already stated, to explain these facts, that, when the distension of the bladder by the urine is long continued, the organ can contain a large quantity of the liquid without being over-distended. Then, its walls being partially dilated, and particularly behind, it forms a large sac which displaces the fundus uteri towards the hollow of the sacrum, while the cervix is retained in its ordinary position. Depaul adds that, in this case, the bladder, in subsequently rising into the abdominal cavity, draws the cervix upward and this increases the displacement already begun. This is the explanation of Boivin and Dugès, of Desormeaux and of Dubois, and we adopt it in its entirety.

The accumulation of feces in the intestine, above the iliac fossa, has been assumed as a cause. Désormeaux, Dubois and Depaul, although accepting this cause, think that it must be preceded by a certain degree of retroversion.

Other assumed causes are curvature of the sacrum, justo-major pelvis, insertion of the placenta at the fundus or on the posterior wall of the uterus, deformed pelvis, uterine prolapse, fibroid uterine tumor, ovarian tumors, abnormally wide vagina, adhesions due to old peritonitis, the multiparous state, feebleness of constitution, etc.

2. *Sudden and Accidental Retroversion.*—Besides the predisposing conditions cited above, the following are given by different authors: efforts, blows, falls, pressure on the abdomen, sudden backward displacement of the cervix in prolapse, and emotions. Salmon quotes two cases of Rolland and Godefroy, in which it was due to violent and unavailing efforts to urinate.

*Time of Appearance.*—Retroversion is a disease of the first half of pregnancy. It occurs, generally, between the third and the fourth month (in nineteen out of Salmon's twenty-seven cases). It rarely takes place before the third month (only five cases). It may occur from the fourth to the fifth month (five cases). It may, very exceptionally, occur after the fifth month (three cases).

*Signs.*—The authors of to-day only admit two degrees of retroversion, although Hunter admitted three.

*First Degree.*—The uterus is inclined backward, so that its fundus is in contact with the upper part of the sacrum, the cervix resting behind the symphysis pubis, but being accessible to the finger.

*Second Degree.*—The fundus has executed an almost complete revolution and has descended so far into the hollow of the sacrum as to become accessible to the finger, or even, when the labia are pressed open, to be



seen distending the posterior vaginal wall. The cervix is so high behind the pubes that the finger no longer reaches it. Ordinarily the second degree succeeds the first, and this is particularly true of the chronic or slow form. But the physiological backward inclination of the uterus, during the first three months, must not be mistaken for a retroversion. After the third month, the uterus tends to quit the true pelvis, straightening itself, and approaching more nearly to the axis of the superior strait. But, if it encounters an obstacle, whether this be a too prominent sacro-vertebral angle or a sigmoid flexure filled with fæces, the fundus is pushed backward while the cervix tends to approach the symphysis. Intestinal and vesical disturbances now appear, (Fig. 17) accompanied by feelings of weight, of traction and of pains in the loins, while examination enables

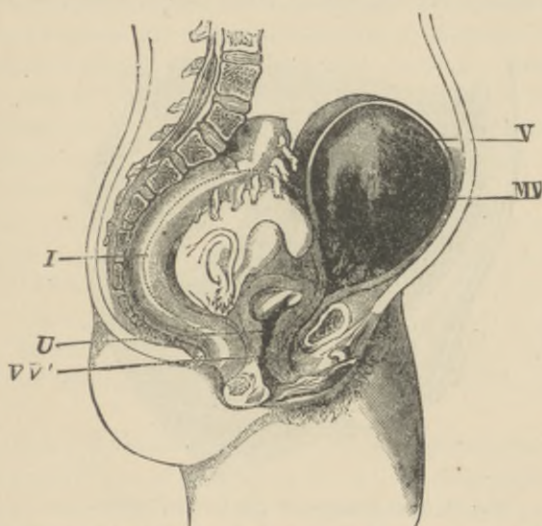


FIG. 17.—RETROVERSION OF THE UTERUS. GANGRENE OF THE DETACHED MUCOUS MEMBRANE OF THE BLADDER AND OF A PART OF THE MUSCULAR COAT.—*I*, Intestine. *U*, Uterus. *V*, Bladder. *VV'*, Vagina. *MV*, Gangrenous mucous membrane of the bladder.

one to discover uterine displacement. Women walk and stand with difficulty, and these symptoms becoming aggravated and retention of urine becoming complete, the disease passes into the second degree.

Salmon thinks that an effort or some injury is necessary, in this case, on which point Depaul does not agree with him. When, however, retroversion is suddenly produced, observation shows it to be always due to violence, to efforts, to fatigues or to traumatism. Then the acute symptoms are speedily developed, and more or less intense pain occurs at the moment when the displacement takes place.

The chief symptom of retroversion is retention of urine, and it is never wanting in the second degree. The retention is generally complete, and the bladder may be much distended. Sometimes there is incontinence

from overflow. The urine is red, strong-smelling, and, sometimes, colored with blood. There is usually, also, retention of fæces, but it is less marked, and we often feel fæcal tumors through the abdominal wall. The patients complain of acute pain in the loins, the groins and the abdomen, and of weight at the perineum. Fever, anorexia, thirst, insomnia, emaciation and general debility then ensue.

Palpation shows, above the umbilicus, an elastic, fluctuating tumor beneath the abdominal wall, in which no foetal member can be distinguished and in which ballottement is not present. If the catheter is used, which may be difficult, the tumor disappears and we reach the uterus, but it is impossible to bound it or to map out the fundus. On palpation, we sometimes feel only a single tumor, formed by the retroverted uterus pushing backward the posterior vaginal wall. More rarely, there are two tumors,

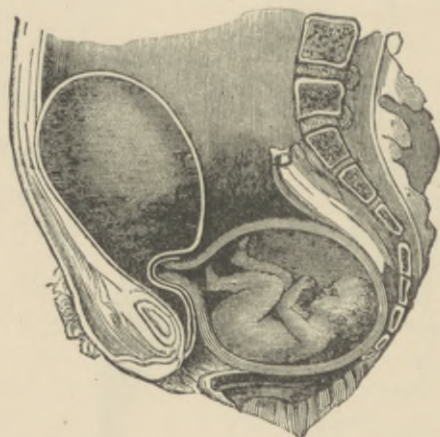


FIG. 18.—RETROVERSION OF THE GRAVID UTERUS.

one behind, which is the uterus, and the other in front, which is the bladder (Fig. 18). Generally the finger does not find the cervix, and, sometimes, we only find it with great difficulty above the pubes, and then one can often only feel one of the lips of the cervix. Finally, one sometimes finds the fundus of the retroverted organ presenting the characteristics of the pregnant uterus.

In some cases there exist, simultaneously, retroversion and retroflexion, and then another difficulty arises for the diagnostician, because the cervix may be displaced, and the facility with which one reaches the cervix disarms the suspicion of a retroversion. Ordinarily it is almost inaccessible, but rectal touch allows us to examine a large part of the uterine tumor and to appreciate the characters of this tumor. What is most striking, at first, is the slight depth at which we encounter this tumor, and, in examining with care, we see that it is not continuous with the uterus, which is



only displaced and flattened by it. Besides, in combining vaginal and rectal palpation, we feel that the finger in the rectum is only separated from that in the vagina by the thickness of the folded and swollen vaginal wall. It is only in exceptional cases that the finger can reach beyond the end of the tumor.

In view of the existing stage of pregnancy, auscultation gives no information, but we generally discover the uterine souffle. In exceptional cases, on separating the labia, we have been able to perceive the tumor, but, in general, that which is striking in these cases is, often, the swelling of the labia majora and minora and the presence of a vaginal prominence large enough to pass for a prolapse of the vagina.

When the affection has reached its acme, and incarceration has taken place, all the above symptoms are aggravated. The pain becomes intolerable, the fever is more and more intense, and to retention of the urine and of the feces are joined emesis, singultus, delirium, irregularity of the pulse and a state of prostration and adynamia, more or less pronounced, with emaciation and exhaustion of the patient. If abortion does not set a limit to these accidents, gangrene of the bladder and rupture of the uterus aggravate the situation, or even result in death.

*Diagnosis.*—This embraces, according to Salmon, five problems.

*First.*—The diagnosis between retroversion of the gravid uterus and intra-uterine fibrous tumors, in a healthy or in a retroverted uterus. Fibroids are distinguished by the hemorrhages, the slow progress of the disease, the resistance of the cervix compared to the softness of pregnancy, and the statements of the patients relative to the existence of an old tumor.

*Second.*—The differential diagnosis between retroversion of the pregnant uterus and tumors of the pelvis or of the abdominal cavity. This is, sometimes, very difficult, as the diagnostic errors, reported by various authors, demonstrate. The characteristic which deserves particular attention is the retention of the urine and the possibility of generally passing the finger behind the pubes. The concomitant symptoms of pregnancy, but especially the character of the cervix, will often make the diagnosis. Retroversion has also been confounded with extra-uterine pregnancy, ovarian tumors and retro-uterine hæmatocele.

*Third.*—The differential diagnosis between simple pregnancy, with retention of urine, and pregnancy with retroversion.

*Fourth.*—The diagnosis between retroversion during normal pregnancy and retroversion in cases of hydatidiform moles. In Salmon's case there was no retention.

*Fifth.*—Finally, the diagnosis between retroversion of the gravid uterus and retroversion of the unimpregnated uterus.

The differential diagnosis of extra-uterine pregnancy really presents the greatest difficulty, and we shall return to the subject under that heading.

*Prognosis.*—This is always very grave, but is more so in proportion as pregnancy is far advanced, for the complications are then more grave and develop more rapidly, and the treatment is more difficult of application. Although the affection often ends in recovery, it may also end in abortion and in death from peritonitis, from gangrene of the bladder, from rupture of the uterus and from partial gangrene of that organ. In some cases, the fundus uteri has contracted adhesions to the rectum, a communication has formed between these two organs, and the disintegrated foetus has been expelled piece-meal through the bowel. In a very interesting case, which we saw at the Clinique, the diagnosis was doubtful, and, in spite of two examinations, Depaul hesitated. An examination to decide regarding intervention was appointed for the following day, when, during the night, the woman fell out of bed. The disturbances ceased as if by magic, but the patient was confined in the forenoon. This was, probably, a case of spontaneously reduced retroversion.

*Treatment.*—There are, according to Depaul, three methods.

*First: Expectation*—i.e., leaving the uterus in its acquired position, treating complications, destroying probable causes of retroversion, or, at least, removing obstacles opposed to reduction. Thus: 1st, catheterism, which is not always easy and sometimes demands the use of the fine elastic sound in place of the ordinary catheter, and is to be repeated three or four times in the twenty-four hours. 2d, combatting constipation, by enemata given through a long canula, but particularly by laxatives, especially castor oil. Depaul does not believe that the position of the woman has any influence, at least in severe cases. If complications occur, resort to the second method.

*Second: Manual Reduction.*—This is effected either by the rectum or the vagina, with one or two fingers or even the whole hand. Gosselin used the first. All these measures have been successful, but the result is sometimes only obtained by their combination and by repeated attempts.

*Third: The Instrumental Method.*—The best known instrument is Evrat's *baguette*, introduced by the rectum. Then come the spatula of Petit, Roederer's spoon, pessaries, bladders introduced empty and then distended, and the lever. If these means fail, recourse must be immediately had to artificial abortion. [The simplest and most effective method of replacing the retroverted, flexed uterus, is to make the patient assume the knee-chest position, lift up the perineum by means of Sims's speculum, and then, very exceptionally, pneumatic pressure and gravity will replace the uterus. If not, pressure may be made on the fundus in the posterior cul-de-sac, by a sponge probang or roll of cotton held in the dressing forceps. Occasionally, especially near the end of the third month and after, it will be necessary to dislodge the fundus from under the sacral promontory before it can be replaced.



This is accomplished by hooking a tenaculum in the anterior lip of the cervix and pulling downwards. Unless the fundus is adherent or the sacral promontory very projecting, these measures will suffice. After reposition, a suitable retroversion pessary should be worn till the end of the fourth month.—Ed.]

*Sacculation of the Uterus.*

Partial retroversion, or sacculation of the uterus, is an unusual form assumed by the pregnant uterus, which has furnished Depaul the occasion for a very complete work from which we have borrowed the following description.

Depaul keeps the name sacciform dilatation of the posterior wall, for this modification of the shape of the uterus has a special origin and depends neither upon a simple flexion, nor upon any other change in the uterine axis. The explanation is found in the unequal growth of different parts of the organ. The cases collected by Depaul, from his private practice, and from different authors, are not numerous, for they are only a dozen, and one of these was erroneously diagnosticated. So it is a rare phenomenon, but it only deserves the more attention on this account, because of the difficulties of the diagnosis and of the dangers for both mother and child which it entails. Depaul begins by stating that certain parts of the uterus grow proportionately much more than others, and that, generally, the anterior wall develops much more fully than the posterior one. But, exceptionally, this abnormal development may occur in the posterior wall. In this case, if the presenting foetal part is engaged in the pelvis, it must push before it this posterior wall of the inferior uterine segment. The cervix, instead of being directed backward, is turned forward toward the symphysis which it touches. It is much higher in the pelvis than the posterior part of the inferior segment of the uterus, which descends toward the vulva, forming a tumor which is in contact with the hollow of the sacrum, and variable in form, in accordance with the part of the foetus which it encloses. In the case of Parise and Depaul, hypertrophy and tension of part of the circular fibres of the external os were super-added.

*Pathogeny.*—Depaul denies any causative relation between this condition and retroversion, for the latter occurs in the first months, and sacculated dilatation in the last two months. Without denying that kyphosis may have some etiological influence, as some authors say, he states that nothing of the sort existed in the cases he has seen. He further rejects constipation, and the consequent straining efforts, invoked, as causes, by Billi, and partial retroversion, suggested by Frank. He shows that Mende first adopted the idea of primary dilatation of the posterior wall, suggested by Kiwisch and Scanzoni, and that the opinion of Chailly and Hyernaux relative to abnormal insertion of the cervix into the inferior uterine seg-

ment, rests upon no anatomical basis. Depaul believes that the deformity depends upon uterine flexions, particularly anteflexions which antedated pregnancy. If pregnancy occurs in these cases, the posterior wall, no longer in its normal state, will become much more hypertrophied than the anterior, because, owing to the character of its tissues, it cannot respond so fully to the stimulus of fecundation. The disproportion existing before pregnancy will persist and even be increased. The posterior wall will be more and more depressed into the pelvic cavity, the anterior will rise in the same proportion, and thus the cervix will come to be placed against the upper border of the symphysis or even several finger-breadths above it.

*Signs and Diagnosis.*—Abdominal palpation shows that the anterior wall is not so prominent or so uniformly rounded as usual, and that it is, sometimes, a little flattened. If the bag of waters is broken, one may see the outlines of the fœtus. If the lower fœtal part has not engaged, which is the exception, it forms a prominence above the pubes, in front. On palpating in front, we see that the posterior part of the uterus is largely developed, and has occupied all the available space in the corresponding part of the abdominal cavity. Generally, even when the patients reach full term, which is not always, the volume of the organ does not seem to correspond to the period in question. The finger introduced into the vagina shows the posterior vaginal wall to be very short, which is the reverse of the normal state. The corresponding cul-de-sac is effaced, and this wall drawn forward seems to end in the prominent part of the fœtal tumor. The finger, instead of entering deeply to encircle the tumor, passes obliquely from below upward, and from behind forward, and is conducted, in spite of itself, toward the centre of the pelvis. Here, again, the shortness of the posterior vaginal wall is not real. The upper part covers the fœtus and the cul-de-sac is lifted above the symphysis, with the cervix. In following the anterior vaginal wall, we seek long and vainly for its upper end, and therefore for the anterior cul-de-sac. Sometimes we do not succeed, even with two fingers, and it is in these cases that the utility of introducing the whole hand is apparent. But this is not always possible, even with chloroform, and the deep position of the tumor obstructs the movements of the hand. It has, in some cases, been impossible to reach the anterior cul-de-sac, and it has been necessary to use a flexible rod passed upward, behind the pubes. When we have once reached the os, we find it closed or partly opened, softened or indurated, directed forward or downward, and more or less mobile. The bladder, being forcibly drawn upward and forward, occupies an unusual position, and to penetrate its cavity, the sound should be exceptionally long. The stretched urethra is in close proximity to the posterior wall of the symphysis, and to find its external orifice, it must be sought much higher, for it is, as it were, hidden behind the anterior pelvic wall. The differential diagnosis



must exclude osseous or fibrous tumors attached to the anterior sacral wall, fibromata, cysts of the recto-vesical septum, fibrous tumors of the posterior lip of the cervix, pelvic hemocele, retroversion, ovarian cysts, uterine fibromata affecting the body and the upper part of the organ, fibromata of the abdominal wall, or of abdominal viscera, extra-uterine pregnancy and complete obliteration of the cervix. The last-named condition led Depaul into error, in his second case.

*Prognosis.*—This is very serious, but there is a difference between cases in which the cervical dilatation is moderate, and those in which it is excessive. In the former case, labor is longer and the cervix dilates less easily, but the deviation may correct itself, little by little, until the child can enter the pelvis, particularly if the pelvic extremity presents. The life of the foetus is almost always sacrificed, Frank's case forming the sole exception. But, when the cervix is drawn forward and above the symphysis, the difficulties are much greater. The part of the foetus contained in the sac formed by the posterior wall, receives the force of the uterine efforts, which cause the tumor to descend even to the vulva. The uterine tissue becomes inflamed, thin and painful, and may even be lacerated or become gangrenous. The cervix, placed beyond the sphere of uterine action, does not dilate, even at the end of several days of labor. Sometimes the posterior lip becomes rigid and opposes a new obstacle to exploration. Metritis and peritonitis may be the results of this forced labor. The women are quite exhausted, and putrefaction of the child being super-added, when the membranes have been ruptured some days, aggravates the situation. Still, the majority of the mothers have survived.

*Treatment.*—The conditions under which we are called are very variable, hence the impossibility of prescribing a line of conduct applicable to all cases. The indications are to reach the cervix, and to draw it downward. If the child presents by the feet, to draw them down and to seek to have them engage; to seize them with a noose and to extract, so soon as dilatation is complete; to see if the tumor can be displaced; to incise the cervix, if it is rigid; and finally, as a last resort, to do vaginal hysterotomy, *i.e.*, to open the inferior segment, through the vagina and to thus extract the foetus.

## CHAPTER III.

### DISEASES OF THE OVUM.

CONSIDERED as a whole, the ovum represents a membranous sac composed of two membranes peculiar to it, the amnion and the chorion, and of one membrane of uterine origin, the decidua, a sac which contains the fœtus, the cord, the placenta and the amniotic fluid. Each of these parts may be the seat of lesions forming the subject of this chapter, and constituting the pathology of the ovum. We shall commence by the study of changes in the decidua.

#### *Diseases of the Decidua.*

Metritis proper is rare in pregnancy, as all authors admit, except when there is retroflexion or retroversion. Inflammations of the decidua are, however, frequent, and may be acute, as in the infectious diseases, cholera, typhus and variola, leading through apoplexy of the membranes to early abortion, to destruction of the ovum, and to the degeneration called fleshy mole. Again, the inflammation may be chronic, and then presents the three following essential varieties: 1. Chronic diffuse endometritis; 2. Polypoid endometritis; 3. Catarrhal endometritis, or hydrorrhœa gravidarum.

#### 1. *Chronic diffuse Endometritis.*

This consists in the development of connective tissue, partly white and partly yellow, forming a granulation tissue and causing thickening and induration of the decidua. There is hyperplasia of the mucous membrane, in which the subjacent muscular fibres are involved, with the formation of cysts. (Spiegelberg). Schroeder considers it to consist in chronic diffuse proliferation of the decidua vera and reflexa. The mucous coat is thickened by the aggregation of the large cells of the decidua; or, as a result of their proliferation, the mucous membrane, particularly the deeper layers, presents a cavernous or cystic structure. These changes cause the death of the fœtus, and abortion may even occur from the irritation of the uterine nerves, occasioned by the inflammation of the mucous membrane. In other cases the inflammation is more chronic, the nutrition of the ovum is unaffected, pregnancy advances to full term, and inflammation is only recognized by examination of the membranes. M. Haschewarowa found, in the thick membranes of a fœtus at term, not only proliferating connective tissue and decidual cells, but also newly-



formed, smooth muscular fibres. Often this inflammatory thickening is merely partial.

Hofe described some deciduæ in which inflammation had caused protuberances as large as a grain of wheat, or larger. In some cases, according to Schroeder and Spiegelberg, the proliferation of the decidual cells is secondary to death of the fœtus. This happens, according to Duncan, particularly in those cases where, after the death of the fœtus, the ovum is retained. This is the adhesive endometritis of Braün. According to him, the proliferation of Friedländer's large cells does not occur in the decidua proper, and is accompanied by hyperæmia and extravasations in the placenta. The disease, he says, is characterized during pregnancy by the fact that the fœtal movements are painful, and that the women experience violent, colic-like pains described under the name of uterine rheumatism. It is chiefly caused by exposure to cold. When the disease mainly attacks the utero-placental mucous membrane, it is much more dangerous for the fœtus, and in these cases abortion is generally caused by the persistent irritation and by the destruction of the mucous membrane through hemorrhages. At the moment of delivery it may occasion difficulty by causing adhesions of the placenta. M. Haschewarowa has given, as causes, syphilis, or a chronic endometritis antedating pregnancy, efforts and difficult labor.

## 2. *Polypoid Endometritis.*

This condition, which is only a more advanced degree of the cases reported by Hofe, is characterized by thickening of the mucous membrane, which may attain double or triple its normal thickness, and by prominences of different form and size, sometimes from one-fifth to one-half an inch high, but smooth, which are situated on the surface of the mucous membrane. (Fig. 19.) The excrescences are sometimes pediculated and sometimes sessile. Sometimes they form thick kernels. The uterine surface is rough and covered with coagula. According to Schroeder, the uterine glands are absent on the bright red surface of these excrescences, but are very apparent on all other parts of the mucous membrane. The whole mucous membrane, particularly in the papillæ, is very vascular. Spiegelberg admits, as does Schroeder, that the outgrowths are more vascular than the rest of the membrane. The glandular orifices are not numerous, are sometimes absent, and, particularly at the extremity of the prominences, have a small diameter. According to Virchow, the microscope shows that the proliferating tissue is the interstitial tissue of the mucous membrane. In the midst of a slightly fibrillary tissue, we see large stellate cells which, on vertical section, appear as thick fasciculi. According to Spiegelberg and Dohrn, the characteristic elements of the proliferation are the decidual cells, which are remarkable for their large size and their large nucleus. They are concentrically ar-

ranged around the vessels and cause constriction of the glands. In some isolated cases, where the decidua vera was absent, the change has been seen in the reflexa. (Dohrn.) It has never been observed, save upon young abortive ova. Almost always the villi are secondarily changed. The embryo has, usually, disappeared. Upon an ovum, observed by Virchow, they constituted long epithelial projections, generally very fine. In Gusserow's case they ended in club-shaped extremities, while the ova seen by Dohrn and Müller showed the beginning of a multiple myxoma of the villi.

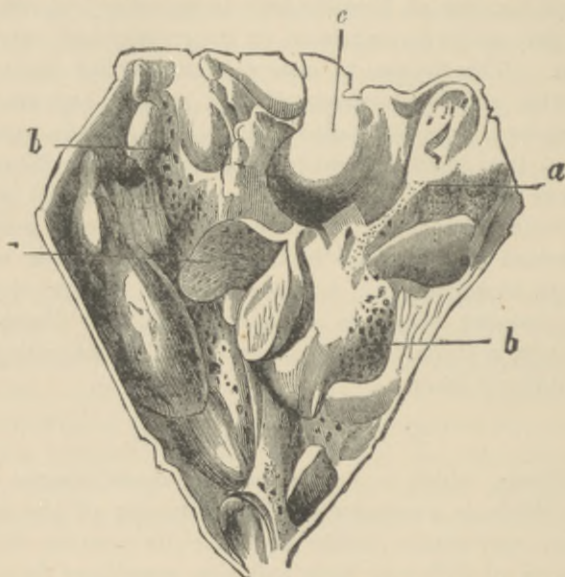


FIG. 19.—POLYPOID ENDOMETRITIS. (After Virchow.)—Foetal surface of decidua. a, Openings of the glands. b, Larger openings. c, c, Projections or vegetations. One of them is cut open.

The etiology is obscure. In Virchow's case there was a syphilitic history, but in the other cases there was none. In some of the cases it seems that the lesion was only the result of an endometritis, of an irritation of the mucous membrane, preceding pregnancy. The changes in the chorion, as those of the foetus, are only secondary. Speigelberg, even, rather considers this alteration secondary.

### 3. *Catarrhal Endometritis.*—*Hydrorrhœa.*

The opinion, entertained to-day by the German authors Schroeder, Spiegelberg and Braün, is that chronic inflammation of the decidua may, aside from cellular proliferation, produce an abnormal secretion called hydrorrhœa gravidarum. But this opinion is not yet accepted by all authors, and Stapfer, after reviewing and discussing all the opinions, concludes that there are, perhaps, two forms of hydrorrhœa, the traumatic and the catarrhal. His work is the most recent and complete. We borrow, from it, the following description.



The aqueous discharges during pregnancy have been considered, now as uterine dropsy, now as dropsy of the membranes, now as premature rupture of the membranes, and have been described, under the titles false waters, hydrorrhœa and metrorrhœa. Several hypotheses have been suggested regarding the seat, the source and the nature of the liquid.

*Seat.—I. Between the Uterine Walls and the Membranes.*—A case of Duclos, quoted by Basset, seems conclusive. Here two full sacs and one empty one were found, as well as the channel leading from the latter to the os, and this in a woman who, three weeks before, had suddenly lost a glassful of liquid, and had, subsequently, had a discharge, drop by drop. This is the anatomical explanation of the clinical fact reported by Naegelé and Geil. A secretion occurs and accumulates. The membranes are detached, progressively, as far as the os, and at this moment, probably owing to a painless uterine contraction, the pocket is suddenly emptied. In this case there has been found, on the internal surface of the uterus, an opaque, whitish plaque. Is this the first or the second degree of the catarrhal endometritis of Schroeder, Spiegelberg and Braün?

*II. The Water collected between the Membranes.*—According to Mattéi, in two out of three cases the amnion is separated from the chorion by liquid, not only in the early weeks, but even up to the end of gestation. He has called this space, thus filled with liquid, the pocket, the amnio-chorial sac. According to others, this pocket only accidentally exists in cases of hydrorrhœa. But Naegelé, Basset and Chassinat have denied the existence of this sac, and shown that, even in hydrorrhœa, there is complete adhesion of the membranes. Duclos had already reported that in his case. Geil overturned this opinion, and maintained that all the water escaping from the uterus during pregnancy or immediately after labor, comes from the space separating the concavity of the uterus from the convexity of the chorion. Stapfer states that, in a case seen by him, at the moment when he was palpating, some liquid escaped which could only come from the internal surface of the uterus, for the cervix was not dilated, and, during labor, two pockets were successively formed and ruptured by Stapfer. The membranes were intact. In a case of Batbedat, however, the chorion and amnion were entirely separated on one side, and incompletely on the other. The amnion on its external surface, and the chorion on its internal surface, were covered by a slight plastic exudation, such as is seen in pleurisy. That seems to prove that Naegelé and Geil were too positive. Dugès stated that the liquid accumulated in the cavity of the allantois!!! The older writers held that the liquid gathered between the two deciduæ. In these cases, hydrorrhœa occurred in the first weeks of pregnancy. The two deciduæ do not, indeed, become united until after the third month.

*III. The water collects in an hydatid.*

*IV. The water collects in a cyst.*

V. The collection occurs in a supernumerary ovum.

These three opinions do not admit of discussion, so that only three opinions remain: 1. The hydrorrhœa of the first weeks (Tarnier) occurs in the cavity of the hydroperion. The liquid collects between the decidua reflexa and the decidua vera. 2. The hydrorrhœa of the last months is due to an accumulation of liquid between the decidua and the chorion. 3. The accumulation is between the chorion and the amnion.

*Origin of the Liquid.*—I. *The Liquid comes from the Amniotic Cavity by Transudation.*—Tarnier and Pinard have shown that this transudation of amniotic liquid is possible at a certain stage of labor under the influence of the pains. Is the same true of pregnancy? Stapfer does not think so, for the anatomical conditions are not the same.

II. *The Liquid comes from the Uterine Walls.*—This is the view of Naegelé and Geil, who have seen these escapes of water persisting after labor, as well as of Chassinat, Chailly and Mackenzie. It is the classical opinion. But does the liquid come from the glands or from the vessels?

1. *The Liquid comes from the Glands.*—This is the opinion of Hegar and of Retzius, who have seen hypertrophied glands on the membranes of the ova of two women who had had hydrorrhœa. The decidua vera is an organ of secretion, and hydrorrhœa is a hypersecretion. This is the catarrhal endometritis of Spiegelberg, Schroeder and Braün.

2. *The Liquid comes from the Vessels.*—*a.* The liquid is serous and escapes from the capillary vessels, torn by the separation of a part of the membranes of the ovum. This is the opinion of Chassinat and of Depaul, but the separation of the membranes is not explained. *b. The Liquid comes from the Lymphatics.*—Stapfer believes that the fluid is not pure lymph, but that other liquids from the vascular capillaries or the amniotic cavity are mixed with the lymph.

III. *The Liquid comes from the Amniotic Cavity, whence it escapes through a Tear in the Membranes, above the Uterine Orifice.*—The only cases are those of Ingleby, Biesing and Graef. In all the others the membranes were intact.

*Nature of the Liquid.*—This is very little understood. Chassinat found it thin, limpid, transparent and viscid from albumin. He found no odor of spermatic fluid. The color is not always yellowish. In a case which we reported to Stapfer, the liquid had a slight spermatic odor, was not viscid, was but slightly turbid and contained no vernix caseosa. Boiling caused slight turbidity but not nitric acid; hence there was no albumin. In Gomès' case the fluid was not albuminous, but was markedly acid and contained much epithelial detritus. After evaporation, crystals of chloride of sodium were found, but no nitrate of urea. With a little hydrochloric acid, no uric acid formed even after twelve hours. A little ammonia caused crystals of ammonio-magnesian phosphate to appear at once in the field of the microscope.



*Frequency.*—The affection is rare. Stapfer could only collect seventy cases. It has been particularly seen in multiparæ, and appears at indeterminate periods. It, however, seems more frequent in the last two months.

*Signs.*—Typical hydrorrhœa has the following symptoms: A woman after the sixth month suddenly loses, at different intervals, a jet of transparent, colorless liquid, slightly tinging the linen, making it stiff, like ascitic fluid, giving a more or less abundant albuminous precipitate, and followed by an oozing more or less marked and prolonged. All this happens without prodromal symptoms and without painful uterine contractions. Labor occurs at term, and the fœtus is healthy. The membranes are intact, adherent, opaque in one, two or three places.

*Local Symptoms.*—The hydrorrhœa begins suddenly, without known cause, at night. At other times, the abdomen becomes distended before the discharge, the patient feels tired; then painful uterine contractions follow; a jet of liquid escapes from the vulva; the pain ceases at once, and the abdomen subsides. Geil disputes this preliminary increase in the size of the abdomen noticed by Hegar and Chassinat. Generally the escape of the liquid is sudden, but sometimes there is simple oozing. Sometimes there is a single discharge, or there may be a repetition which may become periodical. The quantity of liquid varies from one to twenty ounces. Naegelé has seen the discharge continue thirteen weeks. In some rare cases the liquid has been colored by blood, and sometimes a slight sanguinolent discharge has preceded the aqueous one. There are no constitutional symptoms.

*Diagnosis.*—This depends on the source of the liquids. The only available symptoms are: The repetition of the discharge, the non-appearance of abortion, the existence of a catarrhal metritis at the time of conception. In one case we observed an effacement of the cervix, coincident with an escape of liquid, which lasted four days. Then the flow ceased, but the cervix remained obliterated, and the labor took place after sixteen days, twenty days after the accident. The bag of waters formed and broke spontaneously, while the membranes and placenta showed nothing particular. Another sign is the presence, in the liquid, of *débris* of vernix caseosa, which shows the presence of amniotic liquid.

*Prognosis.*—This is good, neither pregnancy nor health being compromised.

*Treatment.*—This consists in keeping the patients quiet and watching uterine contractions, if they occur.

## DISEASES OF THE PLACENTA.

### 1. *Placentitis.*

The disease, described by Geoffroy de Montreuil, Brachet, Simpson, Fer-

dinand Robert and Cauwenberghe, under the title of placentitis, is an endometritis, but a distinction must be made between inflammation of the foetal and of the maternal placenta. Indeed, excluding the observations of Brachet, Stratfordt, Dance, Simpson, Cruveilhier, Wilde, Dubois and Desormeaux, Ramsbotham and Geoffroy de Montreuil, inflammation of the foetal placenta has not been demonstrated. But inflammation of the maternal placenta has been observed and constitutes the organized adhesions of Brachet; the placentitis of the second degree with effusion of coagulable lymph on the uterine surface of the placenta of Simpson; and the metamorphoses of plastic inflammatory exudation on the uterine placental surface of Ferdinand Robert. This is the acute inflammation of Meckel; the chronic inflammation, the primitive or secondary chronic endometritis of Braün, Schroeder and Spiegelberg; the interstitial endometritis of Hegar and Maier, in which the villi are agglutinated and compressed by the hypertrophied decidua serotina, and a new connective tissue.

Here is their microscopical description, after Cauwenberghe: The fusiform cells which, with little amorphous intercellular substance, form the interstitial tissue of the decidua serotina or maternal placenta, are larger than normal, but in various stages of retrogressive metamorphosis. In the points where the change is most recent, the cells are alone. They are now regularly arranged, side by side, fusiform as in their normal state, and only slightly degenerated; now deformed, rounded, distended by finely granular matter or by a fatty granular substance, they either possess a plain nucleus or have none. Their arrangement is less uniform, and between them is free fat in globular masses or in scattered granules.

As the affection advances, we see new elements appearing between those of the interstitial tissue. The new tissue is now fibrillary, finely reticulated, its meshes being filled with nuclei and cells, now fibroid, striated or homogeneous. It displaces the older cells, deforms them or leads to their degeneration, so that a few fatty granules alone testify to their previous existence. In many places, the new connective tissue quite displaces the old. The utero-placental vessels undergo various changes, the constant result of which is atrophy and degeneration from compression, so that there finally remain only hard and whitish foci, comparable to old connective tissue, imbedded in the spongy mass of the placenta. This progressive formation of connective tissue, on the uterine surface and in the placenta, produces induration, the plainest result of which is obliteration of the foetal and maternal vessels, with more or less extensive thromboses and apoplexies.

As early as 1842, Devilliers, in 1849, Dance, and later, Lesauvage, Breschet, Dubreuilh de Montpellier and Jacquemier, reported congestions of the decidua, leading to thickening and the production of white, pseudo-membranous concretions, analogous to pleuritic false membranes. (Dance



reported a layer of thickened pus, between the uterus and the placenta). Congestions of the uterus may lead to apoplexies, that is hemorrhagic extravasations, either partial or general, in the decidual tissue or in its cavity, transforming the abortive ovum into a sort of coagulum, as almost all observers have noticed. If the hemorrhage is violent, the extravasation may occupy not only the thickness of the decidua and their cavity, but may also rupture the membranes and penetrate their interior. Devilliers has reported a case which he considers a hypertrophy of the two folds of the decidua greatly congested around the hypertrophied placenta, the first cause of which was an active congestion or some state peculiar to this membrane. The result is congestion of the uterus followed by a granulo-fatty degeneration (interstitial endometritis of Hegar). He adds that, if one finds pus on the surface of the decidua, it can only come from the inflamed uterus.

Hegar states that the changes in the decidua may affect all parts of it, and that one may find, successively:



FIG. 20.—OVUM WITH ATROPHIED DECIDUA. EXTERNAL SURFACE OF THE DECIDUA VERA. (After Spiegelberg).

Atrophy, which is not serious, except when it affects the decidua reflexa and the serotina, for simple atrophy of the decidua vera has no harmful result. Müller calls attention to the fact that the external surface of the ovum is often thickened, but smooth. Now, detachment of the decidua in the first half of pregnancy cannot take place without numerous lacerations which give a spongy, rough aspect to the detached surface, the uterine surface being thickened while the foetal surface preserves a soft and spongy look. Now, in certain abortions, the two surfaces are alike, being formed of a friable tissue. The glandular spaces are widened and, later, there is fatty degeneration. There is atrophy and deficiency of the decidua reflexa, which may also affect the serotina. In this case, says Spiegelberg, the ovum is in contact with only a small part of the uterine surface and we find the serotina notably elongated, as it were pediculated, and invaginated into the decidua reflexa (Fig. 20). In the latter, the ovum is sustained by the uterine wall. It may then become detached either by its own weight or by uterine contractions.

If the decidua reflexa is originally lacking, the villi of the chorion proliferate over the whole area of the decidua vera, and then we may have either the placenta spread out, or, as the uterine development is not regular, a placenta prævia. Arrest of development in the decidua reflexa, or its premature destruction, is more frequent. The ovum is then only covered by the chorion and is suspended to a pedicle of the serotina. The pedicle may be elongated, producing cervical pregnancy (Rokitansky). Hegar also mentions hypertrophy, which may affect either the glandular tissue (with cyst-formation) or the interstitial tissue. Finally, there may be congestions in the decidua, with hemorrhages, as reported by Devilliers, Jacquemier, etc. They are seated, at the same time, on the external surface, the internal surface, and in the thickness of the mucous membrane, as well in the decidua vera as in the reflexa and in the serotina.

Scanzoni assumes a communication between the two surfaces through the widened glandular orifices. The same may occur between the decidua reflexa and the chorion. When they are seated in the serotina they extend between the reflexa and the chorion, then invaginate the chorion and amnion into the cavity of the ovum, and the fœtus dies from compression, unless it was dead before. Sometimes, even the cavity of the ovum bursts and the blood penetrates into the amniotic cavity. If the ovum does not burst, the amniotic fluid is reabsorbed after the death of the fœtus, which is macerated and disappears. The only remnant of the ovum is *débris* of the funis. This is Montgomery's false germ, ova two months old. If the ovum bursts, the fœtus may be expelled without one's knowing it, and then the clots and membranes are expelled later. If expulsion is long delayed, the clot may become more solid, undergo the changes usual in effused blood and be expelled, later, as the so-called carnified mole. The decidua is often thickened, hypertrophied and very adherent to the uterine wall. This accounts for the long sojourn in utero of the carnified mole, which may undergo pigmentary and other changes. When the chorion and the amnion, or the amnion alone, after rupture of the chorion, have been thus dilated by the extravasation, they form what is called hemorrhagic cysts (Fig. 21), which enclose a sero-sanguinolent fluid or a clear fluid colored and derived from the blood serum. Carnified moles are usually expelled at the fifth month and rarely are larger than an orange. Sometimes part of the mole remains in utero and may become the origin of fibrous polypi.

We thus see that, although inflammation of the maternal placenta is to-day undoubted, the same is not true of fœtal placentitis. Cauwenberghe regards it as doubtful; Duchamp admits its existence, with the reservation that, although the suppurative form is doubtful, the chronic or sclerotic form is real. It shows itself in fibrous degeneration of the villi. The cases of so-called abscess of the placenta, numbering ten in scientific literature, are questionable, for not one of the authors remem-



bered to analyze the pus, and it is more than probable that it was not genuine pus but what Robin has called pseudo-fibrinous pus.

## 2. Changes in the Chorion.

The maternal placenta is formed by the decidua serotina. The foetal placenta is formed by the villi of the chorion which, having originally covered the entire surface of the ovum, atrophy over the major part of the surface, while they ramify and develop, *ad infinitum*, at the point corresponding to the serotina, where they become imbedded and constitute the vascular mass known as the placenta. To study changes in the

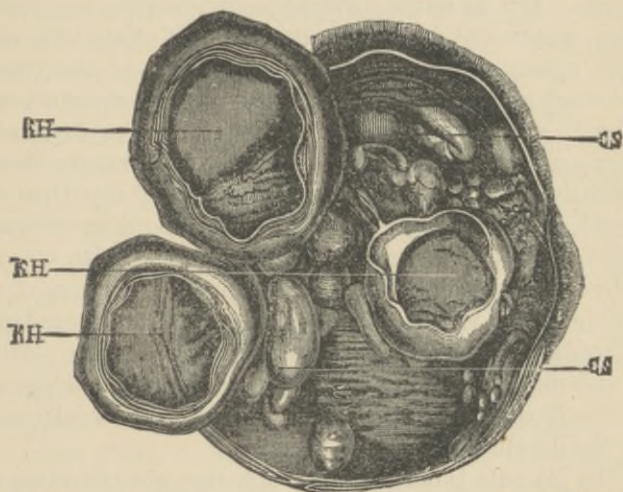


FIG. 21.—BLOODY MOLE, WITH EXTRAVASATIONS AND BLOOD-CYSTS ON THE FŒTAL SURFACE. (After Spiegelberg.)—CS, Clots. KH, Blood Cysts.

chorion amounts to studying the lesions of the placenta and the reverse. Now, these changes may relate to each of the placental elements, *i.e.*, the vessels and the villi. Let us successively study these lesions.

### I. Atrophy of the Villi of the Chorion.

This atrophy occurs, normally, in all the villi not destined to form the placenta, *i.e.*, in all not in contact with the serotina, and these villi may present three different conditions:

1. They are vascular.
2. They are well-formed and hollow but non-vascular.
3. They are mal-formed, and this has prevented their vascularization.

The atrophy is different in the vascular and in the non-vascular villi.

Ch. Robin has best described this atrophy: 1. If the villus is non-vascular, it is obliterated and undergoes fatty degeneration; 2. If the villus is vascular, the vessels are obliterated and the villus transformed into fibrous tissue, composed of longitudinal parallel bundles not continuous

with the tissue of the wall of the villus. There is, also, a little amorphous connective tissue and fine granulations, besides narrow and long nuclei, longitudinally directed and only made visible by acetic acid.

This obliteration occurs in the villi of different cotyledons indifferently.

In many villi, after obliteration, we find that the parietes contain fatty granulations, and real drops of oil, mostly spherical or oval. They are bright yellow at the centre and dark at the periphery. They are insoluble in acetic acid but soluble in liquor potassæ. They are either irregularly dispersed or collected into groups.

The villi of the decidua serotina are developed, *ad infinitum*, and form the placenta. But as Cauwenberghe justly remarks, the disorders of the circulation, manifested during the development of the villi, differ greatly from those obtaining after the perfect formation of the placenta. Authors, although agreeing about the former, disagree about the latter period.

Eigenbrodt and Hegar have noted apoplectiform destruction of the uterine mucous membrane, both in pseudo-membranous dysmenorrhœa and on abortive ova of the early months. During this time the mucosa is thickened, its vessels grow large and numerous, their walls are thinned, they coalesce and form vascular labyrinths gorged with blood as the result of physiological congestion. The gradual penetration of the vessels' walls, thinned by the villi, also favor rupture of the vessels and extravasation (Cauwenberghe). Hemorrhage is very frequent during placental development, and may be primary or secondary to morbid maternal or fœtal states. The blood comes, then, from the mother's circulation, and is situated in the decidua serotina.

When the placenta is once formed, one may observe either simple congestion, the villi presenting no changes, or hemorrhages, apoplectiform extravasations, always due to changes in the villi. But these hemorrhages undergo changes greatly altering the appearance of the lesion, hence diverse descriptions and different opinions, held by authors, not only as to the existence of such or such lesions but as to the connections between them. Some consider the lesions of the villi as merely secondary to the extravasations. Others consider the disease of the villi the chief element, and attach secondary importance to the hemorrhages. Some see the source of the hemorrhages in the maternal circulation and others in the fœtal.

## II. *Extravasations.*

Jacquemier's work on this subject is the most complete. He claims that, unless arterial lesions exist, the hemorrhages are always due to tearing of the veins, either in the placental tissue or in the decidua, outside of the placenta.

The seat of the extravasations depends on the development of the placenta and the time of the hemorrhage, and the hemorrhages are either



true extravasations or what are called by Jacquemier and others placental apoplexies.

When the placenta is fully formed, the blood, extravasated in the placenta, cannot extend between the decidua and the chorion, but accumulates on the external surface of the chorion and is limited to the lobe in which it was first extravasated. Later, the placenta forms a compact mass, and the blood, not being able to reach so far, forms superficial foci rarely reaching the external surface of the chorion. Occasionally, lesions of the umbilical vessels are merely consecutive to those of the utero-placental vessels.

The extravasations may present themselves in three distinct forms:

1. The blood is contained in a very irregular cavity. The neighboring tissues are infiltrated and colored red. The hemorrhagic foci often communicate with the external placental surface, which is torn. They are irregular, being sometimes on the placental border, and sometimes in its centre. In the latter case, they generally extend to the external surface of the chorion and to the cord. If they are at the points where the chief branches of the funis traverse the chorion, the blood sometimes infiltrates the tissues around the umbilical vein and artery. The hemorrhagic foci may be single or multiple and of the same or different dates.

Millet is opposed to these views and thus expresses himself in his thesis:

“*a.* The extravasations in the centre of the cotyledons come from ruptured umbilical vessels, and not from maternal vessels.

“*b.* The supposed false membranes, referred to by certain writers, on the uterine surface of the placenta, and regarded as an inflammatory exudation, are only heaps of epithelial cells, which have undergone a real hypergenesis, or hypertrophy, at certain points.”

Certain microscopists have found aneurisms of the umbilical vessels, at the entrance of the latter on the foetal side of the placenta, which would explain the apoplectiform extravasations.

2. There is no proper focus. The blood is infiltrated in one or more lobes. It may, however, be more abundant at some places.

3. The blood is in regular, circumscribed foci, the number of which may vary from two or three to twenty. The placental tissue around them is healthy. Being first decolorized at their circumference, they seem enveloped by a new cyst. There are, sometimes, very numerous small and regular foci, containing coagula, which closely resemble seeds of black grapes, and which, being in different stages of transformation, indicate recent and old coagulations.

These extravasations may coexist with the lesions of ordinary uterine hemorrhages, internal or external, but they often occur alone or only lead to the lesions in question at a late date. Dubois and Desormeaux make two different degrees of the disease, congestion and apoplexy of the placenta. The congestion may lead to extravasations in the placenta, on

either placental surface or between the decidual membranes and the chorion. The congestion may result from disturbances of either the maternal or of the foetal circulation. Simpson holds this view and Jacquemier rejects it, believing that hemorrhage is always the result of rupture of utero-placental veins.

The surface of the placenta is violet or livid, its tissue of a deep purple color, its vessels full of venous blood. The organ is larger and heavier. A little effort on the patient's part, and extravasation occurs from the torn vessels.

In the first three months it occurs between the chorion and the decidua, later in the placenta, and nearer the foetal surface as pregnancy is less advanced. This is the placental apoplexy of Cruveilhier, the utero-placental of Jacquemier.

In true placental apoplexy, is it the rupture of the umbilical vessels, the placental parenchyma or the utero-placental vessels, which causes extravasation? We never find, except in the case of Cazeaux and Grisolle, even when the foci are near the foetal surface, any torn umbilical vessels.

Is there rupture of the parenchyma or laceration of the utero-placental vessels? This is the sole cause, according to Jacquemier and Simpson.

Their seat is determined by the very structure of the placenta, which is less close on the side of the chorion.

These extravasations, almost always multiple, present themselves as foci, generally rounded and circumscribed. Sometimes their form and outline are irregular. When they are near the foetal surface of the placenta, and the blood is extravasated between the decidua and the chorion, the latter and the amnion are elevated and form on the side of the cavity of the ovum an hemispherical or conical prominence. The adhesion of the clot to the chorion is then, sometimes, very intimate.

Near recent extravasations, the placental tissue is redder, darker, and this state, dependent, perhaps, upon the infiltration of a certain quantity of the extravasated blood, may result, also, from the presence of a number of diminutive foci around the chief focus or of little clots formed in the vessels. The color of the blood is ordinarily of so deep a brown as to simulate melanotic degenerations.

In other cases the blood is decolorized, becomes successively chocolate colored, yellow, reddish or brownish, deep yellow, and dirty white when the coagulum contains only fibrin.

The shrinking of the clot, and the expression of the serum into the cavity left by the contraction, might simulate a serous cyst.

Finally, the tissue near the extravasations becomes changed. It is exsanguine, atrophied, and the atrophy may become general if the foci are multiple.

Joulin, 1867, thinks the foci have two distinct seats: 1, the utero-placental mucous membrane, and 2, the placenta.



He ascribes the effusion to fusion of the vessels and to partial destruction of their original walls. If the solution of continuity be considerable, the pressure of the liquid may cause separation and the blood may then enter the spaces between the cotyledons or escape externally. The placental hemorrhages are seated further in the capillaries, but their mechanism is different. He ascribes them to traction on and laceration of the capillaries from their displacement and their change of direction during the enlargement of the organ. Perhaps there is a disease of the capillaries which causes the hemorrhage. However it be, the hemorrhages are rarely exactly the same and the quantity of blood is very variable. The effusion may cover the whole surface of the ovum, as an irregular layer, sending prolongations into the depressions hollowed out by the separation. It may, in other cases, be in smaller, more numerous, isolated and circumscribed foci. It always stops at the inner surface of the organ, without rupturing the epithelial covering of the uterus.

The appearance of the clots is variable, according to the date of extravasation. They are black, like thin jelly, or whitish, or in yellowish-white resisting plaques, which have been inappropriately compared to scirrhus tissue.

### III. *Changes in the Villi.*

Ch. Robin considers these changes as the consequence of the natural development of the villi of the chorion accidentally affecting the villi of the placenta.

A. According to him, we sometimes find parts of different cotyledons depressed, hard, friable and with a shreddy irregular surface. This tissue is formed of villi in an advanced state of fibrous degeneration. The substance of the chorion proper is very granular and often thin. The nuclei are less numerous than in the normal state. The granulations are small and not all of them are fatty. The villi are adherent, and between them is a little amorphous tissue and a few granules.

B. In some placentaë the cotyledons are separated by deep furrows. The tissue is harder than normal, yet friable, is gray, yellowish-gray or yellowish-white, and less moist than normal. At a deeper level the tissue is more normal but denser, less red and less moist. These parts of the tissue are composed of villi obliterated by cellular tissue, but many of the villi have their own normal substance or contain only a few fatty granulations.

The nuclei are generally partly or entirely absent where these fatty granulations are in contact, but this is not constant.

The diseased cotyledons are more involved on the uterine surface than on that of the chorion, where they have their normal softness, humidity and reddish tint.

The fatty deposit is, thus, only a complication of the obliteration of the

villi, which is accidental. The term fatty degeneration is, therefore, not exactly correct.

Barnes thus describes the lesion, in the cases observed by him: The maternal placental surface is deeply divided by furrows, resembling cerebral tissue in color and lobulation. All the lobes are yellow and shiny, like fat. At the bottom of the furrows the color is red, elsewhere the placenta is pale. The fatty aspect is more marked near the uterine placental surface, and the microscope shows the villi there to be more extensively changed. The villi are, however, nowhere perfectly healthy, but in the firmest lobules are fragile and poorly outlined, and their vessels are ruptured. The chorion is largely destroyed, and the nuclei in the walls of the vessels are enlarged and filled with granules. In the less diseased parts the vessels preserve their normal volume.

D'Outrepont, Wilde and Kilian regard this lesion as a fatty degeneration of the placenta.

So soon as the investigations of Robin were published, observations were multiplied, but it was soon noticed that the facts were not so simple as they appeared from these clear and precise descriptions; and mixed cases, *i.e.*, cases characterized by both placental apoplexy and fatty degeneration of the villi, were cited.

The first was reported in 1854 by Hiffelsheim and Laboulbène, after that of Ch. Robin, who maintained that these lesions are independent of each other, although sometimes coinciding. He held that obliteration of a few placental vessels or of a cotyledon may modify the whole placental circulation and thus cause hemorrhage, but that the lesion itself is independent of the hemorrhage.

Laboulbène and Hiffelsheim came to the following conclusions:

1. There may be, at the same time, apoplexy and obliteration of villi;
2. Apoplexy does not cause obliteration, but rather the reverse;
3. The two lesions are independent of each other.

The appearance of the diseased cotyledons has sometimes been wrongly attributed to retrogressive changes in coagula about which the authors do not agree.

Jacquemier says that the serum is reabsorbed, while the coagulum grows dense by contraction. The pigment gradually disappears, being first lost at the circumference, unless the clot has been formed by successive additions. Sometimes the coagulum is so changed as to be unrecognizable or to simulate cartilage, cancerous growths or tubercles, nodular or diffuse.

Sometimes the coagula enclose cavities containing blood, and sometimes they are soft like adipose tissue and seem to be encysted. Often the umbilical vessels penetrating the coagula are obliterated. When the blood-clot is large, the placental tissue is firm and white around them, and one or more lobes of the placenta are obliterated.



When the hemorrhage has led to detachment of the placenta, the circulation cannot be restored. If, however, the extravasation is small, the blood may be taken up and the serotina reproduced. The latter then has new vessels, adherence between the placenta and uterus is not disturbed, and the umbilical circulation is not suspended.

Ch. Robin states that fibrin appears in two forms, according to the manner of its coagulation. The first is the thrombus, formed while the blood is still circulating, as in the case of cardiac vegetations and in aneurisms. The thrombus is stratified and pale in color, and may look like organized tissue, but never has fasciculi as does fibrous tissue. It has no capillaries and never grows, but either enlarges by the deposition of new laminae, or becomes granular and is reabsorbed. Now, it is not even this form of fibrin which is found in the placental coagula.

The second form of fibrin, called a clot, is produced during life, when extravasation, apoplectic or otherwise, takes place, or when the current of blood in some normal or pathological cavity is interrupted. The clot, proper, is formed of fibrin and red and white corpuscles, is softer than a thrombus, is friable and non-striated.

These are the coagula found in the placenta, and some writers speak of their organization because the fibrin resembles formed connective tissue. Verrier states that coagula may either contract and become permanent, be destroyed or become organized. The contraction and permanence of coagula is simple and undisputable. The destruction of the clot consists in several stages. The fibrin, when first deposited, gives a yellowish, lardaceous look, and a firm yet friable feeling. It soon, however, becomes granular and presents two kinds of granules. One kind is proteid, dissolving in alkalis and in acetic acid, the other fatty, resisting these reagents. The mass then becomes soft and liquid, resembling pus, and regarded as such by earlier writers. In these pyoid masses one finds, 1, innumerable fibrinous and fatty granules; 2, some liquid; 3, fatty white corpuscles; 4, granular bodies formed either by simple adhesion of fatty molecules or by their accumulation in a white corpuscle; 5, hematoidin crystals.

It was once held that the clots could become organized.

Hunter's theory of organizable plastic lymph was soon abandoned. Cruveilhier denied that coagula are organized, and so did Robin, but Vulpien reaffirmed the old theory, and Weber describes the organization of extravasated blood. In the coagula of ligated vessels the white corpuscles, in a few days, change their shape, the nuclei divide, they send out slender prolongations and form a reticulum like that of connective tissue. Then capillaries form and anastomose with neighboring vessels, the red corpuscles disappearing.

Bustamente, adopting Dalton's ideas, says that the villi, with their arterial and venous channels, plunge into the maternal blood from which

they are not separated at all. The placenta, according to him, is continually bathed in the mother's blood, which extends into the interstices of the cotyledons like liquid into a sponge.

Without defining the nature of the lesion in question, the author describes its gross and microscopical appearances.

*a. External Appearance.*—The lesion occurs either in scattered foci or in more or less extended plaques, which may be far separated, near together, or confluent. The color varies from yellowish-white to blackish-red or black. These colors are due to metamorphoses of the blood.

*b.* In the diseased parts, the tissue is firmer, yet more friable, particularly in cases with multiple foci.

*c.* The extent is variable. Sometimes the foci are scattered and vary in size from a pea to a nut; sometimes there are plaques, which may be a few lines broad or may rarely occupy nearly the whole placenta.

*d.* The most frequent seat is the border or the neighboring parts. The next is the foetal surface, and then, in order, the whole thickness of the organ, the uterine surface, the centre and one third or one half of the entire organ.

*e.* The state of the tissues varies. Now we find the placenta filled with numerous and recent clots; now their number has diminished, they are decolorized and include the agglutinated villi. Again, older clots are soft and their centre looks like broth, varying from reddish-brown to yellow, which may, according to Billroth, be true pus, which is denied by Virchow and Robin.

In other cases the coagula are stratified, particularly if on the foetal surface. The tissue may be so hard that it cannot be broken up, in which case it is of a dirty white or gray. The vessels in the diseased parts are generally diminished in calibre (Jacquemier), but they are sometimes obliterated and atrophied, either primarily or secondarily.

The microscopical appearances, according to Bustamente, are due to changes more or less advanced in the blood, and to secondary changes in the villi.

A. When the lesion is recent, we find coagulated blood around the villi, and, later, fibrin with blood corpuscles in its meshes. The villi in the clot are intact, but their vessels are filled with clotted blood.

B. At a later stage the fibrinous meshes are closer and the red corpuscles fewer, and so changed as to be recognized with difficulty.

The white corpuscles change to connective tissue corpuscles, and the new tissue is very dense. The villi undergo fatty degeneration. The blood in the vessels becomes granular, and the connective tissue nuclei begin to proliferate. Compound granulation corpuscles appear in the clot. At the most advanced stage of the change, the white corpuscles present one, two or three nuclei. Yellow elastic fibres appear, cross and increase, while the blood corpuscles disappear. The vessels of the



villi become, finally, obliterated. The walls of some of the villi become fatty.

The mechanism of the lesion is as follows: The maternal blood current is retarded in the placental sinuses, the blood clots surround the villi and the above changes occur. According as the coagulation is rapid or slow, the coagula are amorphous or striated. Bustamente proposes the name placental thrombosis for this condition. Cauwenberghe says that the blood undergoes the most diverse changes in different parts of the same or of different placenta, just as in vascular thrombi. 1. The decolorized fibrin may remain stratified without other change; 2. The thrombus is transformed into connective tissue; 3. Retrogressive changes occur in the blood, the red corpuscles disappearing and the white undergoing fatty degeneration and being carried away. The fibrin is changed to a pulpy mass like pus, the fibrinous pseudo-pus of Robin, the true pus of Billroth.

The microscope presents the following appearances in these lesions:

1. *Transformation of the Blood.*—In some cases red corpuscles predominate, in some the fibrin. The white corpuscles may be few and scattered, or grouped and in layers. The red corpuscles become deformed and decolorized. The pigment may disappear or remain a long time. At this time the fibrin is still fibrillary and the white corpuscles are unchanged. Later, the red corpuscles break up, the fibrin becomes granular and the white corpuscles become fatty and are disintegrated. When the foci do not enclose villi, the clot may be changed to pseudo-pus. The fibrin may remain unchanged. But may the clot form organized connective tissue? This is admitted by Billroth, Virchow, Cohnheim and Bustamente, but denied by Robin, Cauwenberghe and Maier. Maier says that new connective tissue, when found, is the result of hyperplasia in the decidua-serotina or interstitial placentitis.

2. Cauwenberghe considers the changes in the villi and the umbilical vessels as secondary, and repeats Bustamente's views, but he agrees with Hegar and Maier that the walls of the large vessels, on the foetal placental surface, are thickened from hypertrophy of the tunica adventitia, the lumen of the vessels being contracted and the capillaries empty.

Ercolani, 1876, considers the villi to be formed of two parts, the parenchyma, (chorial tissue of Robin; mucous tissue of Virchow), in communication with the chorion and the external part or epithelial envelope. He distinguishes, among diseases of the villi, hypertrophy or myxoma of Virchow; hydatigenous placenta; myxoma of the serotina or of the glandular organ surrounding the villi. The first two lesions correspond to the vesicular mole of the books. Here is his description of myxoma of the serotina: The placenta belonged to an abortive foetus of three or four months. It was normal and completely developed. The supposed placental parenchyma was composed of an intricate net of villi, between

the chorion and the serotina. The microscope showed in the pedicles and tufts of the villi, irregular swellings formed by a layer of the cells of the serotina. In the cells the development of the glandular organ was arrested and little pediculated bodies, generally pyriform, had appeared. Some of these, Virchow's *physalides*, contained liquid such as we saw in the epithelial proliferations of the villi. The parenchyma of the villi had undergone atrophy and fibroid degeneration at the beginning of its development.

Ercolani considers the fibro-fatty degeneration of the placenta a cellular hypertrophy of the parenchyma of the foetal villi, simple or complicated by vascular obliteration and glandular atrophy. He considers the hyperplasia of the cells in the mucous tissue of the villi, to be peculiar to the disease.

Dilatation of the vessels seems to be the result of the obstacle opposed to the circulation by obliteration of vessels in some of the tufts of the villi. The reason for the obliteration is the pressure exerted on the vessels by the neighboring cells, which are greatly increased in number and in volume. The volume of the diseased villi is augmented and they form compact, grayish masses, because they have no vessels and because the maternal blood cannot circulate around them. This is the lesion described by Bustamente and Neumann as sclerosis of the placenta.

Ercolani also describes fibroma of the villi and of the serotina. Called fibro-fatty degeneration by Robin, and designated as syphilitic by Virchow, this lesion is frequently found, according to Ercolani, on abortive placentas expelled after the third month or on placentas at term. In the latter it is less extensive. In the beginning of the transformation of the mucous tissue of the villi into fibrous tissue, the cells become more elliptical and numerous, and the surface seems firm and almost vitreous. Ercolani regards this really as a hyaline transformation and not as a fibroid one, because amorphous transparent matter abounds in the cells.

The fibrous transformation is now partial, now general. Obliteration of the vessels in the villi is secondary. The fibrous change may affect the villi alone, or also involve the glandular organ. The change may occur simultaneously in the villi and the serotina, before the glandular organ is formed. When the cells of the serotina assume the character of fibrous tissue, they remain round but get smaller, arrange themselves in series, lose their granules, and their nucleus is rapidly colored red with carmine.

Later, the hyaline substance exudes through the cell walls, and the cells, losing their round form, take on that of the connective tissue corpuscles, having numerous inter-communicating poles. The vessels of the villi are mostly obliterated. The fibrous tissue of the serotina is fused with the new fibrous tissue of the villi.

Ercolani and Beluzzi also mention melanosis of the placenta, consisting



in the deposition of pigment granules around the utero-placental vessels or in the villi. The pigment is hematoidin.

Ercolani states that there may be thrombosis of the sinuses and hemorrhage. The decidual vessels may rupture in the early months, and cause hemorrhage between the decidua and the chorion. The chief cause of the clots and hemorrhages is fatty degeneration of the cells of the serotina. The cells, thus altered, support, but poorly, the pressure of the blood in the lacunæ, and hemorrhage results. He has never observed the transformation of the coagula into pyoid matter, pus or neoplasms. He, however, remarks that the diversity of color in apoplectic centres, does not only depend on the time and character of the changes, but also on the quantity of lacunal blood and on the relative rapidity of coagulation.

Finally, Duchamp, in 1880, returning to Robin's view, considers fatty degeneration secondary to fibrous degeneration.

From an examination of these different opinions we conclude that the subject of placental lesions may be summed up thus: 1. Hemorrhages occur in the placental tissue, and the extravasated blood undergoes great change; 2. The villi may undergo a fibro-fatty degeneration; 3. There may be, simultaneously, extravasation and degeneration of the villi.

But the questions already asked by us, in our thesis of 1869, now present themselves again, *viz.*: 1. May there be placental hemorrhage or thrombosis without change in the villi? 2. May there, conversely, be changes in the villi without hemorrhage or thrombosis? 3. In mixed cases, with both lesions, are they dependent upon each other, and which is the initial lesion?

The facts reported by Hiffelsheim, Laboulbène, Depaul, Ercolani and de Sinéty show that the first question may be answered affirmatively. The same is true of the second question, as is proved by the cases of Robin and of Depaul and de Sinéty.

The solution of the third problem is far harder. Less positive than formerly, we no longer say, as in 1869, that the lesion is one. There is, first, fatty degeneration and obliteration of the villi, and then extravasation of blood which undergoes transformations; these two lesions being, in reality, successive degrees of one and the same change in the placenta. We do not, however, adopt the exaggerated ideas of Bustamente. His anatomical considerations on the structure of the villi are not conclusive. Indeed, the researches of the Germans and of Dastre tend to show that the villus is not hollow, as Robin thinks, but formed, externally, by a layer of polyhedral epithelial cells enclosing fatty globules and crystalline rings, or rods beneath this layer, and by a parenchyma of connective tissue arranged in planes parallel to the surface and forming a more or less dense felt-like tissue. Stellate cells are interposed between the groups of fibres. The villus is formed by a displacement of the chorion when the

vessels enter, but no central canal is formed. At the point where the displacement of the chorion is to occur, the fibres of connective tissue, parallel to the surface, become erect to enter the villi, the centre of which they form.

There is, here, nothing comparable to what Ch. Robin understands by the fibrous degeneration of the villi, which is a well-ascertained lesion. Besides, if, at the beginning of pregnancy, the extravasation of blood can only come from the maternal circulation, it may, later, come from the umbilical vessels. Millet expressed this opinion and certain microscopists have seen aneurisms on the umbilical vessels, near their entrance to the placenta, the rupture of which would explain the apoplectic extravasations. The facts quoted by Cauwenberghe, himself, and by Hegar and Maier prove the changes in the umbilical vessels. We reserve our decision, for both explanations can be maintained while neither is absolutely proven. This is, moreover, Duchamp's opinion.

#### IV. *Calcareous Changes in the Villi.*

By the terms ossification, ossiform concretions, placental calculi and calcareous degeneration, authors understand deposits of lime, either on the surface or in the interior of the placenta. Sometimes there are isolated grains or needles, sometimes calcareous masses. The grains contain amorphous carbonates and phosphates of lime and magnesia, and are found, most frequently, on the uterine placental surface. Carestia has reported some on the foetal surface. Lobstein, Meckel, Adelon and Cruveilhier, thought that they were in the capillaries. Robin has shown that the grains are especially found in the cotyledons whose villi are wholly or partly obliterated. They adhere, strongly, to the surface of the villi, surrounding and sometimes obscuring the villi, always deforming them. They are, then, in the maternal placenta, as Ercolani also believes.

*Etiology.*—The causes of the changes of the placenta mostly elude us. Hegar has observed, in a great number of ova, coexistent anomalies of the decidua and of the embryo which we have mentioned before, and this may explain the abortions occurring in the first months. This is not true of the important placental lesions which we have just considered. The advocates of the theory of blood changes have sought the explanation of these phenomena in placental thrombosis. But what are the causes of this thrombosis? Cauwenberghe finds them in the conditions of the placental circulation, the modifications of which seem to tend to one and the same end, *viz.*, augmentation of the quantity of blood, and excessive slowing of the circulatory current, or changes in the composition of the blood.

Finally, the following occasional causes have been noticed: Extreme youth, or, on the contrary, extreme age; the predisposition of certain women who menstruate very abundantly; acute diseases which affect the



circulation, and the respiration; the eruptive fevers; pneumonia; cholera; typhus; the diatheses and cachexias (among which latter, syphilis is the most prominent), and, finally, syncope, gravidica diac troubles, traumatism, or, in one word, all the causes of abortion.

1st. *Influence upon the Mother.*—All authors agree that whatever the lesion, it exerts no influence upon the mother. The sanguineous effusions may possibly, it is true, compromise her health, and exceptionally endanger her life; but, as a general rule, she suffers from nothing more than a more or less pronounced state of malaise, which has only a passing influence upon the material health. According as the disease is more or less intense, and according as it has or has not accidental complications, the mother suffers more or less; but the placental malady seems to have hardly any pathological influence upon her.

2d. *Influence of Placental Lesions upon the Fœtus.*—Here, on the contrary, all authorities agree as to the direct influence of the lesion. How can it be otherwise? The placenta is the essential organ of fœtal development; through it all its functions of nutrition and assimilation are accomplished; through it it respire and is nourished, and from it draws the elements necessary for its development. Is it not natural that the fœtus should suffer when it is affected with disease? We may conclude with Dubois: "If a portion of the placenta still preserves its structure and its functions, the fœtus will not only continue to live, but its nutrition will suffer little or nothing. On the other hand, if it does not die, it will be born feeble, thin, and wizened. If the placental disease is progressive, it will cause, in spite of our efforts, a gradual enfeeblement of the fœtal movements and heart-beats, until both stop completely; and the mother and the accoucheur, not unfrequently, help on the agony and death of the fœtus in these unfortunate cases."

3d. *Influence of Diseases of the Fœtus upon the Placental Lesion.*—Is it not possible for the state of health or the life or death of the fœtus to react upon the disease of the placenta? We are entirely dependent upon hypothesis for an answer. It is true that placental œdema, atrophy, and hypertrophy, appear to be lesions which are peculiarly prone to follow death of the fœtus; but we know nothing certain about it. If we could recognize and diagnosticate disease in the fœtus, we might obtain more precise data. The only thing that we can determine, and that but rarely, is the condition of the heart-beat, that is to say, the life or death of the fœtus. It is only after the beginning of the second half of pregnancy that even this is possible, and the first cause of the death of the fœtus escapes us. One fact only can be appreciated at the time of the death of the fœtus, and that is the almost constant tendency to abortion which follows that accident. But how often do we not see this accident occur without there being either in the placenta, the membranes, or the fœtus, anything to explain the death, and we are forced to ascribe it to general causes, to diatheses. Even when

we find a placental lesion, is the placenta diseased because the fœtus is dead? or has the fœtus died because the placenta is abnormal? The question is still entirely unanswered.

John Bremmer has studied the pathological alterations of the placenta, in connection with their influence upon the course of labor. He claims that placental alterations cause, by contiguity, a state of torpor and debility of the uterus, which manifests itself at the time of labor, by a more or less marked paralysis of the organ. Certain symptoms during pregnancy enable us to foretell this condition; these are a pale, thin, and pining facies, flaccid breasts, loss of flesh, frequent pains in the back and in the uterus, but above all, a continuous and unbearable state of malaise, lasting day and night, and often resisting even narcotics; a soft or compressible pulse, and a slight lowering of the uterus. At the time of labor, its slowness and difficulty, in women who have had other easy deliveries, are markedly in contrast with the continuous and severe pains, and softness and facidity of the os. The child is born feeble and almost asphyxiated, or it may be covered with livid blotches. Others again, though born at term, are only half the average weight of new-born infants; they may live a few days.

The amount of alteration in the placenta does not appear to bear any direct relation to the infant's condition as regards life or death.

Finally, the escape of meconium, if not always a sign of the death of the fœtus, indicates a state of such great weakness that relaxation of the sphincters has occurred. Nevertheless, the diagnosis is only certain after the expulsion of the placenta. The cord looks dirty, and the vessels are yellowish green in color; the placenta exhales a fœtid odor, and may be smaller than usual, but its texture seems to be but little changed.

#### HYPERTROPHY.

*Hypertrophy and Œdema of the Placenta.*—These two lesions, which are inseparable, are due to an increase in number and volume of the elements constituting the villosities, together with an exudation of fluid material between these elements. The epithelial covering remains intact, though it is hypertrophied to cover the enlarged villi; but the other structures may be profoundly modified. The cells of the mucoid tissue are hypertrophied and increased in number, and are closely aggregated together, one or two vessels still retaining their normal calibre. In more advanced degrees of change, the vessels disappear entirely from the mucoid tissue. Within the epithelial layer are a large number of round cells, dentate, and with fusiform prolongations, and even star-shaped; in other words, we find a true myxoma of the mucoid tissue. De Sinéty considers this the first stage in the development of the vesicular mole. Ercolani, as we have seen, regards this lesion as a hyaline transformation, because few cells thus changed can be found in the parenchyma of the



villus, while the amorphous and transparent element is abundant; and Wilde has seen the trunks that were not dilated by fluid undergo a fatty degeneration. In a case of acute hydramnion in a twin pregnancy, de Sinéty, who examined the placenta, found in it the following alterations: "Even with the naked eye it was possible to distinguish two different parts of the organ; the one being violet red and filled with blood, and the other looking pale yellow and thin. The fluid appeared to be everywhere between the membranes, though the contents of the amniotic cavity did not seem to be increased. The membranes were easily detachable from one another. Histological examination of hardened sections showed that the red portion exhibited a considerable dilatation and engorgement of the blood spaces, while the villosities appeared normal. In the white part, on the other hand, the walls of the maternal vessels were hypertrophied, and there was no blood in them. The villosities had but few vessels, and they were bloodless. There were seen certain dilatations of the mucoid tissue reticulum, which contained an amorphous material not colorable by either picro-carminate of ammonia or by purpurine.

"Some of these spaces contained a large cell which almost entirely filled it. In most villosities of the white portion of the placenta, the cellular elements were much more numerous than is normal. Some villosities had become fibrous, or, more rarely, fatty. The epithelial covering was notably hypertrophied, and was thus much more apparent than in the red part. The cord was apparently normal. The vein and one of the arteries contained blood-cells; but the other artery was contracted, and almost obliterated, and contained no blood; it only had a few small round elements, which were colorable by reagents, and appeared to be due to endothelial proliferation. The intima was infiltrated with these same elements, showing the existence of endarteritis. In the healthy artery we could see, in the midst of the blood globules, a certain number of giant cells of various shapes. They appeared also in the vein, but less abundantly, and mostly rounded. The stroma of the cord and its covering were normal. In short, the lesion consisted of a partial œdema of the placenta, together with complete anæmia of that region, probably of maternal origin. Although I do not consider the lesion a specific one, I must add that I have seen similar lesions in cases of syphilitic placenta." There was no syphilis in either the patient or her husband.

#### ATROPHY OF THE PLACENTA.

This lesion has been attributed by various authors to hemorrhages, to fatty degeneration, or to consecutive blood changes. It may be partial or general. But atrophy does not always appear to be due to the above causes, since placenta have been found whose dimensions are much reduced, though the tissue of the organ itself shows nothing peculiar. This is an anomaly, and if very pronounced, may interfere with foetal nutri-

tion, though not to the extent that it does in cases of consecutive atrophy, involving the whole or a great portion of the placenta.

#### SCLEROSIS OF THE PLACENTA.

This, according to Bustamente, causes the placenta to appear as a reddish, flesh-like, lobulated, and smooth mass, bearing some resemblance to the thymus gland. It is homogeneous and dense to the cut. The altered portion adheres partly to the villousities of the healthy part. Towards the sides, and especially upon the fetal face of the placenta, the normal tissue is encroached upon and compressed; as may easily be seen if the altered portions be removed. The mucous coat, on the uterine portion of the placenta, is detachable over the abnormal parts.

On microscopic examination, the villousities of the morbid tissue are not well defined. The section is homogeneous, and shows very small arterial vessels at the centre of the lobules. It is composed of fibro-plastic elements arranged in regular order in concentric layers, almost like the vascular tissues.

#### CYSTS OF THE PLACENTA.

According to Millet, who has seen two cases, the walls of placental cysts are formed of layers of tissue very like that which we find interposed between the chorion and the amnion. The fluid they contain resembles, both in consistence and in composition, the gelatine of Wharton. The cyst is, in fact, developed in meshes of the cellular tissue, just as are those cysts of the cord which Ruysch has described under the name of hydatidiform degeneration of the umbilical cord.

Bustamente describes a kind of cyst which is sometimes found upon the fetal surface of the placenta, of a regularly rounded or elongated shape, and varying in size from  $\frac{3}{8}$  of an inch to 2 or  $2\frac{3}{8}$  inches. They are placed below the amnion and chorion, which form their superficial or fetal boundary, being limited below by the placental tissue itself.

The contents of these cysts are solid and liquid. The fluid is usually lemon-colored, lactescent, and contains blood globules. Nitrate of silver causes a curdy precipitate; heat and nitric acid show the presence of albumin. Underneath this liquid portion of the contents is a whitish or slightly yellow substance, from  $\frac{1}{2}$  of an inch to  $\frac{3}{8}$  of an inch in thickness. Under the microscope, this tissue is seen to consist of reticulated fibrin, perhaps containing in its meshes some placental villi. Close inspection reveals the fact that it is disposed in layers. The greasy masses of which it is apparently composed, are usually found towards the centre of the placenta, in the intervals between the large vessels. Finally, it is not unusual to find plates on the surface in which we find a small quantity of fluid, having the same characters as the liquid of the cysts.

How are these cysts formed? A coagulation has taken place against



the chorion, forming the plate which is the deeper layer of the cyst. The fluid may be produced in one of several ways: 1st. A certain quantity of blood may have been included between the coagulum and the chorion; or the blood may have appeared later, after the formation of the first layers of the plaque, from rupture of the layers. 2d. Or a little bleeding point may be left open, and the blood then tears a cavity between the chorion and the plaque of coagulated fibrin. We cannot attribute these to the rupture of a vessel, since in the cases examined there was no such thing. The fibrinous parietal layer also shows evidence of having come from the maternal blood of the placenta.

Ercolani has seen two cases of placental cyst. In one the entire foetal surface of the placenta was sown with round tumors, covered by the chorion, the largest being about the size of a cherry. Some had been opened, and the chorional wall torn, showing a solid material filling the depths of the cyst. They were in fact like the variety described by Bustamente. Others again were more solid, and were filled with coagulated fibrin, in which rounded masses of granular hæmatin could be seen.

In the second case three hemorrhagic centres could be easily distinguished upon the foetal surface; they were round, red in color, and about the size of small peas. Others were less prominent and more irregular in shape. In those that were cyst-like, Ercolani proved that the interior wall was formed by the chorion, which covered the whole bloody mass, of which half projected above the placental surface, while half dipped into the placental tissue, and lay in immediate contact with the effused blood. The term cyst is therefore inexact. At the placental depths of these tumors, the villousities, more fibrous than usual, formed a compact layer, certain spots in which turned out to be cells of the serotina, some of which plainly showed fatty degeneration of the nuclei. Small irregular calcareous concretions were scattered through the mass.

#### TUMORS OF THE PLACENTA.

The following is the description, by A. Danyau, of a tumor occurring in a healthy woman, and after a normal pregnancy, the only effect of the mass being to cause considerable abdominal distension, so that labor occurred at the seventh month. "Near the margin of the foetal portion of the placenta, is an oval tumor  $4\frac{2}{3}$  inches long by  $3\frac{1}{2}$  inches broad, and covered by the membranes, which are partly detached from its surface. Several large venous and arterial branches of the umbilical vessels run over its surface and penetrate its substance to the centre. The tumor is lobulated, and, besides the membranes, has a proper envelope, thin superficially, thicker over the portion covered by placenta, easily torn, and apparently formed of plastic lymph more or less condensed. Divided longitudinally, the tumor appears to be composed of intimately adherent lobes, some being of a dead white, and others of a pale or deep rose tint; its

tissue is homogeneous, very dry, like schirrhus in appearance, and crying under the scalpel; its color and consistence reminding one in some places of the cortical substance of the kidney, and appearing in others to be composed of layers of fibrin; vascular orifices are apparent, some of which are still filled with clots."

The author describes a second similar but smaller tumor, and adds, that the portion of the placenta upon which they rest is depressed; that the tumors can be nucleated; that the placental tissue is then very compact, and that a neighboring cotyledon contained a blood clot about the size of a filbert. The second tumor was observed under circumstances similar to the rest; it differed only by a greater homogeneity of the tissue out of which it was formed, and by the absence of the layer of plastic lymph which almost entirely covered the first one.

The author then discusses the nature of these tumors, whether they are monstrosities or moles, or perhaps due to degeneration of the decidua, or whether of cancerous nature. Danyau comes to what appears to us the well-founded conclusion, that they are due to anterior sanguineous effusions. In conclusion, he states that the tumors appeared to have no evil influence upon either pregnancy, delivery or the puerperal state, and that they cannot, at present, be diagnosticated before birth.

#### SYPHILITIC LESIONS OF THE PLACENTA.

It is only recently that syphilitic affections of the placenta have been studied. Duchamp has given the best *resumé* of the subject. He shows that while Astruc, in 1796, recognized abortion as a consequence of syphilis, Murat first, in 1820, noticed certain black spots upon the organ, due to hemorrhage, though Paul Dubois, Putégnat, and d'Outrepont denied their significance. Simpson and Lebert, in 1822, Virchow, Bärensprung, Wilk, Biervliet, Slavjansky, Kleinwächter, Mayer, Adamson, Birne, Verdier, Hennig, and ourselves, have noticed these lesions in the placentas of syphilitic children. Frankel, in concert with Waldeyer and Kolaczek, was, however, the first to bestow serious attention on the subject.

He could collect fifteen observations of syphilis transmitted from the father, in which nothing more than hypertrophy of the villi could be found; but when the mothers were diseased, the lesions were more complex. His conclusions were as follows:

- 1st. There is a syphilitic placenta, with characteristic features.
- 2d. It is only found in cases of congenital or hereditary foetal syphilis.
- 3d. The seat of the lesion is different when the mother is affected, or when the virus is simply transported by the zoö sperm to the egg.

a. In the latter case the placenta is degenerated and the foetus is diseased, and the villi of the foetal placenta are filled with fatty granulations; their vessels are obliterated, and their epithelial coverings thickened or absent.



b. The mother being infected, one of three conditions may be present:

1. If the mother is infected during the generative act, at the same time as the fœtus, syphilitic foci will often develop in the maternal placenta (placental endometritis.)

2. If the mother is syphilitic before conception, or becomes so shortly after, the chances of the placenta remaining healthy are about even. In the latter cases the endometritis gummosa of Virchow is observed.

3. If the mother is not infected until after the seventh month of pregnancy, both fœtus and placenta escape entirely.

4. Infection of the fœtus during delivery has not been proved.

Macdonald, in 1875, noticed hyperplasia of the villi in cases of paternal origin. The vessels are especially affected, and there is considerable perivascular hyperplasia, followed by vascular atrophy and disappearances of the villous tissue. The rest of the placenta is the seat of congestions and bloody effusions. In cases of maternal origin there is hyperplasia of the elements of the decidua, with compression and atrophy of the villi—in fact, the endometritis of Virchow and of Slavjansky.

When both mother and father are syphilitic, the lesions are mixed. Nevertheless, Tarnier and Depaul doubt the existence of specific lesions of the placenta. De Sinéty, if he has not found lesions in every case, has proved that the following three important changes may occur.

1. Hypertrophy of the villi, which may be doubled, or even tripled in size.

2. Fibroid degeneration of the villi.

3. Nodules of cheesy-degenerated granulations.

The coincidence of the fibroid and caseous degenerations is found in syphilitic gummata, and notably in those of the liver, and although de Sinéty has not found this *ensemble* of lesions in any other disease than syphilis, he does not enter upon the question of the specific nature of the lesion; he does not deny that a disease other than the pox may cause them, but he suspects syphilis when he finds all three lesions. In two cases his surmises have been clinically confirmed. (Duchamp.)

#### ALBUMINURIC CHANGES.

Chantreuil has found, in a certain number of albuminuric women, placental lesions consisting of whitish plaques, some of which the microscope showed to be tissue in a state of fibro-fatty degeneration. Others again were merely collections of fibrin. They were fatty degenerations of the placental villi, and apoplexies. There was a placentitis albuminurica, analogous to the retinitis albuminurica.

#### ADHESIONS OF THE PLACENTA.

The two most complete works upon this subject are those of Van Lynseele, and of Hegar. The latter found adhesions in cases of abortion, of

premature labor, and of delivery at term, and showed them to be due to such pathological processes as degeneration of or hemorrhage into the placenta, and inflammations of its parenchyma, of the decidua, and of the tissues about the uterus.

1st. In cases of abortion and premature labor there is an arrest in the process of involution of the placenta. Retention of the placenta occurs from the intimate union between the maternal placenta and the uterine parietes, from separation of the maternal from the foetal placenta, from the want of energy in the uterine contractions due to incomplete development of the muscular layer, from the resistance of the cervix, and from pathological processes of the uterus, of the appendages of the egg, and of the organs in the neighborhood of the womb.

2d. In cases of vesicular mole, to which we shall presently return.

3d. In case of exudative processes, and of extravasations into the placenta.

That adhesions from primary exudations from the uterine wall do occur, has been anatomically demonstrated. (Obs. of Stradfort, Chiari, Clay, Braün, Wrisberg, Hegar, Simpson, Meckel, Hüter, Siebold, Stoltz). The placental tissue may appear solid, anæmic, and white, or, on the contrary, it may be soft, friable, and brownish, but it is firmly attached to the uterus by the uniting layer. Thus the placenta is easily torn, and fragments remain in the uterus at the time of delivery.

Some authors have described adherent placentas in a condition of atrophy; they were dry, small, and anæmic.

When the adhesions are secondary, they occur in consequence of exudations and extravasations into the parenchyma of the placenta, or between it and its membranous covering. The uniting layer of the mucosa participates in the lesion by extension of the morbid process, by the irritation which the pathological product causes in its vicinity, and by the modifications of the circulation which it effects. The effusions poured out between the membranous coverings and the foetal surface of the placenta most often extend to the periphery, following the ramifications of the umbilical vessels along the external surface of the chorion, and with prolongations extending to the decidua.

These placental adhesions may be spread out as membranes or may form bands and cords. They rarely extend over the entire uterine surface.

*Causes.*—These may be diseases of the foetus, of the umbilical vessels, of the amnion, or of the chorion; or they may be obstacles to the umbilical circulation, hemorrhages and effusions, or endometritis.

Hegar believes that he can recognize them during pregnancy, but the symptoms that he gives are of very doubtful value.



## MOLES.

Mole was the name formerly given to the fibrinous masses which women sometimes pass during menstruation, and also to the altered products of abortion. Hence the distinction between true moles and false moles, which were further classified according to their appearance as fleshy, vesicular, and watery moles. Now-a-days, under the name of the hydatid or vesicular mole, or the designations of cystic degeneration of the chorion and the placenta, dropsy of the chorionic villi, myxoma of the placenta, all authors describe a peculiar placental alteration, characterized by the production of more or less pedunculated vesicles, and sometimes forming a very considerable mass.

Madame Boivin distinguishes four kinds of moles: 1st. The red, fleshy, and vascular mole, due to abnormality of the sanguineous system of the embryo. 2d. The white, hydatid or vesicular mole, due to lesions of the membranous shell of the egg. 3d. The complex, fleshy and vesicular mole, due to lesions of both portions. 4th. The embryonal mole, composed of an embryo and a mole, due to the partial degeneration of one germ, and the complete degeneration of another.

Madame Boivin insists that the vesicular mole is always the product of sexual intercourse, and states in proof thereof, that its enveloping membrane is entirely analogous to the epichorion or decidua. This enveloping membrane is sometimes expelled entire with its hydatid contents, and it is, like the decidua, the bond of communication between the body which it encloses and the matrix to which it adheres.

If the decidua is adherent, it may not be expelled with the vesicular mass; it may putrefy and exfoliate and gradually break down and flow away, exactly as occurs after ordinary delivery.

*Time of the First Hemorrhage, and its Duration in Hydatid Gestation.*

| Names of Authors.   | Time of first hemorrhage. | Time of delivery. | Duration of flow. |
|---------------------|---------------------------|-------------------|-------------------|
| Dumanceau, . . .    | at 45 days.               | at 8 months.      | 6½ months.        |
| Mme. Boivin, . . .  | " 45 "                    | " 4 "             | 3½ "              |
| Littré, . . . . .   | " 2 months.               | " 6 "             | 4 "               |
| Crawford, . . . . . | " 3 "                     | " 7 "             | 4 "               |
| Souville, . . . . . | " 3 "                     | " 7 "             | 4 "               |
| Percy, . . . . .    | " 3 "                     | " 8 "             | 5 "               |
| Mme. Boivin, . . .  | " 3½ "                    | " 8 "             | 4½ "              |
| Pichart, . . . . .  | " 4 "                     | " 4 "             |                   |
| Millot, . . . . .   | " 4 "                     | " 4 "             |                   |
| Delamotte, . . . .  | " 5 "                     | " 5½ "            | 15 days.          |
| Percy . . . . .     | " 6 "                     | " 9 "             | 3 months.         |
| Bremser, . . . . .  | " 7 "                     | " 8 "             | 1 month.          |
| Jolly, . . . . .    | " 8 "                     | " 10 "            | 2 months.         |
| Baudelocque, . . .  | " 11 "                    | " 11 "            |                   |
| " . . . . .         | " 16 "                    | " 14 "            |                   |

## DURATION OF HYDATID GESTATION.

*Observations in 28 Cases.*

|                               |            |   |   |   |           |
|-------------------------------|------------|---|---|---|-----------|
| Woman delivered at 14 months, | .          | . | . | . | 1 case.   |
| “ “ “ 11 “                    | .          | . | . | . | 1 “       |
| “ “ “ 10 “                    | .          | . | . | . | 3 cases.  |
| “ “ “ 9 “                     | .          | . | . | . | 3 “       |
| “ “ “ 8 “                     | .          | . | . | . | 4 “       |
| “ “ “ 7 “                     | and 8 days | . | . | . | 1 case.   |
| “ “ “ 7 “                     | .          | . | . | . | 1 “       |
| “ “ “ 6 “                     | .          | . | . | . | 5 cases.  |
| “ “ “ 5½ “                    | .          | . | . | . | 2 “       |
| “ “ “ 4 “                     | .          | . | . | . | 3 “       |
| “ “ “ 3 “                     | .          | . | . | . | 4 “       |
| —                             |            |   |   |   | 28 cases. |

Dubois and Desormeaux describe three varieties of hydatid mole: 1st. The embryonal hydatid mole. 2d. The hollow hydatid mole. 3d. The hydatid mole *en masse*.

The first variety consists of a membrane, vesicular on its outer surface, with an internal cavity containing a fœtus or parts of one, and possibly fluid.

The second kind is like the first, save that its cavity contains only fluid, and possibly a remnant of the umbilical cord, the fœtus having been dissolved.

The third variety is distinguished by the enormous development of the hydatid bodies, and the more or less complete effacement of the central cavity formed by the amnion, the place of which is taken by a mass of soft, yellowish, spongy tissue.

Moles of all kinds are covered by a thick membrane, which is in immediate contact with the uterus, and which is nothing but the decidua.

Cayla has sought to prove that the hydatid moles are only uterine villosities, modified in shape and size by the accumulation of fluid within their cavities. He thus describes what he calls dropsy of the chorionic villi. “The pedicle of the villus forms a membranous tube filled with serosity, and some  $\frac{1}{2}$  to one inch in length. At the point where the pedicle begins to branch, the dilatations or hydatid vesicles begin to develop. They may be as large as a hazel-nut, or so small as to be hardly visible, smaller vesicles often springing by a short pedicle from the larger ones; the pedicle being the non-dilated portion of the branch. The flow of fluid is free from one vesicle into another. Curious groups of vesicles of varying size and shape are thus formed. Each vesicle is oval, spherical or pear-shaped. Occasionally one will be found triangular, or even cylindrical in shape. A few are more irregular, and have prolongations in various directions. The microscope shows small cysts upon the pedicles or on the walls of the vesicles; these are vesicles in process of formation.



*Texture of the Hydatid Bunches.*—They are usually easily isolated, though they may be more or less intimately interlaced, when they form a mass of cysts as thick as the placenta, in the centre of which nearly normal villi may be found.

*Contents of the Vesicles.*—The walls are thin, semi-transparent and resisting. The contents consist of a transparent, reddish, serous fluid, albuminous and coagulable by alcohol and nitric acid. There is no trace of cysticerci or echinococci.

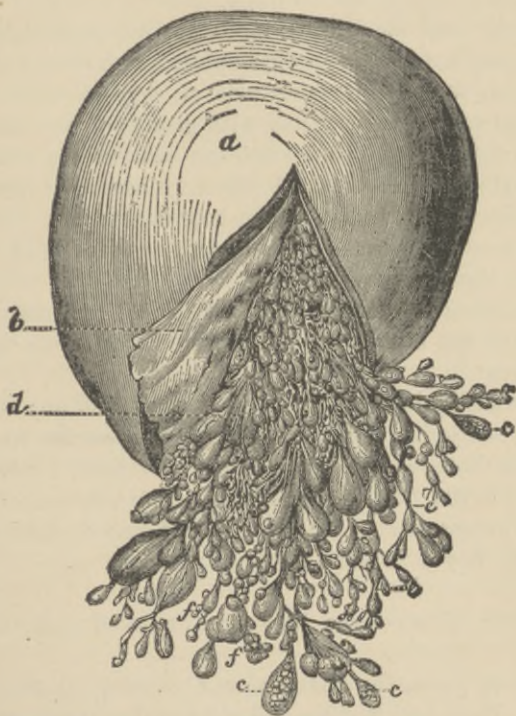


FIG. 22.—HYDATID MOLE.—This mass, which weighed 2 pounds 2 ounces, preserved the shape of the uterine cavity in which it was enclosed. On opening it, a certain quantity of the hydatid vesicles that it contained escaped. Two membranous layers could be distinguished; the first, *a*, the external or uterine membrane, analogous to the epichorion or decidua; the second, *b*, thin and transparent and apparently consisting of the remains of the chorion. *c.c.c.*, Granular vesicles. *d*, Free vesicles. *e.e.*, Oblong vesicles. *f.f.*, bud-like vesicles. (*Mme. Boivin.*)

“Two varieties of special cells were found in equal and limited numbers in this fluid.

“The first are spherical, transparent and regular with one or two round nuclei, and contain fine gray molecular granulations. The nuclei contain a small brilliant nucleolus. They are unlike any known anatomical element.

“The second variety belongs to the class of pavement epithelium and

are exactly like the cells of that tissue save for the brilliant, yellowish, molecular granulations that they contain. It is difficult to understand the origin of these cells if we admit that the cysts were formed after the penetration of the vessels; for there is no pavement epithelium in capillaries.

“The walls of the vesicles are formed by the chorionic tissue. They contain a large number of brilliant molecular granules, or sometimes, instead of that, very fine grayish grains. Thus the hydatid vesicles are nothing but dilatations of the chorionic villi.”

We have seen that the dropsy may occur when the placenta is completely organized, but that it may take place much earlier is shown by the isolated vesicles, and by the examples of eggs expelled entire, whose whole chorionic surface was covered with groups of vesicles, proving that the alteration occurred at a time when the chorion was entirely villous.

Clots of varying consistency and color are almost invariably found in the midst of the vesicular mass, which may explain the coloration of the vesicles. Amnion and chorion showed no lesion. The weight varies, and may reach eleven pounds.

Depaul, accepting the division of Dubois and Desormeaux, seeks to explain the nature and occurrence of the various elements encountered in the vesicles thus:

“The vesicular liquid is, at first, transparent, and any reddish tinge is due to blood temporarily in contact with the vesicles, the hæmatin of which has been dissolved and has reached the fluid, for Robin found no blood globules in the fluid he examined. The rupture of the allantoic vessels, then, causes the color. We do not know where the epithelial cells come from any more than we know the real cause of the dropsy of the villi.

“What are the causes of the differences observed in the various hydatid moles?”

“In the first place, the membranous envelop of the mole must be the decidua. Each vesicle, like the chorionic villus from which it has sprung, is in intimate relationship with the internal surface of this membrane.

“The dropsy always begins early in embryonic life. If it occurs at the very beginning, the villousities which cover the entire surface of the egg will undergo hydatidiform degeneration. The embryo and its membranes will be dissolved, and we will have the mole *en masse* of Desormeaux and Dubois.

“If it occur later, the amniotic cavity will persist, though the foetus will be dissolved, and we will have the mole hollow.

“As to the third form, the embryonic mole, the dropsy also dates from the first period of embryonic life, but a portion only of the villi are involved, being those which were nearest to the inter-utero-placental de-



cidua. The allantoic vessels in the other villi sufficed to maintain the life of the embryo; when they became involved, death of the fœtus ensued."

Though the arrangement in clusters of Cayla is evident in quite a number of cases, it cannot always be demonstrated, on account of the frequently intricate interlacement of the villi, even in the normal state. Cruveilhier, therefore, has given a somewhat different description of the mole. He claims that the vesicles are not bunched, and are not united by a common pedicle, but that they are joined to one another by numbers of delicate filaments.

Ancelet has observed the same thing, and describes two forms of adherence for the vesicles, one by a pedicle, and the other by filaments. The pedicle, whose diameter is greater the less the vesicle is developed, represents a simple circular contraction, and is formed by the more or less intimate fusion of the internal membrane of two adjacent vesicles.

The adhesion diminishes as the vesicles develop, and they assume a pyriform shape; then, as they tend to detach themselves, their fibro-cellular pedicle finally breaks.

Do the vesicles communicate with each other? Vallisnieri and Cayla, and especially Shrokius, who insufflated them, say they do; Madame Boivin is doubtful; Ancelet could not prove it. As to their structure, Cruveilhier says that the cyst membrane is composed of a single layer of transparent reticulated tissue; Pelvet has always found it formed of molecular granules; while Luys claims that it is fibroid and non-vascular.

From these various opinions Ancelet concludes: that the vesicles are pendant in the uterine cavity, and are attached to a membrane that lines either the uterine parietes or the coverings of the egg, the decidua vera or reflexa. We may admit that, secreted by the glands of the uterine mucous membrane, they push its most superficial layer before them, and this most superficial layer, being less elastic, gives way, and is torn into filaments. This view is justified by the microscopic observations of Sirelius de Helsingfords, upon the modifications of the elements of the uterine mucous membrane during pregnancy.

Ancelet concludes, with reservations, as follows: "The hydatid mole is a peculiar alteration of one of the surfaces of the deciduous membrane, arising under the influence of impregnation, and consists of the production by successive budding and exogenous multiplication of independent vesicles, adhering to one another, covered by a common membrane, and tending to become isolated as they develop."

Ancelet thus returns to the ideas of those authors who consider the hydatid mole a disease of the decidua and not of the chorion; an evident error, since its seat is in the chorionic villi.

But there are still other opinions, which, while admitting the seat of the affection to be in the villosities, differ as to its nature.

Virchow does not believe in any dropsy proper of the chorionic villi,

but regards the affection as a hypertrophy of pre-existing mucoid tissue. This exists in the umbilical cord abundantly, and is called the gelatine of Wharton, and also in other portions of the fœtus. We may denominate it imperfect fatty tissue, since in most cases it develops into that tissue later.

It is a distinctly individual tissue, and the most typical tumors formed of it are found in the fœtus during its early development, and in the membranes of the egg. These are the growths which have been described as hydatid, vesicular, or cystic mole, and which Virchow calls myxoma of the chorionic villi.

This condition is found, he says, almost without exception in the human egg after abortion, while it is rarely seen in labor at term. Usually a large mass of mixed blood and vesicles is expelled. On removing the former, the vesicles are seen to be united in clusters, so that each vesicle has a pedicle, and the larger vesicles give insertion upon their surface to smaller ones, which in their turn support others.

Heinrich Müller, on the other hand, places the affection in the external membrane covering the villi, in the so-called exo-chorion; while Mettenheimer, whose opinion is shared by Pajot, claims that there occurs a cystic transformation of the cells contained in the interior of the villi.

These contradictions are due, according to Virchow, to an incomplete knowledge of the structure of the chorionic villi. Virchow was the first to show that the hypertrophied villi of the hydatid mole, as well as the normal villosities, consist of prolongations of the same mucoid tissue that forms the gelatine of the umbilical cord; that the villi are formed of two elements only: an epithelial covering (exo-chorion) and a substratum of mucoid tissue (endo-chorion), which only later becomes vascularized. The epithelial proliferation of Heinrich Müller is simply a stage in the normal development of that tissue. It is in the body of the papilla alone, and not in the epithelium, that the peculiar transformation occurs that leads to the production of a mole.

In fact, these growths have been found on other parts of the envelopes of the egg, both Ruysch and Virchow having seen them upon the umbilical cord.

Normally, only those villi that correspond to the placenta develop progressively; but if a pathological condition supervenes very early in pregnancy, they all proliferate and become hyperplastic. Abortion usually follows; but it may happen that the placenta develops normally, only a certain group of villi becoming hydatid. Usually, however, the affection is situated just at the placental site, though only a portion of the cotyledons may be affected.

In any case the affection begins as a multiplication of nuclei and cells.

Whether simple hyperplasia or a hydatid state results, it is very common to find the isolated vesiculated cells which Virchow has designated



*physaliphores*. They are found in the epithelium as well as in the parenchyma of the villi, but they have no relation to the development of the vesicular mole. The morbid process corresponds to that described as the mucoid degeneration of cells. Virchow does not deny that some cells may disappear, or may undergo a fatty change; but they often persist in great number, and the principal accumulation of mucus occurs in the intercellular tissue. Where this accumulation is relatively large, the tissue becomes cystic in appearance. Where the fibrinous portions are in excess, a simple hyperplasia results.

Thus these tumors are formed. A villus, whose normal diameter may be hardly half a line, may be dilated to half an inch or more. The larger they get the more characteristic they become of mucoid tissue. They become clear, transparent, and gelatiniform; they contain a ropy liquid which gives the reactions of mucin.

The vesicular appearance depends upon the delicacy of the liquid-filled tissue.

This development has nothing to do with the vessels; but if it occurs late in pregnancy, the vesicles may become the seat of an extremely rich capillary plexus. But vessels are usually absent, at least in eggs coming from the first months; and dropsy of the amnion and atrophy and death of the fœtus occur in consequence of the disease, which cuts off the circulation.

Hence, the different descriptions given by authors, and the three kinds of hydatid mole; they are only degrees of one and the same lesion, varying from a simple faulty conformation to complete destruction of the fœtus and the cord.

Most authors regard the disease of the membranes as the primary, and that of the fœtus as the secondary and consecutive affection.

Hewitt has returned to the first theory, and it is the true one; for no one has yet shown that the placenta continues to grow when retained after the death of the fœtus. The villosities remain intact; and besides this, the condition in question is found in carnified and sanguineous moles as well as in those of the hydatid variety; but it is very likely that the secondary condition is not then due to a myxoma, but to the hemorrhage which produces the so-called carnified mole.

Finally, and it is a most important argument, partial myxomata of the placenta occur in children which are well developed, and which have died during the last months of pregnancy.

The lesion of the membranes is then the original one. Does it begin as an irritation of one of the uterine surfaces, or does it come by the blood of the mother? The fact that women sometimes have hydatid moles several times, and that in them the decidua plainly shows traces of inflammatory thickening, and even, according to Virchow, little polypoid excrescences, is favorable to the former view. A more or less extensive endo-

metritis will cause such hypertrophy of the villi, that each one will form a true, independent tumor, and will not only deprive the embryo of the nutritive materials which they should supply to it, but, when that embryo is destroyed, can continue to live and furnish a perfect example of a true parasitic tumor, heterologous even to the mother's body, and yet proceeding from it.

The theories concerning the vesicular mole may be summed up, as Duchamp says, in the following propositions: 1st. The vesicular mole is entirely independent of pregnancy; 2d. The vesicular mole increases under the influence of pregnancy, but is not due to disease of the egg; 3d. The vesicular mole is due to a change in the product of conception, from—*a.* Alteration of the vascular walls (Cruveilhier); *b.* Alteration of the lymphatic vessels; *c.* Dropsy of the chorionic villi (Robin, Cayla); *d.* Myxomatous degeneration (Virchow and the Germans, Ercolani, Damaschino, Cornil, Ranvier, Hirtzmann, 1874, Josephson, 1879).

The vascular and lymphatic theories are untenable, and if true hydatids have been expelled from the uteri even of virgins, they bore no likeness to the clusters of the vesicular mole.

Ancelet's idea, that it is a disease of the decidua, is wrong, since the degenerated villi might contract adhesions to the decidua without that membrane being affected; besides which the villosities have been seen to be continuous, by their pedicles, with the chorion.

Ruysch and Cruveilhier's vascular theory is disproved by the fact that the vessels are not dilated, but obliterated; and the theory of the lymphatics is in complete opposition to the structure of the villi.

There remain the two theories of Robin and of Virchow. Both place the morbid change in the villi, but Robin claims that the vesicle contains nothing but a fluid, in which a few cells float freely, while Virchow holds that what fluid there is, is simply the intercellular fluid of a tissue. The following reasons favor the latter opinion: 1st. The normal villus contains mucoid tissue; it is not astonishing that it should hypertrophy; 2d. The vesicular fluid contains mucin; the following is Gscheidlen's analysis:

|                               |      |
|-------------------------------|------|
| Chloride of sodium, . . . . . | 3.34 |
| Phosphoric acid, . . . . .    | 0.74 |
| Albumin, . . . . .            | 6.12 |
| Mucin, . . . . .              | 2.94 |
| Salts, . . . . .              | 6.25 |

3d. Virchow, Cornil, Ranvier, Malassez and de Sinéty, have demonstrated the identity of the vesicular mole with myxomata of other regions.

*Causes.*—The vesicular mole is rare, and is found oftenest in multiparæ of twenty-five to forty years. A molar pregnancy is apparently, to a certain extent, a predisposing cause. As to its etiology, Ruysch, Scanzoni and Graily Hewitt, find it in the death of the foetus; but moles have been found with living children. Virchow attributes it to endometritis,



and this is the generally received opinion in Germany to-day. It is probable that the myxomatous lesion begins in the abundant mucoid tissue of the villosities, and that this tissue becomes infiltrated with fluid.

*Symptoms.*—According to Depaul three symptoms are generally found; but they may be wanting, in part at least: 1st. Rapid and exaggerated development of the abdomen not in accordance with the period of pregnancy (Boivin, Depaul); 2d. Small and frequent hemorrhages of a peculiar character. According to Percy, there is an alternation of small hemorrhagic and watery flows, commencing in most women at the second month, and continuing at longer or shorter intervals until parturition. Gardien observes that the expulsion of hydatids is usually accompanied by hemorrhages and syncopes, and Depaul has observed the same peculiarity; 3d. The expulsion of clusters of vesicles, or of isolated ones.

This pathognomonic sign is unfortunately rare, and when it does occur, it is usually shortly before the expulsion of the entire mass.

*Diagnosis.*—The diagnosis is based upon these symptoms, and is difficult to make. The first symptom occurs in false pregnancies, and with ovarian cysts. The second would lead one to think of cancer of the cervix, and of a vicious insertion. The third is rare, and appears too late.

To make the diagnosis, therefore, both the first signs must be present during the first months of pregnancy, when uterine development is more easily appreciated, and a faulty placental insertion is not likely to be accompanied by frequent hemorrhages.

The older authors did not consider the mole as always due to pregnancy, and claimed that the mammae did not develop. That is not the case, for Cartereau has demonstrated the abundant presence of milk. They said the mother did not feel life; but there are moles where the child is born living, and at term. Finally, the uterus shows the ordinary inequalities, and all the signs of pregnancy, nausea, vomiting, etc., may be present.

*Prognosis.*—1st. *For the Mother*—Is grave. In many cases the mother succumbs, not from the development of the mole, but from hemorrhage. The only instance where death could be attributed directly to the mole is that of rupture of the uterus mentioned by Madame Boivin. The hemorrhages are usually moderate at first, and usually only become serious towards the end of pregnancy, and at the moment of expulsion.

There are several instances on record of women who have had several vesicular moles (Depaul cites one in which it occurred three times); but as a rule, it happens only once, and does not predispose to a recurrence.

2d. *For the Child.*—It is always serious. In the two first varieties, the child is liquified or dead; in the third it is almost always injured and ailing, and ill-prepared for life.

*Treatment.*—We can only treat the hemorrhage as an accident of the pregnancy. General measures and expectant treatment, if it is slight;

tamponing, if it is severe. The expulsion of a few vesicles during the pregnancy does not affect the treatment. If labor has commenced, and the hemorrhage is serious, tampon again if it is thought that the hydatid product cannot be extracted. If, however, that can be done either manually or with forceps, it should be at once resorted to.

Finally, Breslau, Eberth, and Spiegelberg, have described another form which they call diffuse myxoma of the membranes. It consists of a mucoid infiltration of the chorion by a homogeneous mucoid substance with thick fibres, with round or star-shaped cells, partly *physaliphores*. The amnion is thickened, and the intermediate layer but little developed, being completely absent in places. The superior chorional surface shows numerous flattened, slightly fluctuating processes, from pea to cherry sized. A partial myxoma of this kind has been demonstrated by Rokitansky and Winogradow. The latter found a goose-egg sized mucoid mass, soft, trembling like jelly, and absolutely analogous to Wharton's gelatine, some three inches distant from the placenta.

#### DISEASES OF THE AMNION.

Like the decidua and the chorion, the amnion is subject to various lesions ; but there is one of more importance than all the others from its influence upon the mother and the fœtus. We refer to what is known as dropsy of the amnion or hydramnion.

##### *Dropsy of the Amnion.*

Dropsy of the amnion, or hydramnion, consists of an exaggerated collection of fluid in the amniotic cavity. As Guillemet remarks, it is difficult to fix the limit at which the amount of the liquor amnii becomes morbid, since it varies considerably in a state of health. It is, therefore, from the phenomena that result therefrom that, in the absence of any precise point of departure, we decide what is dropsy of the amnion. But these phenomena themselves vary with the individual, and with the rapidity with which the secretion accumulates; so that an arbitrary limit has been fixed upon, and all authors agree that when the quantity of the fluid exceeds 32 to 48 ounces there is dropsy of the amnion.

*Frequency.*—If we followed the statistics we should hold that hydramnion is rare, occurring hardly once in 100 to 150 confinements; but it is really far commoner. Typical cases, with enormous accumulation of liquor amnii are rare, it is true, but a relative abundance is often seen, the ordinary cases passing unnoticed; for the accidents that occur from it depend more upon the rapidity of accumulation than upon the amount of the fluid. This accumulation is usually slow and progressive, and is well borne; but sometimes the effusion is more rapid, and the womb, forced to distend itself suddenly and excessively, rebels, and gives rise to certain peculiar symptoms. Jacquemier and Oulmont only have carefully studied



these cases. We ourselves have seen two, which are described, together with those which we have been able to collect, in our memoir on hydramnion, 1880.

*Etiology.*—We must now return to the theories as to the origin of the liquor amnii. The theories concerning it may be reduced to three: 1st. It is of foetal origin; 2d. It is of maternal origin; 3d. It is of foetal and maternal origin.

1st. *The liquor amnii is of foetal origin.*—We may dismiss the ridiculous theories of Bohn, who derives it from the mammary glands; of Lister, who draws it from the salivary glands; of Warthon, who believed that it was a product of the gelatinous matter of the cord, and even of the lachrymal glands. The following hypotheses are possible: *a.* The liquor amnii is due to secretion from the skin; *b.* It is due to secretion from the kidneys; *c.* It is due to a transudation of the liquid parts of the foetal blood, through the amniotic membrane; *d.* It is a peculiar secretion of the amnion.

*a. The liquor amnii is secreted by the skin.*

This theory originated with Galen. Scherer says that since the vernix caseosa has the same composition; since Schwann found pyine in the foetal skin, and Eicholz mucous matter in the new-born at term; since the umbilical cord produces a larger quantity of water than its return vessels can carry away; that, therefore, the foetal skin excretes a watery fluid. Nevertheless, the liquor amnii is not exclusively produced by the skin, and the presence of the various materials in the amniotic fluid is due to a simple mixture.

Schatz attributes a considerable influence to the skin upon the formation of the liquor amnii during the latter half of pregnancy. The high temperature to which the foetus is subjected causes excessive secretion of the sweat, and the liquor amnii contains the constituents of that secretion. During early intra-uterine life, before the sudoriporous glands are formed, the liquid parts of the foetal blood transude through the integument. Bar denies this, since he never found ferrocyanide of potassium, injected into the veins of a pregnant rabbit, in the liquor amnii.

*b. The amniotic fluid is due to the urinary secretion and to the excretion of the urine by the foetus into the amniotic cavity.*

Gusserow claims, that since there must be in the foetus an exchange of nutritive materials and activity of function, after the obliteration of the allantois at the second month, the urine must flow into the liquor amnii; and urea and ammonia, absent at first, increase in quantity in the liquor amnii as pregnancy progresses. The amniotic fluid is thus a foetal secretion.

That the foetus does secrete urine is incontestible, and, as Bar has remarked, may be demonstrated in three ways: 1st. By anatomical observation, showing that the kidneys functionate normally during uterine life,

since urine is almost always found in the bladder at birth; 2d. By pathological observation, which teaches us that, when there is obliteration of the urinary passages, hydronephrosis of greater or less extent occurs. The kidneys are normal, save where modified by the pathological process, and the liquid contained in the urinary passages has the chemical composition of urine. If, in these cases, the amount of liquor amnii is not diminished, it is simply because the excretion of urine is not the only source of the liquor amnii. Finally, uric acid infarctions have been found in the kidneys of infants. 3d. By experiment, Fehling, Gusserow and others have shown that certain medicines either absorbed by the mother, and thus passing through the placenta, or injected directly under the foetal skin, could be refound in the urine of the foetus; 4th. By the chemical composition of the liquor amnii.

Prochownick has studied the chemistry of the fluid, and has proved the presence of urea, and concludes that the liquor amnii is an exclusively foetal product, and is derived from the nutritive materials of the foetus. The quantity of urea should therefore be proportionate to the energy of nutritive interchange. In point of fact it increases largely as pregnancy advances, and the kidneys begin to functionate. He therefore concludes: 1st. The liquor amnii always, after the sixth week of pregnancy, contains urea; 2d. It is produced by the skin and kidneys of the foetus; 3d. The quantity of urea during the last third of pregnancy is proportionate to the length and weight of the foetus.

In a second chapter he proves that the liquor amnii contains chloride of sodium, and from a quantitative analysis of the liquor amnii, he concludes: 1st. The liquor amnii is exclusively a foetal product, and is the product of the interchange of foetal nutritive materials; 2d. It is secreted by the skin and the kidneys; 3d. The secretion by the skin begins early in pregnancy; that by the kidneys commences only at its middle; 4th. The amnion is a serous membrane, and can absorb; 5th. This absorption becomes more and more easy as pregnancy advances; 6th. The concentration of the amniotic fluid increases during the first half of pregnancy, decreases rapidly at its middle, and thus remains about the same until its termination; 7th. The amount of the fluid at various times will be noted later.

Fehling holds that the albumin in the liquor amnii precludes the possibility of its being a purely urinary secretion, since there is none in the urine of living children, and that there is no more urea in the fluid of the amnion than in other serous fluids.

*c. The liquor amnii is due to a transudation of the fluid portions of the blood through the amniotic membrane.*

Both Monro and Lobstein have seen fluid percolate through the internal surface of the amnion after injecting hot water into the umbilical arteries; and Jungbluth has found a minute capillary net-work, which he



calls the vasa propria, in the superficial placental layer nearest to the amnion, which is almost always obliterated in the later months of pregnancy. This he considers as the source of the liquor amnii, and hence it is that that fluid is nearly identical with blood serum in composition. An excess of pressure in the foetal circulation will cause a transudation into the amniotic cavity from this capillary plexus, although of course, when we consider the length of the cord and the multiplicity of its spirals, the arterial pressure can be but feeble.

Gassner considers Jungbluth's explanation as only partially sufficient, since the liquor amnii increases during the second half of pregnancy, when this capillary plexus has been obliterated. The foetal urinary secretion explains its continued increase, and explains the cause of Gassner's law, that the quantity of the fluid is proportional to the weight of the foetus. Thus the relative quantity of albumin decreases in the urine-diluted fluid, and therefore, in cases of occlusion of the foetal urinary passages in the later months of pregnancy, the liquor amnii is absent or nearly so. But while Jungbluth's theory will explain certain cases of dropsy of the amnion, there are others that it will not explain.

Lebedjew seeks to answer the following two propositions: 1st. Does there exist, in the limiting chorionic layer of children at term, in cases of dropsy of the amnion, the capillary net-work described by Jungbluth? 2d. What circumstances determine this persistence of vascular permeability which is absent under normal conditions?

Lebedjew has proved microscopically the existence of this plexus in a case of hydramnion with a dead child; but there existed aortic stenosis, hypertrophy of the right ventricle, and consequently stasis in the inferior vena cava. This obstruction to the flow would be transmitted to the placenta through the portal and umbilical veins. This probably interfered with the obliteration of the plexus in question, and determined the increased transudation. Lebedjew claims that dropsy of the amnion is due primarily to a foetal anomaly, and hence arises the large mortality in these cases.

Sallinger holds that the amniotic fluid is derived exclusively from the foetal circulation; coming at the commencement of pregnancy from the foetal skin, later from the cord and the vessels of the foetal placenta, and only towards the end, in greater or smaller quantity, from the kidneys. Only a small amount of fluid is derived, during the early months of pregnancy, from the skin, which soon becomes covered with epidermis, and secretes less freely; the greater part of it is due to the resistance that the foetal circulation encounters in the placenta, and in the cord. Excess of resistance will cause dropsy of the amnion; and clinical observation shows that obstruction of the veins that bring blood to the foetus, either in the placenta or the cord, or at the umbilical ring or in the liver, is the cause of the affection.

Sallinger thus holds that hydramnion is due to mechanical disturbances of the foetal circulation, or to variations in the entire mass of the foetal blood, and not, as Jungbluth says, to special anatomical conditions of the placenta. He performed a series of experiments, which tended to prove that the liquor amnii, whether in normal or abnormal quantity, is a direct product of transudation from the umbilical vein and from its ramifications in the placenta. Taking healthy and untorn placentæ, and introducing a canula into the umbilical vein, he injected under a constant pressure pure water and defibrinated bullock's blood. The injected liquids transuded through the amnion with great rapidity; thus:

1st. With a pressure of 36 inches upon the single vein of a small cord, there passed in one hour 25.43 grains.

2d. With the same pressure and a thick cord, 28.91 grains.

He once employed the double placenta of twins, and obtained:

3d. With a pressure of 36 inches on both veins together, 56.31 grains.

4th. With a pressure of 74 inches on the vein of the thick cord, and of 36 inches on the vein of the thin one, in half an hour, 60.94 grains.

5th. With a pressure of 50 inches upon the thin cord, and of 36 inches upon the thick one, in half an hour 75.61 grains.

6th. With an equal pressure of 50 inches on both, in the same time, 50.68 grains.

Bar has repeated these experiments of Sallinger, and concludes with him:

1st. Under a certain pressure the fluids contained in the umbilical vein may transude into the amniotic cavity.

2d. Under an equal pressure fluids will not transude through the walls of the umbilical arteries.

These two theories each have their partisans and their adversaries. Thus, Winckler has never been able to prove the existence of Jungbluth's capillary plexus, but believes that there is a lymphatic plexus in the cellular layer of the chorion, which opens freely into the cavity of the egg through the amniotic epithelium, exactly as occurs in the diaphragm. These canaliculi are the source of the fluid in dropsy of the amnion. A considerable dilatation of these lymphatic vessels has been found by Winckler in a case of hydramnion complicated with foetal rachitis.

Levison and Gusserow support Jungbluth's theory. The former, by means of injections into the vessels of the umbilical cord, found the capillaries well developed in the membranous lamina of the placenta of prematurely born infants, while in those born at term, there was none; but in cases of hydramnion, either at term or before it, he found it very abundantly developed.

He admits the presence of the lymphatic vessels which, with Winckler, play the part of the vasa propria of Jungbluth. May not, he asks, disturbances of pressure in the foetal circulation prolong the permeability of



the vasa propria of the placenta, and thus increase the amount of liquid that passes through them.

Weil and Waldeyer also admit the existence of Jungbluth's vasa propria. Bar contests their existence, claiming that Jungbluth never described them as being in the amnion, but only as being in contact with its lower surface, being situated below it. He denies the correctness of the designation vasa propria, especially as in the amnions of some of the lower animals there exist true proper vessels. The branches of the umbilical vein that ramify over the foetal surface of the placenta, give off a capillary plexus that ramifies and anastomoses with itself, and then penetrates the placental tissue. Injected with a colored fluid, the plexus becomes visible to the naked eye.

We, ourselves, have found a venous net-work applied to the deep face of the placenta; but never a capillary one. Nor have we ever been able to inject it with prussian blue. Nevertheless, we do not absolutely deny its existence. We have, ourselves, seen in cases of dropsy of the amnion a considerable turgescence of the branches of the umbilical vein; we have even in one case seen the chorionic vessels more largely open than in the normal state; but Jungbluth's description certainly does not apply to all cases of dropsy of the amnion, and permeability of the vasa propria, to the end of pregnancy, cannot be the sole cause of the affection. For: 1st. If the vessels are obliterated at the middle of pregnancy, how can the quantity of the liquor amnii increase continuously until the time of pregnancy? 2d. We have been unable to demonstrate the capillary plexus in some cases of dropsy of the amnion.

As to Winkler's theory of a sub-amniotic capillary plexus, Bar rejects it also.

*d. The fluid is a peculiar secretion of the amnion.*

The amnion, according to Hotz, is often covered with a layer of cylindrical cells, and Kölliker records a case in which there were many amniotic caruncles. But their function is still entirely unknown.

2d. *The amniotic fluid is a product of the maternal organism.*—Ahlfeld claims that in consequence of the eccentric hypertrophy of the uterus, the pressure upon its contents is less than the abdominal pressure; and since it is a closed cavity, the maternal blood must necessarily flow into it. This negative pressure diminishes progressively up to the third month, when it ceases, the contents thenceforward developing equally with the organ itself. The serosity, in passing from the vessels to the egg, traverses the pores of the chorion and of the amnion, and the author has been able to prove the existence of blood-coloring matter in these pores, which had traversed the chorion and had penetrated to the epithelium of the amnion.

Léopold agrees with Ahlfeld so far as the first months of pregnancy are concerned; and Zuntz, whose experiments have proved that substances injected into the maternal vessels may pass into the liquor amnii without

going through the body of the fœtus, believes that, at least in part, the liquor amnii is derived from the maternal blood. Wiener and Bar have repeated Zuntz's experiments, and have arrived at the same conclusions.

3d. *The fluid is derived both from the mother and from the child.*—This is Virchow's opinion; he holds that the fœtal portion is composed of the vernix caseosa and renal secretion, the rest being essentially a maternal transudation.

As we see, theories are not wanting; but the real cause of dropsy of the amnion remains to be found. Whether we admit that the liquor amnii comes from the mother, or whether we believe, as is the more probable supposition, that it is produced by the fœtus and the membranes, it in no way explains the occurrence of dropsy of the amnion. The following facts are to-day incontestible, and have been proved by various observations.

1st. Dropsy of the amnion coincides very frequently with twin pregnancy.

2d. Children born with the complication of dropsy of the amnion are often the subjects of malformations and monstrosities.

3d. A certain number of women who have dropsy of the amnion are syphilitic, and their children, born dead or living, show unmistakable signs of the disease. Finally hydramnion is very rare in primiparæ, and seems to be especially liable to occur after a certain number of pregnancies.

Mac Clintock, in 33 cases, found primiparæ 5; second pregnancies 8; third to twelfth pregnancies 20.

As to twin pregnancies, the following figures will suffice:

Oulmont, in 14 cases, had 7 twin births.  
Guillemet " 28 " " 15 " "

Sallinger in 81 cases, had:

|                |                   |              |    |
|----------------|-------------------|--------------|----|
| Primiparæ, 19; | Multiparæ, 49;    | Unknown, 13. |    |
| Primiparæ, 19, | { 1 single child, | . . . . .    | 10 |
|                | { 2 children,     | . . . . .    | 9  |
|                | { 1 single child, | . . . . .    | 31 |
| Multiparæ, 49, | { Twins,          | . . . . .    | 16 |
|                | { Triplets,       | . . . . .    | 1  |
|                | { Quadruplets,    | . . . . .    | 1  |
| Unknown, 13    | { 1 single child, | . . . . .    | 10 |
|                | { Twins,          | . . . . .    | 3  |
|                |                   |              | —  |
|                |                   |              | 81 |

Thus, in 81 cases there were :

|                     |           |    |
|---------------------|-----------|----|
| Simple pregnancies, | . . . . . | 51 |
| Multiple " "        | . . . . . | 30 |
|                     |           | —  |
|                     |           | 81 |



In the 114 children, 1 of which was a case of extra-uterine pregnancy, there were: girls, 23; boys, 38; unknown, 53.

Can we explain the coincidence of dropsy of the amnion with twin pregnancy? Is it exaggerated uterine development, or the stretching of the membranes, or compression of one fœtus by the other, or is there anything peculiar about the circulation or the blood pressure, or in the arrangement of the placenta and membranes that accounts for it? It is impossible to say. We know that there may be one of four conditions present in these twin births:

1st. A single placenta, chorion, and amnion, with a communication between the two fœtal circulations.

2d. A single placenta, chorion and amnion, with an almost constant communication between the two circulations; or one chorion and two amnions, with a rarer communication.

3d. Two isolated placenta, united by a membranous bridge; rarely communication between the two circulations; often two chorions and two amnions.

4th. Two entirely distinct placenta, two chorions and two amnions; no communication between the two circulations.

Frankenhauser only seems disposed to admit hydramnion as possible in cases where there exists a communication between the two fœtal circulations. In consequence, he claims that the cardiac activity of the stronger fœtus causes cardiac stasis in the weaker one, and hence increased transudation on that side. Schatz agrees with this opinion, and says: "The child that has the more powerful heart will have the greater arterial pressure, will secrete more urine, and have more liquor amnii." To this Sallinger rightly objects that in that case we should have hydramnion in twin pregnancy with an acardiac fœtus; whereas this has not been found.

Every variety of malformation has been found with dropsy of the amnion, from hydrocephalus and spina bifida, to anencephalus, harelip, clubbed feet and hands, double monstrosities, etc. Internal deformities, malformations of the heart, imperforate genital organs, etc., have also been noted.

And if some of these malformations, such as an imperforate urethra, will explain hydramnion, the others will not do so, and we must return to the opinion of Burns, who said: "Dropsy of the amnion is a disease of the egg, and not of the mother; the fœtus is often deformed, and the affection must be considered as a species of monstrous conception." As to syphilis, Burns, in 1839, had already proved that hydramnion might occur with syphilis of the father or the mother. Fournier has recently again called attention to this relationship, as have Bourgarel, Preel, Depaul, Guéniot, Charpentier, Sallinger, etc.

In some cases of hydramnion with syphilis, the fœtus shows indubitable marks of the disease; but in others neither fœtus, placenta, nor mem-

branes showed the least sign, and we are compelled to admit the efficiency of the maternal influence. To these three main facts—twin pregnancies, foetal malformations, and syphilis—we must add lesions of the ovum and membranes of various kinds.

In the four cases of syphilis we observed in two years of clinical service, there was but a single case of dropsy of the amnion. The woman had dropsy of the amnion in 1875, has since had two healthy children while under specific treatment, and is at the present moment *enceinte* for the fourth time, and shows a small amount of amniotic dropsy.

The anomalies of the cord may cause a stasis in the venous circulation of the placenta.

Hildebrandt has noticed the connection between these anomalies and the hydatid mole; indeed the hydatid mole is often accompanied by a large amount of liquor amnii.

Among these anomalies of the cord, Sallinger notices: Extreme thinness; exaggerated torsion; cystic degeneration; stenosis of the umbilical vein; rings of the cord.

There may be also cartilaginous and hepatic degeneration of the placental tissue, fibro-myxoma of the placenta; atrophy of the placenta; hypertrophy of the placenta; abnormality of the hepatic circulation. On the side of the mother there may be hydræmia, tumors, especially fibroids, and carcinoma uteri.

As to the membranes themselves, they may be the seat of a multitude of inflammatory and other lesions, concerning which we have recorded a number of observations in our *Memoire*.

Finally, Gervis decided that the liquor amnii came from the amnion, and its excessive accumulation was due to serous extravasation. In most cases we can detect either: 1st. Inflammation of the amnion; 2d. A hypertrophic and morbid decidua, the amnion remaining healthy; the foetus is compromised, and abortion is imminent; 3d. Dyscrasias of the maternal blood, such as cause serous transudations in other parts of the body.

*Symptoms.*—By dropsy of the amnion, we mean a disease in which the amniotic cavity contains an abnormally large amount of fluid. It may exist alone, or be accompanied by other dropsies, as ascites (Scarpa); and it shows itself in two forms, sufficiently distinct, though not very sharply divided from one another. One is the slower, classical form; the other, more acute, has been described by Oulmont and Jacquemier. The symptoms are different enough to justify expectant treatment in the one case, and to call for active interference in the other. Let us first describe the symptoms of the ordinary classical dropsy of the amnion.

Gassner has found that there is, on the average,

|              |            |                    |
|--------------|------------|--------------------|
| At 7 months, | 32 ounces, | } of liquor amnii. |
| “ 8 “        | 43 “       |                    |
| “ 9 “        | 54 “       |                    |
| “ term,      | 60 “       |                    |



This quantity is doubled in twin pregnancies. The figures, of course, are not by any means exact. Gassner also found that, in general, the amount of liquor amnii increased proportionately with the weight of foetus and placenta. The amount of fluid present with hydramnion is very variable. Sallinger has collected the following cases: Schneider, 60 pounds, 24 pints; O. Reilly, 48 pounds, with 20 pounds of ascitic fluid; Hansen, over two buckets full; G. de Gorregues Griffith, 40 pounds; Battson, 32 pints; Haerlin, 30 pounds; Klink, more than a bucket full; Pelletan, 2½ pounds; Werner, 15 pounds; Rouger, 15 pounds; Martin, 14 pounds; Ridder, 14 pounds; Ramsbotham, 15 pounds, with 25 to 30 pounds of ascitic fluid; Valenta, 5 pounds; Fabrice de Hilden, 27 pounds; Sallinger, 30 pounds.

It thus takes five pounds to cause trouble during pregnancy and childbirth; but as a rule the amount varies between 10 and 60 pounds.

Usually the disease does not commence before the fifth or sixth month of pregnancy, although it occasionally appears earlier. Thus the case of Fabrice de Hilden dated from the beginning of pregnancy; those of Scarpa, Schneider, Hahn, Depaul, and Menschler, from the end of the second month; those of Martin, Pelletan, and Guéniot, from the third month; that of Rausch, Werner and Rouger from the fourth month, and that of Seulen from the fifth month.

The first symptom is the appearance of persistent vomiting, followed by general enfeeblement, and marked emaciation. But these symptoms are not constant, and much more characteristic are the pains, which are seated sometimes in the belly, sometimes in the hypogastrium, or even in the sacral, inguinal, or lumbar regions; they are usually continuous, though they may be intermittent and take on the character of uterine contractions. They do not appear, usually, until pregnancy has advanced to a certain point.

Then comes a rapid and exaggerated development of the abdomen, accompanied by thinning of the uterine parietes, and by fluctuation. This sensation of fluctuation is never seen in normal pregnancies, and has been found so pronounced as to have been mistaken for ascitic fluctuation. More often, however, there is a sensation of false fluctuation, exactly like that experienced in cases of ovarian cysts. We will return to this subject when we come to speak of diagnosis.

The abdominal development usually begins early in pregnancy, but does not become very marked until after the fourth or fifth month. Although it advances rapidly, and out of all proportion to the supposed stage of the pregnancy, it progresses evenly, and may reach an enormous development. Hence the morbid symptoms are not very intense, and it is only after the disease has existed for some time, that the women begin to suffer much. The uterus, in fact, does not react very energetically against the progressive liquid accumulation. Hence the relative tolerance to and benignity of the affection.

In consequence of the abdominal distension and increased intra-abdominal pressure, œdema appears. It may be limited to the lower limbs, or appear on different parts, such as the genitals or the abdominal wall. But its consequence may be more serious, and ascites appear. Œdema is not a constant symptom, and is absent in many well-pronounced cases.

In consequence of the great abdominal distension, other symptoms appear indicative of compression of the lungs: dyspnœa, oppression, engorgements of the base of the lung, œdema pulmonum, with syncopes and asphyxias, and in some cases even real hemorrhages.

Cardiac palpitation naturally ensues, and the pulse becomes small and frequent.

The urine is diminished in quantity; it is thick, reddish, and more or less highly charged with albumin. A dysuria more or less pronounced appears at the same time; and in rare cases there may be some icterus.

Constipation is the rule. Then nervous troubles appear, vague neuralgic pains, especially marked in the lower limbs.

Insomnia, with agitation and depression of spirits, may now appear; and in some rare cases psychic troubles, delirium, trismus, and even eclamptic attacks may follow.

It is a curious fact noticed by Sallinger, that in most cases there is no fever.

The extreme distension of the abdomen causes thinning of the uterus, the vagina is shortened, the cervix effaced, and often partly open. The presenting part is very mobile, and ballottement is very marked.

The foetal heart-sounds are usually feeble; they change their place, and sometimes become inaudible towards the close of pregnancy; in some cases they may never have been perceived.

The hyper-distended membranes are often ruptured too early, and premature labor occurs.

Finally, metrorrhagia is common during pregnancy, and occurs during labor, and especially after delivery from uterine inertia. Such are the principal symptoms of dropsy of the amnion; but we must consider some of them more in detail, especially the abdominal tumor, and the sensations obtained by palpation.

The shape of the abdomen is peculiar. In the place of a distinct protuberance surmounted by a depression, the belly is evenly swollen, especially in front, while the lateral portions appear to be depressed.

In some cases Guillemet has noticed peculiar deformities. Thus he has seen the uterine volume so considerable, that the upper part of the abdomen projected in front of the sternum, and the sides of the abdomen swollen out with a deep cleft in the middle, so that it resembled the heart in a pack of cards. We may notice in addition a supra-pubic œdema, often considerable, and finally, that this form of belly remains the same, whatever be the position taken by the woman.



There is a large area of dull percussion, sometimes occupying almost the whole abdomen, and tympanitic intestinal percussion can only be found at the sides, where a sonorous and fixed percussion note will be found when the distension is large.

Palpation gives different results according to the intensity of the disease and the time at which it is practised.

At the beginning, the uterus is readily appreciable to the hand through the soft abdominal walls. Later, they not only become harder, but the distended uterus is so intimately applied in some cases to the abdominal walls, that it is only to be distinguished from it by its faint contractions. The abdominal walls are sometimes very œdematous, sometimes thinned out and very white and pale; or the skin may be covered with reddish or bluish blotches, and appear ready to break. In the first case the sense of fluctuation, and the perception of the foetal part, will be nearly or quite imperceptible to the touch; in the other case, fluctuation may be so distinctly perceived that the fluid appears to be contained in the peritoneal cavity.

Fluctuation may be absent entirely. (Chereau.) It is the same precisely with the recognition of foetal parts. Sometimes ballottement is very easy, and sometimes it is very difficult to obtain. Besides the difficulties created by the distension of the abdominal wall, the distension of the uterus itself is of great importance; and when the dilatation of the organ is great, and the foetus is small, it is often difficult to feel it, and to appreciate its presence. Twin pregnancies, and death, which alters the density and firmness of the foetus, increase these difficulties. The same things apply to the vaginal touch. It is true that, in most cases, vaginal ballottement is very easily obtained; but in some cases it cannot be gotten at all. The finger feels a soft mass filling the vagina, or an elastic and hyper-distended pouch, but no presenting part is appreciable.

Finally, the exaggerated sensibility of the abdominal walls, which are sometimes so tender that patients can hardly bear the weight of their clothes, is an obstacle to palpation; and the œdema and tenderness of the genitals make a vaginal examination so painful, and the sensations are so incomplete, that the perception of the foetal parts, if not impossible, is extremely difficult. The other symptoms we will find more marked in the acute form of dropsy of the amnion.

Besides this, which we may call the classical form of the malady, and which is relatively common, there is another, which is much rarer, and of which we have only been able to collect twenty-one cases, two of which we ourselves have seen.

Nevertheless, we believe that we can justify our division of the rapid cases from those that we call the classical ones. One prime fact confronts us; and that is that, while in the ordinary form the dropsy takes several months to attain its maximum, in the other it takes only from a few days

to three weeks at the utmost for the belly to be enormously swollen, and for symptoms so grave to appear that the life of the woman, as well as that of the product of conception, may be compromised. For while, in the first instance, the uterus has time to accustom itself to the distension, in the second case it is suddenly invaded by the enormous liquid accumulation, and reacts against it.

And here we meet a second difference. While in the classical hydramnion fever is so exceptional that Sallinger only found it recorded in two out of the eighty-one cases he collected, it is the invariable rule in the second class, and gives the disease an inflammatory appearance. Acceleration of the pulse, and increase of the temperature, have never been absent in a case of acute dropsy of the amnion. (See observations of Charpentier, Cerné, Sentex, etc.)

Authors have, therefore, sought to attribute acute hydramnion to inflammation of the membranes.

Besides these distinctive points there is a third; in acute dropsy the symptom of vomiting assumes an exceptional intensity and gravity. In the two cases that we have seen, it was so severe that the patients could eat nothing at all. The vomit is at first composed of food, then of mucus and bile; very great abdominal pains, with a feeling of heat and burning, accompany it, and reduce the patient to a condition of most alarming debility.

Alimentation becomes almost impossible; milk, bouillon, alcohol, nothing can be retained; the woman loses flesh with extreme rapidity, and the contrast between the volume of the stomach and that of other parts of the body is very striking. The shrivelled face, the hollow eyes, brilliant with fever, and the pinched and tightly drawn lips, sufficiently indicate the serious condition of the sick woman.

At the same time, the pains are characteristic in their extreme intensity; occupying the entire abdomen, they shoot down into the loins and thighs. They cease neither day nor night, depriving the patient of all sleep, and are exacerbated by movement on her part. The dorsal position does not ease her, and she can neither stand nor sit; she lies crouched in bed, in the most curious positions, writhing occasionally under exacerbations of the pain. She weeps and sighs, piteously demands relief, and cries out inarticulately. Treatment is useless; neither quinine nor opium, nor chloroform, nor chloral, nor morphine injections are of avail. The pains keep the patient in a perpetual state of agitation; the fever and the pain increase continuously as the belly is distended. Deprived of sleep, and with a constant fever, with frequent vomitings and exacerbations of pain, the woman soon sinks into a state of profound exhaustion, and cries loudly for the relief which it seems impossible to give her.

The abdominal distension increases continuously. Although it attains an enormous size in a few days, it grows steadily though more slowly after



the first outburst, until it reaches proportions that are frightful. Especially is this the case in twin pregnancies. Œdema of the abdominal walls, especially marked above the pubis, where the skin forms a kind of sac, adds to the distress, and, causing swelling of the labia majora and minora, interferes with micturition. The urine itself is scanty, dark in color, and turbid, and contains a variable quantity of albumin.

Usually, after a certain time, the patient feels other abdominal pains, which, from their intermittent character, are readily recognized by multiparæ as uterine contractions. Although not a constant phenomena, this is, as we shall see, of great value in diagnosis.

The abdomen has now assumed the form that we have described in the more ordinary variety of hydramnion; but palpation is almost impracticable from the pain it causes the woman. Where it can be employed, it does not give us the same results as regards ballottement and fluctuation as it does in the other cases.

If the abdomen is very œdematous, palpation is useless. If it is not œdematous, we feel the uterus as a thin-walled mass, which gives to the finger an elastic sensation, but no feeling of fluctuation, exactly as an extremely distended ovarian cyst would do. It is in vain that we search the mass for foetal parts. Percussion and auscultation give only negative results, and, if we have not studied the disease from the beginning of pregnancy, we are liable to make grave errors in diagnosis. As to volume, the abdomen may take on enormous dimensions. In our second case, at 5½ months, the abdomen measured 52.8 inches.

In some cases, as in this one, the abdomen permits a special sensation to be perceived, which enables us to establish the diagnosis, though several examinations are necessary for the purpose. Thus, at our first visit, the uniformly distended abdomen allowed us only to feel, in the right iliac region, a hard and specially painful point, which gave the sensation of a thick-walled multilocular ovarian cyst. At the second examination, made two days later, on gently palpating the abdomen, which had in the meantime increased  $\frac{1}{4}$  of an inch in circumference, we first found again the same sensation. But on palpating in the right iliac region, we found the sensation of hardness to increase under the pressure, diminishing markedly as it was relaxed. At the same time, this hard point seemed to increase in extent, and, prolonging itself towards the upper part of the abdomen, gained the epigastric depression by a curved track; and on placing the left hand on the epigastrium, it was plainly felt to become harder. Then the abdomen appeared to change a little in shape; it gradually became more prominent in front, the lateral portions becoming depressed. This sensation of a contracting organ could be given by nothing but the uterus, and decided the diagnosis. It is easy to understand the importance of this sign, which of course will be more difficult to appreciate where dropsy of the amnion is complicated with ascites.

The intestine shares in the general derangement. Usually there is a more or less obstinate constipation, sometimes interrupted by a diarrhœa which may persist for several days.

The vaginal touch, which apparently should give us definite information, and does so in certain cases, is insufficient in others.

The marked œdema of the external genitals interferes with the introduction of the finger, and limits the field of exploration. The changes in the cervix are sometimes difficult to appreciate at three months. At the fundus vaginæ, we feel only a more or less elastic mass, which might as well belong to an ovarian cyst as to a uterus distended by one or several fœtuses. The fœtus cannot be reached, nor can the change from the neck to the inferior portion of the uterus be appreciated by the finger. The only thing that we can be sure of is that the uterus is fixed and the cervix but little developed. Rectal touch did not, in our second case, give us any more exact information. The vital importance of a precise diagnosis for the woman, is, however, easily appreciable. Happily, in most cases, the diagnosis of pregnancy has been made beforehand, and the field of error is thus limited.

Thus acute dropsy of the amnion differs in its symptoms and its course from the slower form, and it is liable to cause errors of diagnosis, which may have most serious consequences for the patient. For energetic treatment will not only relieve them, but will remove the threatening dangers; while they will surely succumb if the disease be left to its own course.

Happily, nature herself sometimes effects a cure by means of premature labor; but in only too many cases the contractile power of the uterus is much impaired by the distension; and then the obstetrician must interfere, and, by perforating the membranes, bring on the labor.

*Diagnosis.*—The diagnosis of dropsy of the amnion presents several points for examination: 1st. The recognition of pregnancy; 2d. The determination whether it is single or twin; 3d. The recognition of dropsy of the amnion, and its differentiation from hydrorrhœa, ascites, the vesicular mole, and ovarian cysts; 4th. The determination of the cause and the nature of the dropsy.

1st. *The Recognition of Pregnancy.*—This is sometimes difficult in normal cases, and it is not astonishing that it should be more so in cases complicated with hydramnion. In ordinary pregnancies we have, besides the probable signs, only active fœtal movement, the fœtal heart-beat, and ballottement as positive evidences of pregnancy. The first of these, active fœtal motion may easily, in dropsy of the amnion, escape the notice both of the mother and of the accoucheur. Lost, so to speak, in the liquor amnii, the movements of the child are not transmitted to the abdominal walls. Then, the fœtus being so moveable, its heart-beat, as we have seen, is not constant at any one point even when alive; and when it is dead, both this and the preceding sign fail entirely.



Luckily, it is not the same with ballottement, which, in cases of hydramnion, assumes a capital importance. It is in fact more readily perceived than usual, whether practised by the abdominal or by the vaginal method. But even ballottement may sometimes be absent, and then it is only by a careful consideration of the *ensemble* of the symptoms that a conclusion can be reached. Usually, however, ballottement is easily appreciated, and by that sign, with fluctuation, the diagnosis must be established.

2d. *The Determination between twin Pregnancy and Dropsy of the Amnion.*—Both cases give us exaggerated abdominal enlargement; but in twin pregnancy there is hyper-enlargement from the beginning of pregnancy, while in hydramnion the first months of pregnancy pass normally, and the rapid and excessive distension comes only later.

In twin pregnancy, also, the peculiar shape of the abdomen, with its increased transverse diameter, and the presence of similar fœtal parts on opposite sides of the abdomen, are peculiar. In some cases the belly appears to be divided into two lobes by a vertical furrow, especially on top, and the shape is characteristic.

In dropsy of the amnion, on the contrary, the shape of the abdomen is globular and more regular. The uterus is uniformly distended, and its vertical diameter is almost always greater than is its transverse measurement.

Of course, twin pregnancies are frequent in dropsy of the amnion, and it must be recollected that these signs are by no means absolute.

In twin pregnancies, fœtal mobility is always more or less interfered with; the parts that are appreciable by palpation are difficult to displace, whereas all authors agree that the size of abdominal ballottement is obtained with great ease in hydramnion. The same holds true for vaginal ballottement. Baudelocque and Levret had already called attention to the fact that, while in twin pregnancy, ballottement is incomplete or absent, both it and the *choc en retour* are obtained in dropsy of the amnion with great facility. Depaul mentions another sign, which he has been the first and only one to recognize: "On examining by the touch the membranes that project from the os, he has twice encountered a depression or furrow upon them, which divides the amniotic cyst into two parts; he was thus enabled to recognize the two eggs placed side by side." The supra-pubic œdema, regarded by some as of value in the diagnosis of twin pregnancy, may exist in cases of single pregnancy complicated with dropsy of the amnion; nevertheless, it should be regarded with attention, for a number of cases of hydramnion in which it occurred were also cases of twins. One extremely important sign for the diagnosis of dropsy of the amnion is fluctuation, since it is never met with in simple twin pregnancies. It is an absolute sign, but unfortunately it is not always present, and when it is, it may be due to a dropsy other than that of the amnion, such as ascites.

Auscultation usually enables us to establish the diagnosis of twin pregnancy, while the foetal heart-beats are obscure, fugacious, mobile, or even undetectable in cases of hydramnion.

Auscultation enables us in twin pregnancies to determine the existence at two different points on the abdomen of two hearts of different rhythms, and between which a point can be found where the two hearts are heard with a minimum of intensity, which increases as you proceed in either direction towards the points of maximum intensity, before ascertained.

The diagnosis is far more difficult when the foetus is dead; for we are forced to rely upon palpation alone, and the modifications of the uterus are such that the very existence of pregnancy may be a matter of doubt. When dropsy of the amnion has complicated twin pregnancy, as has been often the case, the latter diagnosis has usually not been made. The dropsy has been diagnosticated early, but the presence of a second foetus has only been known after the expulsion of the first.

We think that, in these cases, very great importance is to be attached to the supra-pubic oedema; it does indeed exist in almost every case of twin pregnancy, and its presence should always awaken a suspicion of it when dropsy of the amnion is present.

In our case, where there was both twin pregnancy and acute hydramnion, this oedema was very marked; but it was accompanied by a general oedema of the abdominal wall, and of the genital organs. We must confess that we recognized the complication without thinking of the existence of twin pregnancy, which was noticed by Dr. Savornin, whom we had called in to see the patient.

There remains for us to consider the differential diagnosis between hydramnion and the diseases which may be mistaken for it, hydrorrhœas, ascites, ovarian cysts, and vesicular moles.

It would seemingly be difficult to confound hydrorrhœa with hydramnion. Hydrorrhœa is characterized by a flow of watery fluid, occurring during pregnancy, and usually first coming on during the night. There is generally, after the first outburst of fluid, a slower and continuous loss. The material that escapes is clear, has a spermatic odor, and stains the linen. The flow may be intermittent, or continuous, or come drop by drop. As a rule, there is no pain, though Naegelé, Belfinger, and Cheston have recorded cases in which there was. Rare before the fourth, it is usually at the end of the fifth or sixth month that hydrorrhœa occurs. Recurring generally three or four times during the pregnancy, hydrorrhœa may persist after delivery, and replace the lochia (Mauriceau, Naegelé, Dubois). The os remains closed, and if there are uterine contractions, they are regular and general. If nature be allowed to take its course, whatever pain may be present generally ceases, and the pregnancy advances normally. The flow of false water does not diminish the amount of normal liquor amnii present at birth, nor does it ever contain particles



of sebaceous matter. The diagnosis from ascites may be more difficult, especially if the ascites complicates pregnancy.

In simple ascites, besides what can be ascertained by palpation, auscultation, and the vaginal touch, and besides the absence of positive signs of pregnancy, the abdomen is peculiarly flattened and widened laterally, and fluctuation is very readily perceived. There is absolute flatness over the lateral portions of the tumor, with an intestinal tympanitic percussion note over the superior, anterior, and median portions.

This flatness varies of course with the position of the patient, the intestines being always uppermost. There is no ballottement, nor can foetal parts be felt. Œdema of the lower portion of the abdomen is often present, and finally we find in the heart, liver, or kidneys, evidences of the lesion that has caused the ascites.

If the ascites complicate pregnancy, the diagnosis is more difficult. The fluctuation is more readily perceived in the upper than in the lower part of the abdomen, and the fluid is displaced according to the woman's position.

But when ascites exists with hydramnion, the diagnosis may be very difficult; and this explains the errors that have occurred.

Robert Lee says: "The diagnosis of hydramnion with ascites is very difficult. Fluctuation is distinct, but it does not tell us whether the fluid is in the peritoneal cavity, or in the amniotic cavity, or in both places. The presence of fluctuation, therefore, is not a certain evidence of the existence of the affection, and the only way to arrive at a precise diagnosis is by means of the vaginal touch. This enables us to determine whether the uterus has undergone changes consecutive to impregnation, and also whether there is an excessive amount of liquid within the membranes of the ovum. This will be shown by the almost entire effacement of the cervix, by the development of the body of the uterus, and by the sensation of vaginal fluctuation upon abdominal percussion." In ascites complicated with pregnancy, Scarpa has observed that the symptoms are different from those of hydramnion. "The large collection of fluid interferes with our recognition of the regular form of the fundus and body of the gravid uterus. The urine is diminished and lactescent, thirst is constant. There is obscure fluctuation in the hypogastric region, more distinctly perceptible in the hypochondrium, between the edge of the rectus muscle, and the false ribs."

Scarpa thereupon maintains that puncture of the pregnant uterus is not as serious an operation as has been maintained by Chambon, and cites the observations of Bohn (pregnancy mistaken for ascites), of Camper, Langius, and especially Nessé: (Dropsy of the amnion at the fifth month. Paracentesis at the linea alba, midway between umbilicus and pubes. Twins born, that died soon after. A metrorrhagia, not followed by serious results, was all that ensued.)

*Ovarian Cysts.*—Though usually easy to distinguish from dropsy of the amnion, it is not always so, as the cases of Boddy, Hiod, Hunt, and Kidd would show.

The recognition of the certain signs of pregnancy only can prevent error. The menses may be absent in both cases, and there are on record cases of inflammation of ovarian cysts in which the accumulation of liquid has taken place, almost as quickly as in dropsy of the amnion. In both cases great pain accompanies the abdominal enlargement. But the progressive growth of hydramnion is replaced in the case of the cyst by sudden enlargements at the menstrual epochs, with slower and more continuous progress between them. Besides this the tumor in ovarian cyst begins on one side, and the uterus is displaced in the opposite direction. Finally, we may detect the modifications in the neck and lower part of the uterus, and the three certain signs of pregnancy, ballottement, the foetal heart and foetal motion.

Sometimes, as in one of our cases, these signs fail us, and we must have recourse to other means of diagnosis. Fluctuation is said to be more manifest in hydramnion than in ovarian cyst; but in certain cases it may be wanting. But there is one sign which is pathognomonic, and which was present in our second case.

In this case all the certain signs of pregnancy were absent, and rectal and vaginal touch gave us no aid. Palpation was difficult from the extreme sensibility, and the œdema of the abdominal walls permitted only the perception of a false fluctuation. Only the suppression of the menses, and the results of an anterior examination made by a physician, caused us to suspect pregnancy. But at the second examination I could feel in the abdomen intermittent contractions, and the uterus is the only organ which could give rise to any such sensation.

G. H. Kidd, discussing the diagnosis between dropsy of the amnion and ovarian cysts, says: "The encysted liquid may be a distended bladder, a dropsy of the amnion, an ovarian cyst, or a pregnancy complicated by an ovarian cyst. The absence of urine on catheterism, disposes of the first; the state of the nipples, and the presence of a floating body in the abdomen, shows the presence of a foetus; while with ovarian cysts, the uterus can always be felt in the true pelvis." Both Boddy and Hiod punctured, in cases of hydramnion, believing them to be ovarian cysts, and Kill did the same, and delivered the woman of twins, in a case of hydramnion, which he took to be pregnancy complicated with ovarian cyst. Depaul, in connection with his case of extra-uterine peritoneal pregnancy with hydramnion, says: "This is a rare, if not unique example, of dropsy of the amnion, complicating an extra-uterine pregnancy. The size of the abdomen prevented palpation of the foetal parts, and there was a tense, rounded, and fluctuating pouch instead of the ordinary lumpy tumor. The cervix was in its usual place, which is rare in extra-uterine



pregnancy. The patent orifice permitted me to reach the fundus uteri with my finger; but, instead of enlightening me, it simply made me suspect an obliteration of the internal os."

There remains to be considered the diagnosis from the hydatid mole. It seems impossible to mistake hydramnion for it. The only symptom sometimes found in the vesicular mole, that is analogous to any sign of dropsy of the amnion, is the rapid development of the abdomen, and its want of proportion to the stage of pregnancy. But the constant presence of alternating losses of reddish and watery fluid, the hemorrhage which always accompanies, precedes, or follows the termination of the disease, and the occasional passage of vesicles, should suffice to remove all doubts.

*Pathological Anatomy.*—Most authors regard hydramnion as a disease of the foetus or its membranes, and it is there that we should look for the cause of the affection. But in some cases the examination of these has been neglected; and in as many more it has been made without finding anything. In a third set of cases, lesions have been found, but they were not characteristic. Three varieties of lesion seem, however, to be specially constant: 1st. Those of a supposedly inflammatory nature. 2d. Fœtal malformations. 3d. Lesions of the uterus, or tumors of various kinds.

1st. *Lesions of an inflammatory Nature.*—These have usually consisted in thickening of the membranes, with more or less marked capillary injection, a varying red color, and false membranes, either on the surface of the amnion, or on the foetal surface, and in the thickness of the placenta.

Thus Dubois and Desormeaux: thickening and hypertrophy of both placenta, which were united.

Godefroy: membranous plaques upon the internal surface of the placenta and the membranes.

Oulmont: infiltration of edges of the placenta, and œdema of the cord.

Prévost: one placenta and two amniotic cavities for three foetuses, the two amnii being enclosed in a common covering. One cord was œdematous.

Ollivier (d'Angers): thickening of the membranes, which were white and opaque, like parchment. Injected vessels.

Mercier: the same changes, with a species of false membrane. Sentex: same, placenta livid.

Robert Lee: placenta soft in parts, and dark in color, looking like the lung in cases of pulmonary apoplexy.

Toogood: adhesions of placenta. Atthill: same.

D'Outrepont: cartilaginous and hepatic degeneration of the placental tissue.

Hildebrandt: fibro-myxoma of placenta.

Hunter: hypertrophy of placenta.

Valenta: maternal and foetal syphilis.

Sédillot: emphysema of foetus.

Lee, Obs. I.: Foetal ascites, malformations of lungs. Obs. VI.: Foetal ascites.

Bourgarel: Foetal ascites. Pemphigus. Onyxia, congested placenta.

Liegener, Obs. XII.: Cord soft and short. Obs. XIV.: Cord very oedematous; pemphigus; liver much developed.

2d. *Monstrosities*.—Pietro Lusana: anencephalus.

Siebold: hydrocephalus. Cystic degeneration of kidneys.

Battson: hydrocephalus. Infiltration of skin and subcutaneous cellular tissue. Anchylosis of articulations of hands and feet. Cystic degeneration of the cord.

Thomas: exaggerated development of the head.

Jungmann: premature ossification of the head.

Lumpe: umbilical hernia into cord. Hypertrophy of the skin of the head. Club-foot.

Zacharias, Lawrence, and West: encephalocele.

Griffith: tumor covered with the normal scalp, filled with liquid and cerebral *débris*.

Werner: thin cord with bands. Double hair-lip. Absence of left lung.

Bühelen: hydrothorax.

Löschner: double monstrosity. One child normal, the other atrophied. Adhesions of both lungs.

Frankenhauser: obliteration of the urethra; œdema of cord and foetus.

Hildebrandt: hydatid mole.

Rausch, Werner, Parien: faults in the cord. Placental atrophy.

Lee: hydrocephalus.

Dill: anencephalus.

Liegener: double hare-lip.

Guéniot (Guillemet): anencephalus.

Polailon (Guillemet): clubbed hands, imperforate anus.

Pinard: two cases of anencephalus.

3d. *Tumors*.—Keating: uterine fibroid. Guéniot: same.

Neuschler: uterine tumor.

Pfannkuch: carcinoma uteri.

These are the chief changes; and we shall see that it is especially in the acute cases of hydramnion that the lesions considered inflammatory have been noticed.

The liquor amnii itself is generally normal; a few authors have found it fetid, and reddish or greenish in color.

We, therefore, conclude that pathological anatomy gives us no certain data; for all the above lesions have often been found in cases in which there was not the least trace of dropsy of the amnion.

*Prognosis*.—Most authorities consider dropsy of the amnion a serious



complication for the fœtus, while it rarely compromises the health or life of the mother. This, however, is only true up to a certain point. In the slowly progressive form, but little discomfort is experienced by the woman; but in acute hydramnion the distress is very great indeed, and the prognosis for the mother much more grave. We may, in this respect, divide dropsy of the amnion into three degrees.

In the first degree, the excess of fluid accumulates very slowly, and the woman only suffers from discomfort and an increase of the usual malaise of pregnancy. As a rule no diagnosis is made, and it is only at the moment of delivery that the excessive amount of liquor amnii strikes the accoucheur. Every obstetrician must have met such cases.

In the second degree, there is more fluid, and the uterus reacts more strongly. Besides the ordinary accidents of dropsy of the amnion, uterine contractions causing premature rupture of the membranes, and expulsion of the fœtus, are liable to occur.

In the third degree, the same premature contractions exist, but they are not sufficient to determine labor, at all events for a certain time. The patients are very sick, and are exposed to the various accidents that we have noticed, so that active interference is sometimes required. It is especially in cases where hydramnion occurs with phenomena that have caused errors of diagnosis (ascites, ovarian cysts, etc.), that active measures have been taken.

This is by no means the case in the fourth set of cases, which we have called acute hydramnion. In these cases, the diagnosis is made. The rapidity of its evolution, and the serious nature of the accidents that may occur, can in a short time compromise the life of the woman, and necessitate immediate intervention.

Here the enormous distension of the uterus, out of all proportion to the presumed stage of the pregnancy, the excessive pain, the vomiting, the emaciation, the intense fever, the circulatory and respiratory troubles, the asphyxias, œdemas, eclampsias, and even abortions, give us a very different form of the disease.

In regard to delivery itself, let us note the frequency of faulty presentation, and the occurrence of proclivencia and uterine inertia, either during labor or at delivery, and the hemorrhages. The following table of observations, deduced from 80 cases collected from literature, show the result and the presentations:

|                              |           |    |
|------------------------------|-----------|----|
| Child dead without sign,     | . . . . . | 1  |
| Abortion,                    | . . . . . | 1  |
| Head, with prolapse of hand, | . . . . . | 1  |
| Vertex,                      | . . . . . | 46 |
| Buttocks and feet,           | . . . . . | 9  |
| Shoulders,                   | . . . . . | 20 |
| Face,                        | . . . . . | 2  |

MacClintock, out of 31 cases: presentation of the vertex, 20; breech, 9; foot, 2.

We understand to what extent hydramnios complicates confinement, by the fact of the abnormal presentations, and these figures only include single pregnancies. As for the hemorrhages which accompany or follow delivery, and which are due to uterine inertia, all the authors have noticed them in the cases of exaggerated distension of the uterus, either by a very large fœtus, or in cases of twin pregnancy. It is not extraordinary to see them produced in cases of hydramnios, or this exaggerated distension of the uterus produced in an extreme degree. We confine ourselves, with Sallinger, to citing the cases of Senlen, Valenta, Schmatz, Lumpe, Guéniot, Martin, Hansen, Klink, Härlin, Parieu, Rigler, Quadrat, Huber, Keating.

As regards the child, the prognosis is still more grave, and though in the observations of Liegener, out of 40, there were 31 infants living, we do not hesitate to say that hydramnios is one of the diseases which most compromise the existence of the fœtus. In many cases, indeed, it is expelled dead from the uterus (we may ask if the death of the fœtus had not been the determining cause of the malady); in others, more frequently, it dies shortly after birth. We have seen that often delivery occurs before term.

In addition, the frequency of multiple pregnancy, and of dangerous presentations complicating the confinement, put the infant in unfavorable conditions and render the prognosis more grave.

Finally, we recall the frequency of monstrosities in cases of hydramnios, and the connection between syphilis and hydramnios.

MacClintock considered hydramnios as one of the morbid conditions very common in abortion, and he regards it as a frequent cause of the premature death and expulsion of the embryo. Out of 33 cases of hydramnios noted by him, one terminated by abortion at five months, one at six months, ten resulted in premature delivery. In 21 cases the child appeared to have attained the normal term, and he says "there is good reason to think that some cases of the disease in question are a disease of the ovum and not of the uterus. The abnormal excess of the amniotic fluid, or perhaps the morbid action of which it is the result, appears very unfavorable to the fœtus. Thus, 9 of the children were still-born, of which 5 were putrid, and 10 born alive died some hours after birth. This was oftener the case among the girls than the boys (25 girls to 8 boys).

*Treatment.*—In many cases hydramnios passes almost unnoticed. The indications are confined to combating the ordinary diseases of pregnancy, without the necessity of special treatment. At other times, on the contrary, the conditions are exceptionally serious, and then intervention is necessary, which is either medical or obstetrical.



Medical treatment is in general of little use. All forms designed to combat the "dropsy," diuretics, purgatives, sulphate of quinine and opium, have been employed. All seem to have failed. Phlebotomy has, at times, seemed to succeed.

Modern works on the composition of the blood in pregnant women have, however, rejected bleeding in the treatment of pregnancy. We believe that the writers have gone too far in this regard. Of course we do not believe in the ancient method, in which bleeding was practised to an incredible extent, as in the observation of Mauriceau, where a woman had been bled 72 times during her pregnancy; but we believe in certain cases bleeding has its advantages; and, without speaking here of bleeding employed as preventive of eclampsia, we have seen (as interne at the Charité) Beau, who certainly was not partial to bleeding, practise it in a number of pregnant women, and never have there been other than good results. Our teachers did not reject it utterly, and P. Dubois, Cazeaux and Jacquemier, advised it in certain cases, where women considered as plethoric were threatened with abortion; and they have cited cases where, thanks to a rapid and moderate depletion of the vascular system, the pregnancy has continued its course.

*Surgical Treatment.*—On account of the serious condition, and the threatened life of the mother, it is necessary to interfere. Nature, indeed, seems to indicate the means, in provoking premature contractions, which induce rupture of the membranes and interruption of the pregnancy. Whatever Guillemet may say, all obstetricians agree that it is by the cervix that the foetal sac must be penetrated, and if there are some instances where puncture of the uterus has been done, it was due to an error of diagnosis, and, though Scarpa, Camper, Noël Desmarais, etc., have cited cases where a puncture has not been followed by accident, and certainly by the woman's recovery, it should be rejected. Consequently rupture of the membranes should be adhered to. But here, still, different questions are presented: 1st. The point of perforation. 2. The moment for intervention.

1st. *Point to rupture the Membrane.*—It is seen at once that there is no time for hesitation. The cervix being generally partly open from the premature contraction, the membranes rush into the internal os. Nothing is simpler than to perforate them with a stylet, sound or trocar. But this rupture is not always without difficulties. At the moment of the rupture, the liquid, by reason of its great quantity, rushes out in torrents, tends to enlarge the opening in the membranes, and so to sweep along the foetal membrane, cord and foetus. On the other hand, the uterus, in consequence of the rapid evacuation of the liquid, tends to contract with a rapidity dependent on the quantity of liquid evacuated. Further, there is the possibility of detaching the placenta, at one or many points, and of hemorrhages. Finally, this rapid evacuation induces

symptoms analogous to those seen when the pleural or abdominal cavities are emptied too rapidly, in pleurisy, hydrothorax or ascites, namely syncope. Different methods have been advised for this end. The first, which is an absolute rule when one has to puncture the membranes for hydramnios, or for narrowing of the pelvis—that is, when the fœtus is moveable beyond the superior strait, or in the excavation—is never to rupture the membranes except in an interval of contraction, the woman lying with the buttocks raised, so as to increase the inclination of the pelvis backward. The use of the stylet or trocar, to make only a little opening, has been advised, but the liquid increases the size of the opening.

Tarnier, according to Guillemet, operates as follows: he places the index finger on the bulging membrane; at the same time the other fingers, closed in the palm of the hand, are applied as exactly as possible over the vulvar orifice at the movement of contraction. The membranes are ruptured by the nail of the index finger. At this moment, instead of withdrawing the hand, it is pushed against the vulvar orifice. In this manner a nearly perfect prevention of the issue of fluid is obtained. This procedure does not seem to us to be likely to be followed by the hoped-for success; for if it prevents the escape of fluid from the vagina, it does not prevent the rent enlarging itself. The liquid, it is true, can not flow away externally, but it can flow into the vagina, and it will do so the more according as we have chosen the period of uterine contraction to rupture the membrane.

We prefer then to choose the interval of uterine contractions. It will be a little more difficult to rupture the membranes, but the liquid will escape more slowly, there will be less chance of the prolapse of the members, and of premature detachment of the placenta. Impressed by these inconveniences, Meissner has invented a curved trocar, with which he advises the induction of premature labor, to perforate the membranes at the middle part, or above the ovum, to preserve also a certain quantity of fluid, and to place the fœtus in more favorable conditions. This may be resorted to in cases of hydramnios, though the results hoped for by Meissner do not seem to have been obtained.

2d. *Moment of Intervention.*—Here we are unable to lay down precise rules, and from the gravity of the symptoms only can we determine the moment of intervention. In slight cases, wait. The uneasiness felt by the woman is not sufficient to endanger her life, and consequently the obstetrician should act expectantly. On the contrary, in the more serious cases, it is necessary to interfere, but here still the indications vary with the case. Indeed, ordinarily, hydramnios comes on in an advanced state of pregnancy, its course is slowly progressive, and it is only at certain times, that it produces serious symptoms. The obstetrician should follow the development of the disease; he will gain thus the greatest amount of time, and it is rare that he will have to interfere before the seventh or



eighth month. It is, therefore, a premature delivery that he causes. While wholly protecting the interests of the mother, he regards the viability of the child, and so he should retard the moment of intervention as long as possible, to allow the pregnancy to reach as nearly as possible normal term. In acting thus, we give to the fœtus more chance of surviving, without compromising the life of the mother. If the symptoms supervene earlier, if the phenomena experienced by the mother are of a nature to endanger her life, the obstetrician need not hesitate, and he should interfere promptly and rapidly in her interest—we will say, also, in the interest of the fœtus. In so acting, Guillemet says, rightly, we avoid for the mother excessive pain and serious conditions, which have sometimes induced death, as in the observations of Lee; and, on the other hand, we eliminate the causes of death for the infant, for, in nearly all observations, the signs of life in the infant have only disappeared when the symptoms were protracted a long time.

In cases of acute hydramnios, the procedure should be different. The rapidity with which the symptoms develop, their intensity, the serious phenomena which they cause in the mother, require an early intervention, and necessitate, not only premature labor, but, indeed, the induction of abortion. The uterus tends itself to expel the product of conception, and it is in these cases especially that premature contractions occur. But these contractions are most often insufficient to determine labor, and they only augment the suffering. It is necessary, therefore, to interfere, and induce abortion without hesitation. Of course the responsibility of the obstetrician is great, and interruption of pregnancy at a time when the fœtus is not viable is always an operation not to be undertaken unless it is absolutely necessary; but we believe that in these cases to hesitate is not allowable, and that on account of the chance of the mother's death, the obstetrician should practise abortion conscientiously, which, if it end fatally to the infant, allows the mother almost every chance of recovery.

It is seen by our observation that we did not hesitate. The cure of the mother justifies our intervention, and, should we again be thrown with such a case, we should have recourse to abortion. By it, indeed, the fœtus is surely sacrificed, but the mother is almost certainly saved, and we believe that between the saving of a woman who has other children, and the saving, more or less problematical, of a fœtus subject to all the unfavorable circumstances in which it is placed by the hydramnios alone, not only is abortion authorized, but indicated; and that the obstetrician who hesitates thus to intervene in this case fails professionally, and to his own sense of duty.

#### *Various Alterations of the Amniotic Fluid.*

In dropsy of the amnion, the amniotic fluid is altered in its quantity, and in its quality as well, and these alterations are of quite different kinds. Some are compatible with the life of the fœtus; the others conduce to

its death. At the beginning of pregnancy, limpid, transparent, colorless, of a density less than water, the amniotic fluid later should become unctuous, a little thick, and especially remarkable for the presence of little whitish caseous lumps, which are similar to the sebaceous matter covering the body of the fœtus. Most of the foreign substances absorbed by the mother are there met with. We cite, among others, the case of Levret, who has seen the amniotic fluid whiten copper in a woman who was undergoing mercurial treatment. A case has been cited where the odor of camphor, absorbed by the mother, was noticeable. Everyone knows the case of Stoltz, who has seen a child, born living, where the amniotic fluid gave an offensive odor of putrefying tobacco; the mother worked in tobacco. The amniotic fluid may acquire irritating properties, as in the case of Naegelé, where there was found a kind of maceration of the fœtal epidermis. The child, though born feeble, recovered perfectly, and was in perfect condition at the end of the fifth day, after shedding its epidermis.

There is one form of alteration which is much more frequent—that which is due to the presence of meconium in the liquor amnii. Normally, in cases of breech presentation, the meconium gives to the fluid a green tinge, more or less pronounced according to the quantity that has been mixed. In some cases the fluid is thin; in others it is much thickened and sticky; and if one does not consider the escape of the greenish fluid as evidence of the death of the fœtus, as the older obstetricians thought, it indicates at least an action on this little being, by compression of the cord or otherwise, prolonged labor, etc. However, this sign is not certain, and it is not rare to see the child born alive after abundant escape of very dark liquor amnii. One can say, in a general way, that the degree of intensity of these changes, and the greater or lesser fluidity, are proportional with the perfect health of the fœtus, though the fœtus may be born alive with very thick and fetid liquor amnii. Auscultation only can decide as to the beating of the heart; its perfect regularity and normal force has completely reassured us in a case where at first one might have some fear.

Concerning the alterations which are consecutive to the death of the fœtus, Lempreur describes three degrees. In the first, there is a solution of the fœtus; in the second, a mummification; in the third, maceration; the other alterations are only produced after the escape of the fluid, and after the entrance of air into the sac. To these three periods, different states of the amniotic fluid correspond.

In the first (solution), the fluid is no longer clear, transparent, limpid and pale yellow, but sometimes simply dirty and thickened, sometimes milky, like an emulsion, according to the quantity of organic elements dissolved. This fact is mentioned by the older obstetricians, as Mauriceau, Puzos, Bischoff, Martin, and others.



In the second (mummification), the liquid is diminished, still thicker, granular, purulent, or rather, as if mixed with a clayey earth. At a more advanced degree it disappears, leaving on the embryo a grayish oily sediment analogous to the deposit of overflowed water.

In the third (maceration), the liquid is altered according to the state of the fœtus. This period is characterized by the œdematous infiltration of the fœtal tissue with a bloody serum, complete inhibition of the soft parts with their softening and shrinking, and raising of the epidermis in phlyctenulæ, in vast blisters. It is this escaped liquid which gives to the liquor amnii its special characteristics. It is thin, red and bloody, more or less thick. With this condition of the fluid the fœtus is dead. This is verified by clinical observation. These changes, however, are not always found in cases of fœtal death.

Lempereur has noted many cases, where on rupture of the membranes, a clear and quite transparent liquid escaped. This is due to the fact that, at the moment of rupture, the bullæ are intact, and it proves that the liquid which they contain alters the amniotic fluid after their rupture.

#### *Amniotic Cords.*

These amniotic bands are not as rare as might be supposed, for Klotz was able, in 1869, to collect 34 cases. Montgomery, who had already observed them, considered them as organized lymph; Simpson, as the result of local inflammation of the skin of the fœtus; Simonart, as due to ulceration of the skin of the fœtus, and to inflammation of the amnion; Gurlt, as prolongations, not detached, from the skin of the fœtus; Scanzoni, as exudations from the internal surface of the uterus, and penetrating across the amnion; G. Braün considers them as the folds of the amnion. Very probably they are not inflammatory products, but adhesions, partly metamorphosed, of the amnion to the fœtus. Spiegelberg proclaims that they should be considered as due, sometimes, to a very early inflammation of the amnion having induced an adhesion to the skin of the fœtus; sometimes, more rarely, as an arrest of development, an abnormal fold of the amnion, but he rightly remarks that, up to the present time, no one has discovered vessels in the amnion, hence its inflammation is more than problematical, and he supposes, with Braün, that they are due to abnormal folds of the amnion, or to an incomplete or too late separation from the fœtus, produced by an unknown cause, perhaps by insufficient or tardy secretion of the liquor amnii. As a consequence, arrest of development, sometimes fissures in the fœtus, the liquor amnii developing and distending the amniotic sac. These adhering points are lengthened in bands, which, by the constriction they exercise on the fœtus, cause malformations and spontaneous amputations. One sometimes finds the fœtus thus malformed, and at points corresponding to the constriction, free ends,

detached bands, or sometimes only cicatrices. Finally the bands may be suspended free in the amniotic sac. According to Braün, when the amniotic fluid is produced tardily, the amnion is torn, while the chorion remains intact. Under the influence of the foetal movements the amnion becomes rolled around the cord, and induces thus, by compression, the death of the foetus. (Fig. 23.) Finally, these amniotic folds may be produced after the death of the foetus by diminution of the liquor amnii.

According to Crede, these bands are necessarily found in the third or fourth weeks of foetal development, or before the closure of the ventral cavity; for, in admitting inflammation, it is only possible to affect those parts still projecting. Ordinarily, however, it is in the deep part, or in their neighborhood, that the amnion is adherent. And, moreover, one



FIG. 23.—AMNIOTIC BANDS. (After Braun.) *a*, Cutaneous-bridge. *b*, Liver. *c*, Osseous stump of left lower limb, *d*, Left foot. *e*, Right foot. *f*, Vulva. *g*, Anus. *hh*, Amniotic bands.

never sees those ulcerations, capable of traversing the abdominal integument, and even of the bone, in cases of tuberculosis, scrofula, rachitis, syphilis, etc. It is later, in the eighth week, that these lesions are produced. In the second month the foetus is separated from the amnion by a notable quantity of liquid, and the amnion adheres to the chorion. It is, therefore, before this that they are produced, that is, towards the time of formation of the amnion, the third week. Another proof is the difference that exists between the amnion and the skin of the foetus. From the eighth week the foetus has its epidermic covering, and this cannot further proliferate. In the third, on the contrary, the amnion is developed, and tends to blend towards the middle of the back of the foetus, and its folds, before they unite, form an acute angle; and he believes that the exaggeration of the amniotic fold becomes the origin of the premature



formation of cells and nuclei, which, manifesting themselves on each side, induce premature fusion of the two amniotic folds. If, on the other hand, one remembers that Reichert and Remak consider the amnion as composed of two layers, one epidermic, in connection with the skin of the embryo, the other in immediate continuation with the cutaneous layer, one understands that the folds are able by their traction to cause the flexion of the fœtus and help to give it its form. Braün finds the cause of this adhesion in the too little quantity of fluid, or the too tardy separation of the amnion, and in concussion of the fœtus, which forces it to lengthen, instead of remaining bent. (Stadhagen.) Crede depending on the researches of Panum, of Dareste, believes in the influence of the variations of temperature and variations of pressure in the uterine contractions, and the sudden vaso-motor disorders, produced in the uterus by the emotions and physical influences.

What is the relation between monstrosities and these amniotic bands?

Crede, out of 109 cases of monstrosities, has found 69 of them with amniotic bands, and 21 with herniæ cerebri, eventrations, spontaneous amputations, and atrophies of the bones. The opinion of Braün, who thinks that the spontaneous amputations are produced more frequently in the upper than the lower extremity, because the upper are more prominent, is not sustained by Crede's cases. On the other hand, amniotic adhesions are more common in the upper extremity. Out of 11 cases, 7 were of the upper extremity. All agree that the spontaneous amputations are due to the amniotic bands.

## CHAPTER IV.

### DISEASES OF THE FŒTUS.

THE diseases of the fœtus and the embryo are as yet little known, notwithstanding the progress in this direction made during recent years. Of those appertaining directly to teratology we say a few words only; others, more directly interesting to the obstetrician, not only because they compromise the life of the fœtus, but because they occasion serious difficulties at labor, we refer to under Dystocia.

The first, the true fœtal diseases, we will pass in review.

#### FEVERS.

The eruptive fevers, the intermittent fevers, and typhoid fever, have been studied with reference to their influence on pregnancy and the fœtus, in detail. (See Diseases of Pregnant Women.) The same is true of icterus.

#### CEREBRAL DISEASES.

Scanzoni distinguishes: 1. Hypertrophy of the brain, which sometimes occurs to such a degree that it impedes the development of the cranial vault, sometimes partially, sometimes totally. In the first case, the head, notwithstanding its exaggerated volume, is soft and compressible, the bones are thin and compressible, and their compressibility is still further increased by the size of the fontanelles and sutures. In the second case, the hypertrophy may lead to hemicephalus.

2. *Hemorrhages*.—They may occur in the brain, but ordinarily they are vascular or intra-meningeal apoplexies. In two cases, the cord has been found around the neck; once with a true twist of the cord, and twice with numerous apoplectic nuclei in the placental parenchyma. Usually the cause escaped notice. 3. Hydrocephalus, with atrophy, more or less extensive, of the brain. We will study it in detail under Dystocia.

#### DISEASES OF THE RESPIRATORY ORGANS.

Depaul, Jacquemier, Dubois and Desormeaux, have noticed true croupous, and even purulent pneumonia, in the lungs of the fœtus and before the air had penetrated the pulmonary vesicles. Scanzoni and Rokitansky have never found them, but they admit them more willingly since the pleural inflammations have been observed and described by Jacquemier,



Véron, Tarnier; and their existence is absolutely incontestable. The existence of tubercles and emphysema in the lungs, have been also noted. (Depaul, Hecker.) Véron, Depaul, Dubois, have noted alterations of the thymus, which have been demonstrated to be syphilitic. (See syphilis.)

#### DISEASES OF THE DIGESTIVE TRACT.

Billiard, Scanzoni, Rokitansky, Desormeaux and Drouadaine, have noted different changes in the alimentary canal. In the case of Billiard, there was injection and redness of the pharynx, larynx and œsophagus. The stomach presented a certain number of little ulcerations; besides a general discoloration, without softening of the mucous membrane, the intestine, at the cæcum, presented a series of whitish follicles enclosed in a red circle, but not ulcerated. Desormeaux has noted a case of enteritis very distinct, old and very intense. To Scanzoni and Carreaux, the intestinal mucous membrane presented every degree of hyperæmia. It occurred rapidly and violently, it gave place to bloody extravasations with an accompanying hemorrhagic peritonitis. If it were less intense and progressed more slowly, it was confined to the more or less pronounced inflammation of the intestinal follicles. Rokitansky has seen, in some rare cases, these inflammations produce false membranes. Cases of intestinal perforation are still more rare. (Scanzoni.) The entozoa (*ascarides lumbricoides* and *tænia*) have been noticed.

#### DISEASES OF THE LIVER AND OF THE SPLEEN.

In the liver, hepatitis with persistent softening, fatty degeneration, hypertrophy, induration, etc., have been noted. The lesions are now recognized as syphilitic. Ruptures of the liver, due to traumatism sustained by the mother, may occur. In the spleen the same lesions, also syphilitic, may be present.

#### FETAL PERITONITIS.

The most common lesion is peritonitis, which has been studied particularly, by Simpson and Lorain. Out of 106 still-born infants, Lorain has found it 10 times, and out of 193 infants, born alive, but dying in a few hours or a few days after birth, peritonitis, sometimes simple, sometimes complicated with meningitis, multiple abscesses, or erysipelas, has been found 40 times. (Lorain.) As we shall see, the existence of peritonitis in the fœtus and the newborn is due to the same cause which causes it in the mother after delivery, namely, puerperal fever, which attacks the fœtus first, and the mother afterwards.

Simpson, previous to Lorain, had collected 23 cases, 2 of them personal, some borrowed from Allan, 4 cases, from Billiard, 3 cases, from Banks, Fisher, Fairbain, Cruveilhier, Scott, Véron, Brachet, Chaussier, Dugès and Carus, each one case, a total of 10. Finally, 4 cases of chronic

peritonitis, 2 from Billiard, and 2 from Andral and Morgagni. Since then, such cases have multiplied, and there is no obstetrician at the head of a large hospital who does not each year observe a great many of these cases.

*Pathological Anatomy.*—The nature of the effused fluid varies considerably. Sometimes it is purulent, mixed with more or less plastic lymph. Sometimes the lymph exists alone, or mixed with a large quantity of serum. Sometimes there are non-adherent flakes and membranous deposits of various sizes, floating or adherent; sometimes, soft and pulpy, forming more or less solid adhesions, or even true false-membrane, gluing together, in one unique mass, the abdominal organs. Concomitant lesions are thickening of the intestines, softened liver, persistent infiltration, inflammatory nuclei in the lungs, bloody clots in the abdominal cavity, proceeding from a rent in the liver, enormous development of the spleen, peritoneal adhesions, mesenteric glands enormously swollen, little hemorrhagic effusions in the different organs. Generally the whole peritoneum is affected; at other times only partially. The peritoneum may be hypertrophied and indurated.

*Causes.*—Simpson cites, successively, hard work on the part of the mother, fatigue, cold, dampness, a physical lesion during gestation, peritonitis in the mother during pregnancy, syphilis—especially, anomalies of abdominal viscera, and accidental effusion of irritating liquids, on the peritoneal surface itself—urine, and rents of the liver. Lorain does not believe in the very great influence of syphilis. He thinks the peritonitis due to the puerperal fever which is manifested as in the mother, by the peritonitis, and is reproduced after birth.

*Symptoms.*—The symptoms are more than obscure, the mother generally having experienced only the cessation of movements, accompanied sometimes by false pains, followed by the signs of the death of the fœtus.

*Duration.*—Nothing is definitely known.

*Periods of Fœtal Life when Peritonitis occurs.*—Velpéau, without specifying, said that he had seen incontestable pathological alterations in the lungs, liver, peritoneum, and other parts of the body from three months. According to Simpson, it may develop at all ages, even at term, the infants being born alive, succumbing from a few hours to one or two days after birth. Finally, Lorain has observed in the new-born, hydrocele of the tunica-vaginalis, erysipelas, phlegmon, phlebitis and arteritis of the umbilical vessels.

#### DISEASES OF THE CIRCULATORY ORGANS.

Inflammations of the endocardium, described by Cruveilhier, those of the pericardium and the consecutive lesion of the heart, valvular lesions,



dilatation, pericardiac adhesions, are either spontaneous and isolated or dependent on inflammation of other organs. In the fœtus, the right heart is especially affected.

#### DISEASES OF THE SKIN AND CELLULAR TISSUE.

Besides the eruptive fevers, Moreau has found different colorings of the skin in the dead infant; Naegelé, Edis and Ollivier d'Angers, maceration and changes in the epidermis of a living child; Dohrn, inflammation of the skin; Houel, a case of hypertrophy with ichthyosis; Charpentier, an identical case, 1877; Simpson, ichthyosis; W. Smellie, ichthyosis. Finally, pemphigus has been noted, which, according to Rœser, 1876, is always syphilitic. Still, cases of non-syphilitic pemphigus have been seen by Krauss, Hervieux, Hassan-Mahmoud, Faloy and Desruelles. One of the most interesting is that of Lorain and Prévost. There existed in a syphilitic infant pemphigus, and also changes in the lungs. Finally, Ammon has cited a case of melanosis of the eyes, and Lobstein a case of cirrhosis. Simpson has described certain tumors of the cervical region, and spina bifida. Meckel and Otto, a cystic tumor of the cellular tissue, situated at the posterior part of the neck, divided into two lateral and symmetrical lobes, by the ligamentum nuchæ. Berndt, Cæsar Hawkins, Beatty, Muller and Henke, cystic congenital tumors of the neck. Simpson, cystic tumors, whose mass consisted of the union of little cells, filled with a thick glairy liquid, at the upper part of the neck, and projecting more or less into the mouth. Wallmann has described a similar case. These are true ranulæ, consisting of hypertrophied salivary glands. Simpson, tumors in the cervical region, formed by vascular erectile tissue, deeply situated and disappearing on pressure, — on the contrary, increased by crying or efforts. One of these was operated on later; there was profuse hemorrhage. Under the name of bronchocele, has been described congenital hypertrophy of the thyroid gland; this may disappear after some years; Simpson has seen 5 cases of it. Ollivier has seen in front and to the right of the neck, a tumor, the size of a hazel-nut, of a whitish-yellow color, soft and fluctuating, which yielded pus. Planteau, in 1876, collected a number of cases of cervical tumors. Riveau Landreau has noted a case of purulent ophthalmia, supervening during uterine life.

Taylor records abscesses in the fœtus; Finnell, intra-abdominal tumors; Legendre, hydrocele of the cord; Friedreich, cancer. The intra-uterine fœtal pathology is, however, as yet hardly outlined.

#### SCROFULOUS AFFECTIONS.

Temporary swellings of the thyroid gland have been especially noted in face presentations, and are easily explained, but there exists another

rare affection, which Spiegelberg has called "struma intra-uterina congenita." It is one of the most rare diseases of the fœtus, and consists of a simple parenchymatous hyperplasia, and is persistent. It comes on endemically, apart from the general hereditary condition. Congenital goître may cause brow or face presentation, in causing bending of the head. Hecker, Simpson, Löhlein, have each cited a case of it. It may, after birth, be the cause of respiratory trouble, and even of death, by compressing the trachea. Both Spiegelberg and Hecker, the first in two cases, the second in one case, have observed this asthma due to hyperplasia of the thyroid.

#### AFFECTIONS OF THE BONES.

##### *Fractures.*

The fractures which are seen in the fœtus may be produced in utero, or may result from traumatism occurring during delivery. We shall only consider the first variety. Intra-uterine fractures are due to a defect of ossification, to the non-union of the osseous masses, developed from the different centres (occurring particularly in bones of the head), to the separation of epiphyses, this separation depending on an inflammatory process, or a non-union of the diaphyses with the epiphysis, or to congenital rachitis. They may be caused by some traumatism sustained by the mother, which may leave no trace on her body. These fractures will be, of course, more readily produced where there exists already a primary defect of ossification, or where there is less amniotic fluid. Almost always the extremities are the parts involved, and the thigh frequently, since its situation exposes it unfavorably; whereas the head, from its form, its situation or its engagement in the superior strait, usually escapes. The actual displacement, which is almost always seen in these cases, is the result of muscular traction, which, however, has not prevented union. Can these lesions be produced in the uterus in healthy bone, without external injury? This seems at least doubtful to Spiegelberg, who admits, however, that in these cases, there may have been a protruding promontory and prolonged compression of the head or of other parts against it. Some cases of fracture of the cranial bones have been seen after natural labor in women who had pelvic deformity.

The prognosis is generally not grave. These fractures heal rapidly, unless from the influence of complications, gangrene occur. In some cases, however, they are caused by lesions of which traces are found at birth, in the form of pareses, atrophy of limbs, which show that there have been lesions of the nervous trunks, or inflammation, terminating by atrophy or sclerosis.

Cranial fractures, accompanied by hemorrhages, by concussion or by cerebral contusions, are most often fatal. If these last injuries are es-



escaped, the infants may recover from the fractures. Concerning the torsions, the forced flexions, the general compression of the fœtus, they may be caused, considering the little space the fœtus occupies, by either an internal pressure exercised on the fœtus by uterine or peri-uterine tumors, by deformity of the pelvis, by insufficient liquor amnii. Hohl and Conrad have collected a certain number of examples.

#### *Luxations.*

Concerning luxations, the etiology is obscure. They may be ascribed to an anomaly of development of the articular cavity, which, in consequence of causes to-day still unknown, manifested itself first, not at the normal point, but at some other point of the iliac bone. It is curious that the greatest number of these observations have been in female fœtuses. Fehling believes that these depend on the fact that the flattened portion of the iliac bones was extended. In this connection it is necessary to cite the coxalgia observed by Bird, Broca, Morel Lavallé, Padiou, and the curious cases of ankylosis, by Bird, Richaud, Joulin; of ankylosis with hydrocephalus, by Becourt; and of gibbosity with or without hydrocephalus by Joulin, Mantoux, Nivert.

#### *Spontaneous Amputations.*

Under the name of intra-uterine amputations, spontaneous amputations or congenital amputations, are designated certain defects of conformation, characterized by total or partial absence of one or more extremities. Duplay, holding rightly that among these defects some are due to failure of the normal evolution of the limbs, an arrest of their development, others due to the action of some mutilating agent, which cuts them off as with the surgeon's knife, designates them as congenital amputations. The first, considered under teratology, group of *ectroméliens* (Geoffroy Saint-Hilaire), we shall not consider here. The second directly concern the obstetrician.

*Causes.*—While Haller attributes them to malformations and not to separation of formed parts, Chaussier, the first to find in the uterus the separated part, attributes them to gangrene, but Watkinson shows that, although the stump was largely cicatrized, the foot, found in the uterus, showed no trace of putrefaction, and appeared to be in a state of perfect preservation, and therefore excluded the idea of gangrene. Montgomery, Levert, Simonart, have shown that these amputations result from constrictions of the extremities, sometimes by the umbilical cord, most often by bands of false membrane, which, looped about the extremities, completely cut them off; the bands are developed in the interior of the amniotic cavity. Whether these bands are due, as Montgomery thinks, to an inflammation of the fœtal membranes, accompanied by an effusion of plastic lymph, or as Simonart, Moreau, and German authors think, to the am-

niotic bands, the instances have multiplied, and, by those of Zagorski and of Montgomery, we are able to follow the lesion from its beginning, a simple cutaneous depression, up to a complete amputation. These bands, indeed, fixed by both extremities to the internal surface of the membranes, form rings or loops in which any part of the foetus may be entangled. But authors are not all agreed as to the action of these bands. Montgomery thinks that the ligature, in compressing the vessels more and more, obliterates those of the bones themselves, whose vitality ends by the obliteration; and these bones, now soft and friable, are entirely separated by the foetal movements. He has observed that the skin and soft parts are not divided but depressed inwards to the bone, so that when the section is complete, the skin covering the surface of the section, the stump appears cicatrized. Martin Jena does not believe that the simple ligaturing is able to act on the bone, unless it is in a cartilaginous state. He thinks it should limit its action to the soft parts, and the cause of these amputations, therefore, must be exterior. This opinion, given already by Simpson, is not absolutely tenable. It is perhaps true in certain cases, that of Martin proves it, but besides that the ligature acts frequently on the cartilaginous parts, these ligatures have often produced incomplete sections only including the soft parts; and the morbid influences which cause these bands, and in particular, the inflammation, produce functional difficulties and organic malformations, incompatible with the life of the foetus, which succumbs often before the separation is complete. Finally, the instances of Hecker, Fitsch and Watkinson prove that the mother has not received any accident.

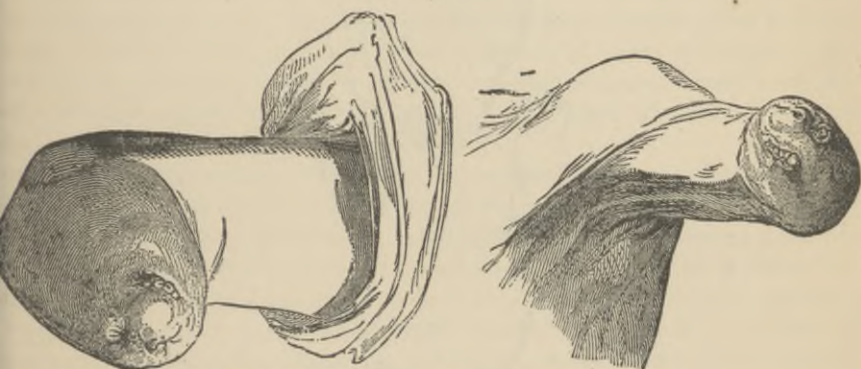
Contrary to the opinion of Braün, who thinks that the spontaneous amputations are produced generally on the upper extremities, it is in the lower extremities that Crede and Duplay have most often found them, and generally on the left side. The direction of the cord to this side, explains to a certain extent this predilection.

Sometimes, and it is the rule, the stump is cicatrized; sometimes there is a wound, generally little extended, at the centre of the stump. In this case, the bone or the bones of the member are prominent on the surface of the wound, as in a circular amputation, in which the stump would be conical.

In the cases where these amputations are due to a veritable malformation, the extremity of the stump has one or more appendages. (Figs. 24 and 25). Sometimes fingers more or less complete with phalanges and nails, sometimes simple cutaneous tubercles; and in these cases, Debout has noted extreme sensibility of the deformed members, due to the enormous development of the nerve trunks, which does not exist in cases of congenital amputations. Simpson, who has observed five or six of these last cases, believes in a tendency in the human species to a reproduction of a missing extremity, and having seen in a case of Withe, the thumb



amputated, first by Withe and a second time by Bromfield, grow again, he supposes that, where the amputation is produced in the early part of foetal life, at a time when the physiological activity is similar to that of an order less elevated, the lost portion is perhaps at least liable to a partial and rudimentary restoration. It is only in exceptional cases that these bands become a cause of dystocia. The only case known is that of Bleeck, but Fitsch has observed one, in which the amputated part had been expelled fifteen days before the birth of the child, following spontaneous and premature rupture of the membranes. Most frequently the children are still-born. Gay and Martin have each observed a case of spontaneous amputation with birth of living children, and which have survived. On the contrary, in cases where the amputations were simply an arrest of development, the children are often born living. We have



FIGS. 24 and 25.—CONGENITAL SPONTANEOUS AMPUTATION.

seen an example of this: the lesion was double; there was a slender stump of the left leg, with complete absence of the foot, and a rudimentary right foot attached to a very atrophied leg; the child is now two years old. As in the cases of Bleeck and Guy, the child presented by the breech.

Beauregard has noted in the negroes and Hindoos, an affection which he calls dactylolysis, and which, always produced in the little toe, at its base, consists in a circular strangulation, which transforms it into a thin pedicle, which breaks off if not cut off. At the same time, the little toe, deviating from its direction, deformed, triple in size, is converted into a compact spheroidal mass, like a little ovoid. Beauregard, who has compared this to spontaneous amputations, describes three varieties of ectrodactylia: first, complete arrest of development, true abortion; second brachydactylia, arrest of phalangeal development; third, spontaneous amputation. We are dealing here, then, with a defect of conformation and not spontaneous amputation.

## INTRA-UTERINE RACHITIS.

The description given by Depaul is so complete, that we can do no better than borrow from him.

“*Recent State.*—The size of the head strikes one at once, and contrasts sharply with the slight development of the trunk and extremities; but this disposition is rather relative than real, and the cavities and organs which it contains are in the normal state. The vertebral column does not present an unusual curve. It only seems that the cervical region is a little short; the head appears as if placed on the upper part of the tho-



FIG. 26.—INTRA-UTERINE RACHITIS.

rax. The chest has a very pronounced conical form, at the top narrow, at the bottom very wide. The lower border of the cartilages and the xyphoid appendix are as if turned outwards, and show themselves under the skin. The thorax is flattened from before backwards. The four extremities are remarkable for their little length and their volume. The upper are held in a nearly vertical situation. In contrast, the clavicles are very long. The lower limbs appear made up of two kinds of enlargements, separated by a furrow, which is found above the knee. The upper one is considerably enlarged, and presents a rounded surface which is directed forward and a little outward. Movements of the articulations are easy, and palpation proves the tissues sufficiently firm. Beneath



the skin, which is normal, exists a bed of fatty cellular tissue of the usual thickness. The muscles, normal, are relaxed; the aponeuroses are perfectly adapted to the conformation of the limbs, and do not hamper them in any direction. There is no anomaly in the nerves, nor in the vessels.

*“Lesions of the Skeleton.—Cranium.—*The fontanelles are wide, but not of the usual shape; sometimes normal, as also the sutures. Ossification of the bone is regular and complete.

*“Face.—*In proportion to the cranium, is normal. Maxillary bones well developed and regular, containing the teeth-germs. Forehead, normally prominent.

*“Thorax.—*The capacity is not considerable, very wide at the base, when the sides and the cartilages are strongly thrown outwards. The ribs are regularly curved; sufficiently slender at their vertebral extremities, they commence to increase toward the anterior part, and terminate by a considerable enlargement. This is not marked except in the first three and last two. At the centre of each of these extremities, which is hollowed out, starts the cartilage, which is slender and filamentous. Certain of the intercostal spaces are wanting. Besides, the ends of certain ribs are sharply and abnormally curved upwards.

*“Upper Extremities.—*The clavicles are very long, considering the dimensions of the thorax. Their curves are not exaggerated. The result is that the scapulæ are thrown backwards, and tend to overlap at the spinal border. The volume is not abnormal either in the shafts or the extremities. The scapulæ are but little altered in form, and present a curve backwards, which increases the depth of the intra-spinous fossæ to such an extent that it effaces the subscapular fossæ, which are replaced by a convexity. The ossification is normal.

*“Humerus.—*Represents, on each side, the arc of a circle, strongly curved on its anterior plane; the convexity is backward, on its posterior plane. The osseous surface, which belongs to the concavity, is flat and almost excavated; that of the projecting part is rounded in its whole extent. Besides this general curve, another is seen toward the lower third, the concavity directed outwards, the convexity inwards. The two ends are noticeably enlarged. The upper end has a rounded form, the lower is more extended transversely than from before backward; the epiphyses, entirely cartilaginous, are reduced by dessication to a very small size.

*“Radius and Ulna.—*Of equal length, but whereas the radius exceeds the ulna below, this exceeds the other above, and in the same proportion. The intra-osseous space is narrow and elliptical, the extremities are of considerable volume. A double inflection exists, the first has the concavity anteriorly, and the convexity posteriorly; the second, the concavity internal to the radius and external to the ulna.

*“Hand.—*No point of ossification in the bones of the carpus; those of

the metacarpus and phalanges are regular as to form and direction. The size is above the normal.

“*Pelvis*.—Sufficiently regular at first, but the upper rim of the pubes is slightly elevated, hence there is considerable obliquity of the superior strait. Considerable increase in the transverse diameter, compared to the antero-posterior; pubes and ischio pubic rami cartilaginous, the other parts regularly ossified.

“*Femora*.—Curve is very marked, directed backward and inward. A second curve, with internal concavity and external convexity less pronounced; extremities largely increased in size.

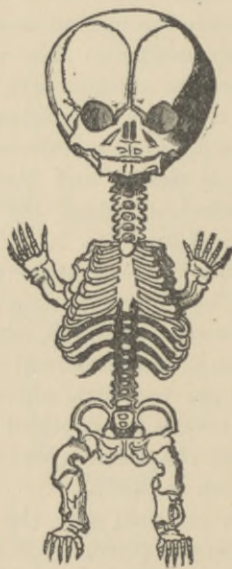


FIG. 27.—INTRA-UTERINE RACHITIS.

“*Tibiæ*.—Large and very short, very obliquely cut away at the upper part, from above downward and behind forward. Curve gentle, concavity backward and outward, convexity forward and inward. The lower extremity presents an analogous curve.

“*Fibulæ*.—Placed more posteriorly than normal; slight curve, concavity anterior and internal; convexity, posterior and external; separated from the tibiæ by a large elliptical space. Normally large; much enlarged at the ends.

“*Feet*.—Tarsus completely cartilaginous, metatarsus and toes abnormally ossified and formed; feet incline outwards in relation to the leg.

“*Vertebral Column*.—Nothing unusual, spinous and transverse processes cartilaginous, with ordinary points of ossification.

“*Periosteum*.—Thin, regular, normally adherent.”



This description, which relates to a fœtus of seven and a half months, born alive, but respiration failed to be established, is typical and characteristic. But in other cases different alterations are observed. In a case seen by Guéniot, and in another seen by myself (and whose skeleton is found in the museum of the Clinic), the changes were identical. Besides the curves and the enlargements of the epiphyses, noted by Depaul, we found on the cranium an ossification more than incomplete, characterized by some disseminated osseous plates, but all the long bones and the lower jaw presented an infinite number of fractures or solutions of continuity. Each bone seemed to consist of little osseous masses, mobile, bound together by the periosteum, which rendered the dissection very difficult. But, contrary to the observations of Guéniot, in our case all the bones of the skeleton, vertebral column, pelvis, hands and feet, participated in the changes. Spiegelberg has found these same changes, and has seen the curves of the bone, the enlargement of the epiphyses, and the fractures, with remarkable integrity of the clavicle. He noted: the flattening of the pelvis, the extension of the sacrum, the deviation of the promontory forward and downward, transverse flattening of the sacral vertebræ and the iliac crests, increase of the pubic arch, the characteristic superior strait, and ossification, sometimes incomplete, sometimes almost exaggerated, of the cranium.

Depaul does not believe that these cases are true instances of intra-uterine rachitis, and holds that in each of the observations there has been omitted mention of the sign which characterizes the second period of rachitis, namely, softening of the bony tissue; but, while *extra*-uterine rachitis rarely invades the whole skeleton, and has a predilection for the long bones, in so-called *intra*-uterine rachitis the whole of the skeleton is invaded. Only the points of ossification which are in the spine appear as exceptions. The deformity is produced with a certain symmetry on the corresponding bones. Contrary to Spiegelberg's opinion, the curves are generally in relation with the muscular action, sometimes more manifested inversely. Finally, there is no arrest of development.

In all probability, the affection began at a slightly advanced period of fœtal life where as yet, only a little, if any, calcareous material had been deposited in the tissue. As a result, it is necessary to reject the idea of a deformity succeeding a perfectly regular state, and to recognize the influence of a single cause, namely, an unequal distribution of the material which gives to the bones their form and their solidity. In short, in the true rachitis, the entire organism appears affected, while in the case of *intra*-uterine rachitis, the lesion appears exclusively confined to the bony system.

Concerning the solutions of continuity which are described under the name of fractures, Depaul believes them to be of two kinds: the one, *the true*, due to external violence, to exaggerated muscular contractions, or

to an essential weakening of the tissue, which lies at the seat of the trouble; and the other, *the false*, those which coincide with the supposed intra-uterine rachitis.

Even as the curvature may be explained by an unequal development of the different parts of the same bone, so may the solutions of continuity result from the fact that calcareous deposits are not made in one or more points of the shaft; hence it is not a fracture which occurs, but an absence of ossification. It is of no account that there has been noted in many observations, in that of Chaussier in particular, the existence in the course of some of the long bones of certain enlargements, which have been cited as proof of fractures which have united, for there is nothing to show that there is true callus. A limited prominence of bony tissue is all that exists, and it is not harder to understand this superabundance of the calcareous material than the diminution, the absence or irregularity of its deposit; and, according to Depaul, all these alterations of the bony tissue are of the same nature, and due to the anomalies of ossification. The health of the mother has nothing to do with their development. In no case has scrofula, rachitis or syphilis been found. In many instances, the disease has occurred in twin pregnancies, which fact is probably connected with the development of the rickets.

As opposed to these ideas Spiegelberg says that histological examination proved that the process is identical in intra-uterine and extra-uterine rachitis.

Winckler makes two subdivisions: rachitis micromelica and annular rachitis. The first is eminently intra-uterine; the second, beginning, possibly, in the last months of pregnancy, passes into the intra-uterine phases of rickets. Müller has described a special alteration in the bones, characterized by disease of the primitive cartilages. Of all the diseases of the bones, that affecting the inner surface of the skull is the rarest. Spiegelberg once found a gumma. Wegner detected lesions of the bony canaliculi. In general, the changes in the bones are most marked in the end of the femur, then in the lower extremity of the tibia, and in the radius and ulna; later in the upper extremity of the humerus and of the radius, and lastly in the lower extremity of the humerus. This alteration is usually due to syphilis of the father. In addition to osteo-chondritis, Wegner has noticed alterations in the marrow of the canaliculi, sometimes diffuse, and sometimes in isolated patches. The medullary tissue is reddish, and under the microscope is found to be in a state of fatty degeneration, especially of the medullary cells and the walls of the vessels.

#### CONGENITAL SYPHILIS.

In studying maternal syphilis we have shown the conditions in which the disease is transmitted to the fœtus. In connection with diseases of the placenta, membranes and cord, we have noted the lesions which are



regarded as characteristic of syphilis; it now remains to study them in the different systems and organs of the fœtus.

In recent years hereditary syphilis has been studied authoritatively by Parrot, from whom the following description is borrowed:

Two different groups of lesions are produced: one, peripheral or superficial, located on the skin or mucous membranes; the other, profound, which affects the different viscera and the bones.

The cutaneous lesions are bullæ, maculæ or papulæ, as shown by the following table.

|             |   |                                      |
|-------------|---|--------------------------------------|
| Syphilides, | { | 1. Bullæ (pemphigus).                |
|             |   | 2. Maculæ.                           |
|             |   | 3. Plaques, { true.<br>{ lenticular. |
|             |   | 4. Vesico-papulæ (very rare).        |

Ulcerous syphilides are only the ordinary syphilides which have become ulcerated by the action of external bodies or under the influence of a generally bad condition. The more intense the diathesis, the sooner the syphilides appear. The first manifested is the bullous syphilides (the pemphigus). It is a precocious manifestation of extreme gravity, which often coincides with visceral lesions, and which frequently and rapidly reaches a fatal termination. On the contrary, the lenticular syphilides is manifested later; it ordinarily appears isolated. The vesico-papular syphilides are extremely rare, are the expression of a vanishing diathesis, and of little gravity, and, as intermediate to these different cutaneous lesions, we find the macular syphilides, rarely isolated and united sometimes to the bullous syphilide, sometimes to the "plaque" syphilide (syphilitic roseola of authors). The mucous patch, the most frequent, is characterized by permanent, tenacious, indurated elevations in patches. The patches are circular, red at the centre, violet or salmon-red at the periphery. They are found about the anus, on the lower limbs, thighs, scrotum, labia majora. (The child at the same time has coryza). They ulcerate easily. On the face they often become crusted; finally they occur on the scalp. The eruption is produced in eight, ten or twelve days, and increases. They last a long time. The lenticular syphilides occur on the buttocks, the upper and back part of the thighs and the leg, the labia majora and the scrotum; these are the true lenticular patches. Then, the buccal ulcerations appear. But while all or nearly all the buccal ulcerations, due to marasmus, are symmetrical and lying on the median line or at symmetrical points, the syphilitic ulcerations are never found in the median line, and it is impossible to give them a particular topography. They have an irregular contour and a hemorrhagic tendency; they occur particularly on the tongue, on the internal surface of the cheeks, on the alveolar border of the maxillæ, and quite frequently on the velum

palati. They are found also in the mouth, as red, prominent patches, similar to ordinary mucous patches. On the lips are found fissures, the true rhagades, erosions and projecting mucous patches. When the children die of syphilis, we find profound lesions of the bones and viscera. All the organs may present the lesions; indeed they have been found in the brain, where occurred a softening of a bluish-red color, and little purulent nuclei, located near the longitudinal fissure and to the left side of the cerebellum. But these four organs, the thymus, the lungs, the liver and the spleen are always affected. In the thymus, Dubois has noted the presence of pus diffused or collected in foci in the parenchyma, without changing the color, form or size of the organ. The observations of Braün, Spath, Depaul, Wild, Virchow, Weber and Hecker, have confirmed those of Dubois; but Spiegelberg, who also found these changes, thinks that, in a good many cases, there is an increase in the size of the gland. In the lungs, Depaul, in 1851, stated: sometimes true collections of pus, or more or less thickened cavities enclosing a liquid of the same nature, are found. "I have many times," said he, "found another disposition which should be considered as the first degree, and which consists in a grayish induration, without as yet recognizable pus, with a considerable deposit of fibro-plastic tissue. Sometimes the lesion was disseminated and limited to circumscribed points; sometimes, on the contrary, it was general and had invaded one or more lobes. But always the pulmonary tissue was impermeable to the air, as proved by mucous insufflations. It is not rare to find these different degrees in the same organ." The lesions are connected with other conditions characteristic of syphilis.

Lebert contests the presence of pus. The tissue has a particularly yellow color, it is resistant and elastic. At the middle of the mesh, formed by the pulmonary network of fibro-plastic elements, is found a soft substance, pulpy, diffused, and in which are many little cells, which are neither cancerous, nor tuberculous elements, but resemble in every way the cells of syphilitic gummata.

*Liver.*—There is described, sometimes simple hypertrophy, sometimes general or partial congestion. Gubler has described the organic lesion which is peculiar to the liver. This lesion may be general or partial.

1st. *General.*—When the alteration is of high degree, the gland shows a yellow color, very different from the normal condition, and which is best compared to the hue of flint. The appearance of the two substances has completely vanished, only on the yellow base we find, on close attention, a more or less clear space of little white opaque grains, looking like grains of millet, and free arborizations appertaining to the exsanguinated vessels. The liver is sensibly hypertrophied, globular, tinged, hard and difficult to grasp with the fingers; it tears without allowing an impression on the surface. Its elasticity is such that if pressed forcibly between the fingers, so as to crush a wedge-shaped piece from its sharp edge,



the piece escapes like a cherry-stone from the compressing fingers. Incised it creaks under the scalpel. The incisions which are made into the liver should be very clean, homogeneous, and the great consistence allows us to obtain very thin sections, semi-transparent, which to a certain degree are found in the naturally thinned portions of the organ (as the borders and especially in the tongue which terminates the left lobe.)

2d. *Partial*.—This form is more common than the general. The liver is less enlarged and shows an undecided coloring, shaded yellow and reddish-brown. No part of the parenchyma appears entirely sound. At the same time the liver has a certain semi-transparency, which allows one to distinguish, at a little depth, millet-like, the grains with which its substance appears strewn. These opaque points are here more numerous and compact. In fact these opaque grains, plunged lightly into the transparent substance, reproduce to a certain point the aspect of the two substances which constitute the hepatic tissue, but, beyond that, the grains are separated by very great intervals, the surface substance does not resemble particularly the net-work, essentially vascular, of the areolar spaces of the healthy state.

Under the microscope we find, in the altered tissue, a considerable, sometimes enormous, quantity of fibro-plastic elements in all stages of evolution, in the centre of which the ecchymosed cells are dispersed. The relation of these fibro-plastic elements, by their connection with the proper tissue of the organ, is more or less strong as the alteration is more or less advanced. There is very little in the parts, still brownish, of the second form, or it is lost in the midst of the proper cells. They are, on the contrary, very predominant in the yellow and very hard livers, as well as in the strongly indurated portions of the livers which only present a partial alteration, while they exist very slightly in parts whose aspect is only slightly modified, and not at all in normally appearing tissue. The fusiform bodies strike us at first; of which some are short, shaped like a spindle, the others very long, enlarged in the centre, and terminating by tapering extremities. Nearly all have an oval or ellipsoid nucleus enclosing a granular substance, in the midst of which are noticed one, two, or three larger granules, of a more fiery brilliancy. There are also many rounded or oval cells, sufficiently like the smaller cells of the parenchyma, but enclosing nuclei, like the fibres. In some cases, especially in the general form, there is found in the tissue indurated nuclei, of which some are soft and filled with a purulent material, true suppurating gummata. Under pressure the liver yields a yellowish liquid, a little ropy, partly coagulable by heat. The heart is soft and flabby, containing a currant-jelly like liquid, characterized by a notable diminution of the globules, which are dissolved in albumin. The pericardium and the cardiac muscular tissue are filled with milky patches.

*Peritoneum*.—We have noted the hemorrhagic peritonitis of Simpson.

The spleen is hypertrophied, softened, indented, permeated with indurated nuclei, as the disorganization is more or less advanced.

The pancreas presents analogous alterations to those of the liver. Proliferation of the fibro-plastic tissue, induration, hypertrophy; on section it is whitish, brilliant. The structure of the acini has disappeared to the naked eye. The proliferation is extended, not only to the intermediate tissue of the glandular groups, but also to the intermediate tissue of the acini; it compresses them, destroys their epithelium, thickens the walls of the vessels and destroys the capillaries.

The kidneys are hypertrophied, the Malpighian pyramids contain little yellow nuclei, indurated, with commencing suppuration.

On the intestines one finds blackish, indurated patches occupying the entire wall of the intestine, and constituted by net-work of fibres, holding entangled at their centre fatty and purulent globules, and their cells having prismatic angles, rounded, strongly tinged with brown.

Finally we find the osseous lesions which, noted vaguely by Waldeyer, Wagner, Körner, Taylor, have been studied in detail by Parrot and Ruge. Parrot finds that in every fœtus bearing on the skin, the mucous membrane or in the viscera, the marks of hereditary syphilis, the bony system is altered. These lesions may exist alone. Parrot has observed them in a very clear case. The long bones of the extremities, excepting those of the hands and feet, are with the scapulæ, the iliac and cranial bones, most frequently attacked; then the ribs, the clavicles, the metacarpal and metatarsal bones, and lastly the vertebræ. But these last are only affected when the disease is of long standing. The symmetry of the lesions is constant.

Parrot thinks that there are four varieties, or better, four degrees of the lesion.

“1. Seen in fœtuses, and in infants dead a few days after delivery. The bones are heavier than normal. Under the periosteum, are found osteophytes. Around the diaphysis the same osteophytes are found, perpendicular to the diaphysal axis. The medullary substance is very much diminished, and the medullary canal almost obliterated. The scapula and the iliac bone are also covered with osteophytes.

“2. The bones are less heavy, the new-formation layers less dense, and more porous. The changes affect in particular the inferior part of the diaphysis of the humerus, the upper part of the ulna, the anterior surface of the femur, and the internal of the tibia. A peculiar characteristic of this degree is the gelatinous atrophy of the bones. The spongy tissue is, in particular, affected. To this atrophy, is added the pseudo-syphilitic paralysis of the new-born. Fracture occurs at the cartilage. Pus forms; osseous fragments become detached; abscesses occur, which may spread to the joints and break outwardly.

“3. This is characterized by medullarization, which appears in cases of



longer duration. The osteophytes are still present, often, as also, the gelatinous atrophy. But the changes are most apparent in the medullary substance, which spreads, invading gradually, in particular, the inferior region of the humerus near the nutrient foramen. It is here, indeed, that we find the distinctive mark of the disease. There occurs enlargement of this extremity, especially from before backwards. A section perpendicularly through the diaphysis, reveals the lesion best. The diaphysis is enlarged, the antero-posterior diameter may be doubled. This is due to one or two layers of osteophytes. The chondro-calcareous layer is not so hard as in the normal.

“4. This degree is characterized by the formation of a spongy tissue at the periphery and end of the diaphysis, where it tends to replace the chondro-calcareous layer. The characteristic deformity of the humerus diagnosticates the lesion. This degree is found in children beyond six months. The older the infant, the more it approaches rickets in appearance.

“Syphilitic bones of the first degree, with their compact osteophytes, and their gelatiniform atrophy, are the very reverse of rachitic bones. The two other degrees resemble one another, but the characteristic shape of certain bones, in particular the humerus, and the greater density of the spongy tissue, and, further, the less development of the cartilaginous layer, are certain signs of syphilis.” (Parrot.)

#### DEATH OF THE FÆTUS.

The causes of foetal death are numerous. It may depend on the father, through alteration in the semen; on the mother, through general disease, irritability or excitability of the uterus, lesions of this organ, etc.; on the foetus itself, from faulty development or monstrosities; on the annexes of the foetus, membranes, placenta, cord. Finally, on external influences, such as traumatism.

Many of these causes we have already studied at sufficient length. We will refer here only to certain facts which result from modern physiological researches.

#### *Influence of high Maternal Temperature on the Vitality of the Fœtus.*

Without referring here to the transmission of disease, variola, intermittent fever, etc., to the foetus from the mother, the researches of Hecker, Fielder, Buhl and Winckel, prove that acceleration of the maternal pulse from disease, may cause foetal death. The foetus sympathizes with the mother, both in evening exacerbations and in morning remissions of the pulse.

Further, Hohl, in 1830, Kaminsky, in 1866, Winckel, in 1869, and especially, Runge, in 1877, have proved the noxious influence of elevation of the maternal temperature on the foetus.

Runge, whose experiments were elaborate, concludes: 1. The temperature is always a few tenths higher than that of the mother. 2. The fœtus is killed by the elevation of the temperature alone, even before the mother dies. 3. A maternal temperature of 107°, even though it lasts but a few minutes, will inevitably kill the fœtus.

#### ACTION OF THE MATERNAL BLOOD ON THE VITALITY OF THE FŒTUS.

We have seen, in the article on the respiration of the fœtus, that there is an exchange of materials between the fœtus and the mother through the placental villosities. As Zweifel, Gusserow, Runge and Porak, have shown, certain soluble salts (salicylic acid, iodide of potassium, benzoic acid), certain poisonous substances (chloroform, ether, alcohol) may pass directly and naturally from the mother to the child; certain forms of virus, certain miasms (variola, syphilis, malaria), may be transmitted by the same, from the mother to the fœtus. Finally, the gaseous interchanges are particularly apt to be produced, the foetal blood-globule taking oxygen from the maternal blood-globule. But, on the other hand, it appears from the experiments of Zweifel, of Zunz and of Andreas-Högyes, that when the maternal blood, from any cause, cannot renew its oxygen from the external air, if the maternal blood corpuscle is intact, and preserves its absorbing power, it in its turn borrows oxygen from the richer foetal blood and thus endangers the life of the fœtus. If the maternal blood corpuscle is altered, or if it has lost its absorbing power, it does not take up the foetal oxygen, and the fœtus, consuming little, continues to live more or less time after the death of the mother. It appears then that whatever interferes with the exchange of gases and nutritive materials between the fœtus and the mother, is fatal to the former.

Then the utero-placental circulation may be obstructed either in the uterine vessels, in the placental villosities or in the cord. It is thus that uterine tumors, peri-uterine tumors, diseases of the placenta, bloody effusions, changes in the villosities, degenerations, may act, as also maternal diseases, pyretic or apyretic, gravido-cardiac accidents; certain toxic substances, phosphorus, lead, arsenic; violent deaths, asphyxia, syncope, finally all the causes which determine the premature contractions of the uterus or obstruct its development; also lesions of the cord.

But in a certain number of cases the fœtus succumbs without any cause being found, and this at several consecutive pregnancies (13 times in a case known personally to us; it was only in the 18th pregnancy that she had a living infant, and indeed it was born at 8 months). In these cases, the young, strong and healthy women were married to strong and vigorous men. Nevertheless, most frequently the cause of death of the fœtus may be found, but authors are not agreed on this point.

Ruge, in an interesting article, "*uber den fœtus sanguinolentus*," states that most authorities believe syphilis to be the usual cause of foetal death,



while Simpson believes that it is only a secondary cause, the primary being the existing peritonitis.

According to Ruge, the *fœtus sanguinolentus*, or the macerated *fœtus*, is almost always the outcome of syphilis.

Leopold believes that the habitual death of the *fœtus* is due: 1. To syphilis; 2. To anemia; 3. Chronic diseases of the mother; 4. Hereditary tendencies. [In 1883, in an article on "Habitual Miscarriage" we tabulated the causes of *fœtal* death, as follows: 1. Syphilis; 2. Maternal anemia; 3. Uterine disease, and disease of the uterine appendages; 4. Uterine displacements; 5. Chronic cellulitis and peritonitis; 6. Laceration of the cervix; 7. Intermittent fever; 8. Chorea; 9. Bright's disease; 10. Tumors of the uterus, and in its neighborhood; 11. Poisoning from metallic substances, lead, arsenic, etc., seen particularly in workers in the arts where these metals are used; 12. Reflex conditions. These latter, we stated, may have their outcome either from the nervous system, in general, or from the uterus and its appendages, in particular. There are some women so delicately nurtured, so highly impressionable, as to react to the slightest nerve stimulus. Like hot-house plants they must be watched and tended, lest the slightest influence, outside of their accustomed *habitat*, affect them unfavorably. Gestation with them is often toxic. The uterus repels the impregnated ovum as it would a foreign body.

Of the above causes, it is apparent that certain ones are more likely to act than others in causing *fœtal* death. In any given case of repeated miscarriage, the greatest care is necessary to determine the possible cause.

In certain cases it may be advisable to absolutely forbid sexual intercourse during gestation, the *fœtal* death being apparently the result of the congestion which accompanies copulation.

As a still further cause, and likely enough not a very infrequent one, we would mention the uterus *septus*. This is all the more likely to be overlooked, because of the difficulty in determining the malformation, except on very careful examination. The cause of death, in this case, is the development of the *fœtus* in a space too contracted to allow of its due expansion. Mundé recently reported a case of this nature, before the New York Obstetrical Society.—Ed.]

If the majority of the causes of *fœtal* death are absolutely beyond the accoucheur's control, it is not so in a certain number of other cases, and particularly for syphilis, all authors, excepting Desprès perhaps, arguing that a careful treatment, begun during the pregnancy, can, and only can, save the child. Hence the precept of Depaul, to always follow an anti-syphilitic treatment in women who abort repeatedly, without known cause, even when they do not present, nor does the father, traces of syphilis. A large number of cases have justified this treatment. We have ourselves plainly observed a case; four abortions without known cause,

syphilis absent in the father and mother, at least in appearance, and absolutely denied by both. Anti-syphilitic treatment of both. Since, two healthy infants, the elder is two years old, the younger just 9 months; neither has ever presented any symptoms. The mother has been able to nourish both.

But, when the anti-syphilitic treatment fails, have we the right to resort to premature delivery? To us, it does not appear even doubtful; and, without hesitation, we should induce labor in the weeks which precede the usual death of the fœtus, not forgetting, however, that, in a good many cases, the death seems to come on more and more tardily, according as the pregnancy is renewed. Such women, who have begun by abortion, have come gradually to premature delivery, and we believe that it is in these cases especially that there is the chance of success.

[In case of habitual miscarriage not dependent on any special appreciable cause, absolute rest in bed for weeks before the usual period of miscarriage, and for some weeks afterwards, associated with the constant administration of the chlorate of potass, and the tincture of the chloride of iron, will sometimes succeed in enabling the woman to go to term, and to give birth to a living infant. Cases of the kind have been recorded by Barker, Mundé, etc., and we are familiar with two instances.—Ed.]

#### DURATION OF RETENTION.

The dead fœtus may remain a variable time in the uterine cavity before being expelled. There is no absolute limit. Where death occurs in the course of an acute disease, or as the result of traumatic influence, expulsion is ordinarily rapid.

If, on the contrary, it follow a chronic affection, syphilis for example, or causes which only act slowly on the fœtus, it may be retained longer in the uterine cavity, and this without danger to the mother. Sheltered from contact from the air, it does not undergo putrefaction, but a peculiar alteration, which constitutes maceration, to which we shall return, and the health of the mother is, in general, but little influenced. At the best, some trifling pains in the abdomen; sometimes, slight general malaise, without fever, and slight hemorrhage, at first sero-sanguinolent, of negative odor and more or less acid; and then delivery occurs a little more slowly, often in the normal way.

However, generally the fœtus is expelled rapidly enough after death, but may be retained many months in the uterus.

Such are the cases of:—

|                   |           |                          |
|-------------------|-----------|--------------------------|
| Young,            | . . . . . | . 2 months and ten days. |
| Pridie,           | . . . . . | } 3 months.              |
| Newmann & Harley, | . . . . . |                          |
| Graily Hewitt,    | . . . . . | } 5 months.              |
| Markoe,           | . . . . . |                          |



|   |             |
|---|-------------|
| Jacobi, . . . . .   | 5½ months.  |
| Peaslee, . . . . .  | 7 months.   |
| Cedersjöld, . . . . .   | 8 months.   |
| Fairbank (entire ovum), . . . . .                             | 3 months.   |
| Nöggerath, Chamberlain and<br>Peaslee (fœtus only), . . . . . | } 3 months. |
| Schacher (fœtus unchanged at the end of)                      |             |
| Stephen, . . . . .  | 4 months.   |
| Warner (ovum entire, unchanged), . . . . .                    | 6 months.   |
| MacClintock, . . . . .  | 4½ months.  |
| Holst (fœtus unchanged), . . . . .                            | 5 months.   |

In addition to these extraordinary cases, we must mention what have been called prolonged gestations, where the fœtus has remained in the uterine cavity beyond the normal term of gestation, and then been expelled more or less altered.

Such are:

|                           |                         |                    |
|---------------------------|-------------------------|--------------------|
| Manget, . . . . .         | fœtus of 5 months,      | retained 12 months |
| Johns, . . . . .          | “ “ 6 “                 | “ 5 to 6 months.   |
| Olshausen, . . . . .      | “ “ 3 “                 | “ 8½ “             |
| Madge, . . . . .          | “ “ 4 “                 | “ 11 “             |
| McMahon, . . . . .        | “ “ 4 “                 | “ 18 “             |
| Voigtel, . . . . .        |                         | 9 years.           |
| Uhlrich, . . . . .        |                         | 2 “                |
| MacClintock, . . . . .    |                         | 1 “                |
| Simpson, . . . . .        | pregnancy of 12 months. |                    |
| Keiller, . . . . .        | “ “ 12 “                |                    |
| Halley & Davis, . . . . . | “ “ 6 years.            |                    |
| Menzies, . . . . .        | “ “ 17 months.          |                    |
| Prael, . . . . .          | “ “ 32 years.           |                    |
| Hecker, . . . . .         | “ “ 14½ “               |                    |
| Muhlbeck, . . . . .       | “ “ 14½ “               |                    |

(See in this connection, “Prolonged Pregnancies.”)

At what period do the infants habitually succumb, and how long before delivery? These are the two questions which Ruge has endeavored to solve in his memoir on infants born dead and macerated; and, basing his assertions on the comparative weights of the fœtuses, and on the maternal recollections, he has arrived at the following conclusions, which, he is careful to say, are only approximate, and which we tabulate:

*Syphilitic Children* : 67.

|                       |           |                   |
|-----------------------|-----------|-------------------|
| Weight over . . . . . | 6⅔ pounds | over 38 weeks, 3. |
| “ “ . . . . .         | 5⅔ “      | “ 34½ “ 6.        |
| “ “ . . . . .         | 4⅔ “      | “ 32 “ 12.        |
| “ “ . . . . .         | 3⅔ “      | “ 37 “ 19.        |
| “ “ . . . . .         | 2½ “      | “ “ 15.           |
| “ “ . . . . .         | 1⅔ “      | “ “ 9.            |
| “ less than . . . . . | 1⅔ “      | “ “ 3.            |

*Non-Syphilitic* : 12.

|                       |                         |   |                        |  |    |
|-----------------------|-------------------------|---|------------------------|--|----|
| Weight over . . . . . | 6 $\frac{3}{5}$ pounds. |   |                        |  |    |
| " " . . . . .         | 5 $\frac{3}{10}$        | " | from 26th to 31st week |  | 2. |
| " " . . . . .         | 4 $\frac{3}{5}$         | " | " " " "                |  | 1. |
| " " . . . . .         | 3 $\frac{3}{10}$        | " | " " " "                |  | 5. |
| " " . . . . .         | 2 $\frac{1}{5}$         | " | " " " "                |  | 2. |
| " less than. . . . .  | 2 $\frac{1}{5}$         | " | " " " "                |  | 2. |

It results, then, that dead and macerated children are usually met with from 6 $\frac{1}{2}$  months to 10 $\frac{1}{2}$  months, remembering that the Germans count pregnancy by lunar months.

But, how long can the fœtus remain in the uterine cavity? In case of abortion, it is not rare to see the fœtus expelled and the placenta retained to vegetate for a longer or shorter time. We have seen three cases ourselves: once, with symptoms of putrid infection of the mother (138 days), the mother recovered; once, three months, the mother having no other symptoms than little trifling floodings from time to time; the placenta was expelled during our absence, and the associate who assisted could not give us any information, except that it was without odor and shrivelled up. There was a slight hemorrhage. In a third, in the service of Dr. Guyot, the placenta was only expelled at the end of five months.

In case of stillborn and macerated fœtuses, it is generally 14 or 16 days after the cessation of the fœtal movements that expulsion should take place, according to Ruge. We have seen two cases, in which one followed this rule, 14 days; the other was prolonged until 18 days. It is not rare to see the expulsion rather sooner; but it may also come off more tardily still, and Muller reports a certain number of cases where the fœtus remained in the uterus many months, and even up to term. There are a certain number of cases of multiple pregnancies where this has occurred; we have seen an example. One of the twins dies, and the other lives, and both are expelled at the same time. But, can the dead fœtus be retained in the uterus beyond term or indefinitely? We have developed this point in the article on prolonged gestation, and have seen that these extremely rare cases should only be admitted with reserve. (Menzies, Herrgott.)

*Symptoms:* 1st. *Signs perceived by the Mother.*—These are absence of active fœtal movements, signs only having value as they have been perceived quite clearly at first, but especially when she noticed that they gradually weakened, presented irregularities, and ceased sometimes suddenly. Sometimes, the cessation has been preceded by an unusual exaggeration of the movements which seem to be convulsive. Some women complain of a sensation of coldness in the abdomen, and these sensations, contested by most authors, have been found once by Hourlier. Schling has established, by the aid of thermometric observation, that there is considerable elevation of the uterine temperature, compared to that of the



vagina, when the fœtus retains life. The abdomen sinks, the uterus—losing its tonicity, and not finding resistance in the fœtal parts—collapses on its lower segment, spreads out, and its centre tends to be depressed. The mother feels the child move about in the abdomen, take next different positions, and fall to the side to which she inclines. Often, in the two or three days which follow the death of the fœtus, there occurs at the breasts a kind of congestive manifestation, a kind of lacteal showing, which is more or less as the woman is advanced in pregnancy, and to which succeeds shrinking of the breasts, and sometimes flowing of lactescent liquid. Then all the sympathetic symptoms of pregnancy disappear, the vomiting particularly. The abdomen ceases to enlarge, and at the same time in some women there is a vague feeling of malaise, characterized by loss of appetite, a feeling of lumbago, of fatigue, of general lassitude; sometimes in very delicate women, a slight febrile reaction, especially towards evening.

2d. *Signs perceived by the Obstetrician.*—Absence of the heart-sounds, established by different trials, is the absolutely certain sign, especially if the obstetrician has clearly perceived them previously. We think this is almost the only sign, for those of palpation seem to us more hypothetical than real, more theoretical than truly practical.

If the accoucheur has previously examined the patient during fœtal life, it may be easy to reach a diagnosis of its death, but the conditions are very different when he sees the woman only after the death of the fœtus. Then, vaginal touch and palpation give us no information. Stoltz has noted a sign, a sound isochronous with the mother's pulse, a species of crackling, which he attributes to the decomposition of the liquor amnii. This sign is, however, not invariably present.

[In one case under our observation, where the woman carried a dead five months fœtus for a period of four months, this crackling was very apparent, but we can hardly say that it was isochronous with the mother's pulse. In other instances, however, we have failed to hear the sign. To us, the most characteristic physical sign of fœtal death is a flabbiness of the uterus, instead of resiliency and compressibility, on the bi-manual palpation, associated, of course, with the decrease in abdominal distension, and collapsing of the mammæ.—Ed.]

What now may be the appearance of the fœtus after its retention in the uterus?

Lempereur, Sentex and Ruge, have described the changes well, and we copy their classification:

“According to the stage of fœtal life at which it has succumbed, we find: 1. Dissolution; 2. Mummification; 3. Maceration; 4. Putrefaction; 5. Peculiar alterations, and of doubtful nature.

“Dissolution is apt to occur during the first two months of fœtal life. The liquor amnii then appears more or less milky, in a state of emulsion,

so to speak. The placenta may continue to develop, and finally be converted into one or another form of mole."

*Mummification.*—*Dessication.*—“At the second period of intra-uterine life is a particular change, entirely distinct in form from those which precede or which follow. The embryo, endowed with a greater force of resistance, provided with an osseous frame, frail and incomplete, it is true, but nevertheless solid, composed of newly organized elements, which already have a fixed texture, does not liquefy; it preserves its first form, except its volume, which suffers a proportional reduction. This is mummification, withering, emaciation, contraction, drying up of the anthers. The tissues, yet soft, are condensed under the influence of this prolonged maceration in a saline fluid; they diminish in volume, reduced to a thinner layer, in a word, shrivelled up. The color also changes very rapidly; it becomes dull, gray, yellowish, tarnished, and as if cachectic, contrasting clearly with the normal color, a brilliant dark rose.” Sentex adds to this description that the quantity of sanguinolent serum exuded in the different serous cavities is very small, very dark, and the rose color of the eye-humors hardly marked. The liquor amnii in the first degrees of change exists still, but it ends by disappearing, leaving on the embryo a dull grayish sediment, analogous to the deposit of overflowed water. The actual drying up may be retarded, in proportion as the fluid medium remains. The embryo undergoes, at the same time with emaciation, a sort of shortening; besides, it is already very small at the time of its death.

To this change, in cases of multiple pregnancy, is added another, namely, flattening. One of the fœtuses dying at this time, and the other continuing to develop, the dead fœtus, beaten down, is flattened like a ginger-bread image. It is found at delivery joined to the placenta of the sound twin, and contained in a little isolated pouch, as we have had occasion to observe in a clinical case. This is the *fœtus compressa* of the Germans.

3d. *Maceration.*—This is by far the most frequent of the alterations, and the most varied in its forms. It differs essentially from putrefaction, in that the decomposition proceeds slowly, without production of gas, without odor, without green cadaveric tinge, and never involves the mother in those formidable consequences to which true putrefaction exposes her.

Ruge and Sentex have described the changes in these fœtuses, to whom Martin has given the name of “*fœtus sanguinolentus*” from its peculiar red-brown appearance, in which respect German authors follow him. In France, such fœtuses are called simply macerated (*fœtus macérés*.)

The shape of the cadaver is peculiar, being flattened out, as it were, in the thorax, while the abdomen projects like that of a frog. The bones have all softened to such an extent that the fœtus collapses, so to speak. The epidermis is readily detachable, and is covered with bullæ. The cel-



lular tissue is edematous and colored reddish. The fœtus is so supple that it is often expelled doubled in two. The internal organs are similarly changed. The serous cavities are full of bloody fluid. The uterus and the lungs are, of all organs, the least altered. There is no odor to the fœtus of a nauseating nature. It is simply stale and disagreeable.

According to both Lempereur and Sentex, the alterations are divisible into periods, the changes being the greater the more delayed the retention. Sentex has followed these changes day by day, as it were.

[Readers especially interested are referred to the original articles of Sentex and Lempereur, where the details, as regards gross and histological appearances, are strikingly minute.—Ed.]

Lempereur, who admits the prolongation of pregnancy beyond term, says that, in such cases, the fœtus may present the following alterations:

1. Maceration, general breaking up of the fœtus, and expulsion of all the *débris* either at a menstrual period, or during a subsequent pregnancy, or delivery.
2. Putrefaction, if air gains access to the uterus.
3. Dessication.
4. Ossification, petrification.
5. Saponification.

As for the fœtal adnexa, fibrinous masses are found in the vessels of the cord, or else simply liquid blood or recent coagula. The cord is swollen, of a color like that of the fœtus. The placenta presents, on the maternal surface, a number of smooth-walled cavities, containing yellow purulent masses. Its color, and that of the membranes may be of an earthy-brown.

There is nothing unusual about the expulsion of the fœtus. Out of 77 macerated syphilitic fœtuses observed by Ruge, 35 presented by the vertex, 24 by the pelvis; there were 8 transverse presentations, 6 of which turned spontaneously. Two points we have noticed particularly. One being that the membranes ruptured slowly, or required to be ruptured; they seemed to have spread considerably. The entire ovum is expelled more frequently than when the fœtus is living. On the other hand, the labor proceeds more slowly, the uterine contractions are feeble.

Are these alterations due to syphilis, or is maceration simply a post-mortem change present as well in non-syphilitic infants? Ruge's researches are absolutely conclusive. According to him, 78 out of 94 dead macerated fœtuses are syphilitic, but it is not this disease which causes the maceration, and induces the alterations, and the proof of this assertion rests on the fact that fœtuses absolutely not syphilitic are born macerated, and presenting identically similar changes; and further, in that syphilis is characterized rather by the presence of peritonitis, and hypertrophy of the liver, spleen, lungs, and, above all, the bones, and these changes we do not find in macerated fœtuses. Maceration, therefore, is caused by post-mortem changes.

*Putrefaction.*—This is the decomposition established spontaneously, under certain conditions, in organs deprived of life. It causes pro-

duction of new substances, especially vapors and very fetid gases. This decomposition only occurs when air has penetrated after the rupture of the membranes. The decomposition goes on very rapidly, the three conditions essential to fermentation being present in the uterus, that is, air, heat, humidity.

The changes affect the whole fœtus at once, and are, as it were, instantaneous. At the outset, there is infiltration of all the superficial cellular tissue with gas, whence more or less generalized emphysema, and marked crepitation on palpation. At times the gases accumulate in the uterus, and are expelled with a loud report. These gases are poisonous to the mother. She is seized with fever, chills, hiccough, vomiting, and may shortly die if we do not extract the fœtus. The odor is awful, but the fœtal epidermis is never covered with bullæ, as in maceration.

*Cadaveric Rigidity.*—Does this exist in the fœtus at the time of birth? Casper says that he has never observed it in the fœtus before term, although it has been noted in maternity hospitals; and that, in those born at term, it is of very short duration. Taylor has seen one case; Tourdes saw it, at Strasburg, in twins of five months; he affirms that it may occur in the uterus itself, and he says that in those cases where it was not noted, this was because the duration was slight.

In England, cadaveric rigidity is admitted by Grigg, Young, Parkinson, but denied by Thompson. Bailly grants it, and has always found it. Dagincourt, who, to the other observations, adds two cases of Budin's, and one personal, says that muscular rigidity is due to coagulation of the myosin, under the influence of the post-mortem acid reaction of the muscles. The fœtal muscle does not differ in composition from that of the adult, and, therefore, may be presumed to act similarly under similar conditions.

The question cannot as yet be answered. The two hypotheses, cadaveric rigidity, and cadaveric spasms, have each weighty arguments in their favor. Are the cases of Thompson and of Bailly analogous to those to which Taylor has given the name of spasm? We believe, with Pinard and Dagincourt, in a true cadaveric rigidity, for, as Pinard justly says, in case of convulsions, we do not observe flexion, but extension of the limbs, and in all the cases cited of cadaveric rigidity, the fœtus has been in a state of flexion.



## CHAPTER V.

### MISCARRIAGE.

THE term miscarriage is applied to the expulsion of the product of conception before it is viable. It is seen at once that this differs from premature labor, which means the expulsion of the product of conception before term, but where the fœtus is viable. In this respect accoucheurs differ from the rulings of the law. The latter states that the fœtus is viable after the sixth month, while the former contend that it is not so till the seventh. It is our belief, then, that miscarriage consists in the expulsion of the fœtus during the six first months of pregnancy. This fœtus may be born dead or alive, but its development will not admit of life—it is not viable. In certain exceptional cases, fœtuses of less than seven months may live, but these cases are of such rarity that we are justified in the division which we have made. Before seven months, therefore, miscarriage; after seven months, premature labor. To the exceptional cases which have been recorded, we can add another. A woman last menstruated the tenth of March; was delivered the twenty-eighth of September, that is to say, twelve days before the seventh lunar month. The child survived.

Although we make this division, it should be understood that miscarriage from the third to the fourth month is a very different affair from miscarriage at the fifth or sixth month. While during the early months, the first three in particular, the phenomena of miscarriage are special and peculiar, from the fourth month on, these phenomena approach more and more in character labor at full term. Struck by these peculiarities, the older writers, and certain modern, (we would instance, in particular Guillemot), made three divisions of miscarriage: 1. Ovular miscarriage. 2. Embryonic. 3. Fœtal. Why this division? It is because each corresponds to a certain stage of development of the ovum, and such distinction, while subtle, has, practically, certain advantages.

Ovular miscarriage includes the first three to four weeks of the life of the ovum.

Embryonic miscarriage extends from the end of the first month to the end of the third.

Fœtal miscarriage from the fourth to the seventh month

Coincidentally, indeed, with the development of the ovum, it undergoes modifications in structure, which necessitate infinite differences in its

expulsion; and even as we were able to say of labor at term, that not one resembled the other, the same may be said of miscarriage. When we study the phenomena of miscarriage, we must remember that we are dealing with a number of factors. Kunecke, in Germany, makes four: 1st. Mechanical modifications. 2d. Organic. 3d. Dynamic. 4th. Plastic. We make of these, two: The modifications which concern: 1st. the ovum, 2d. the uterus.

On the side of the ovum these modifications are enormous, from the day when it arrives, as a new organism, in the womb, up to the end of the third month; so great, indeed, that it is impossible to compare the ovum of the first, second, and third month together.

During the first month, the ovum, engrafted on the uterine mucous membrane, which swells around it, so as to constitute what is termed the decidua reflexa, is surrounded entirely by the villi of the chorion, which develop over its surface. It is composed already of its two membranes, the amnion and the chorion, and the uterine mucous membrane may be decomposed into three portions, parietal decidua, decidua reflexa, and mucous membrane between placenta and uterus, or, better still, between uterus and ovum. There is still no cavity in the ovum. It is being formed. When removed from the decidua, the ovum looks like a small body roughened by the projection of a number of appendages, one longer than the others, at the centre of which is found the amnion, containing the microscopic embryo, so to speak. This little ovum is surrounded by a second membrane, thicker, and more voluminous, in which it is almost lost, and which is no other than the uterine mucous membrane, in two portions, the one applied directly to the ovum, the decidua reflexa, the other larger, and separated from the former by a space filled with gelatinous matter, more or less liquid, and this is the parietal mucous membrane. This gelatinous matter, which disappears later, is the hydroperion. The whole is surrounded by clots, more or less dense.

From the fifth week, the ovum is composed of three distinct layers. An internal, the amnion, which, growing away from the embryo, forms a cavity which fills up, more and more, with the amniotic fluid. An external, the chorion, furnished with ramifying villi, which cover the whole of the ovum, and penetrate into the mucous membrane of the uterus. A middle, the allantois, which, thinning out more and more as it tends to disappear, becomes a vesicle, a cellular layer, which brings the umbilical vessels to the finest radicles of the chorionic villi. The whole is surrounded by the uterine decidua. From this time forth, the vital conditions of the ovum change. While up to now, it is the umbilical vesicle which has furnished nourishment to the ovum and the embryo, from the moment when, through the allantois, the umbilical vessels reach the mucous membrane of the uterus, it is these which supply nourishment to the foetus, and we are going to witness the formation of a



new organ, the placenta, which becomes the centre of foetal nutrition. The umbilical vesicle atrophies and collapses, and it is to be found, between the amnion and the chorion, as a little vesicle adhering to the embryo by a long obliterated pedicle, the omphalo-mesenteric cord, in which are seen traces of the primitive vessels of the embryo. Before, however, the placenta is formed, the ovum undergoes many other changes, which concern in particular the amnion and the chorion.

At first adhering to the embryo, from which it is an offshoot, except at the level of the ventral opening, the amnion recedes more and more towards the dorsal and ventral portion, forming thus a complete sac in which the embryo is plunged, a sac, which, at its ventral surface, is going to form an addition to the organs which issue from the abdominal cavity of the foetus to form the umbilical cord. It thus gradually meets the chorion, and is separated from it only by the cellular layer, which is the remnant of the allantois. The amnion and chorion then grow simultaneously, and, the amniotic fluid increasing, the decidua reflexa is, in turn, pushed towards the parietal decidua, and, towards the fourth month, this decidua joins the parietal and merges into it.

During this period, what becomes of the villousities which we have seen covered the entire ovum? While those which cover the side of the ovum, towards the parietal decidua develop further to form the placenta, those which correspond to the decidua, reflexa, pushed aside by the growth of the ovum, are flattened out, and their vessels obliterated. These villi atrophy, and, when the decidua reflexa and parietal meet, these villi exist no longer, so to speak, and the ovum remains in communication with the mother only by the placental villi, which, bathing in the uterine sinuses, become the medium of exchange in nutritive substances which go towards the development of the foetus. As the ovum develops, these utero-placental adhesions become the stronger, so strong in certain instances that we are obliged to detach the placenta even at term. The nearer we approach term the feebler, normally, become these adhesions, and consequently, the greater the ease with which the ovum detaches itself from the uterus.

After three months and a half to four months, miscarriage becomes a labor in miniature. The placenta is fully formed, the ovum has definite structure. The uterine mucous membrane has sent solid epithelial prolongations between the villi, so as to intimately attach the ovum to the uterus, and protect it against destruction. While prior to this, the ovum lived, so to speak, by its entire periphery, under the influence of the development of the amnion, and of its greater distension by the liquor amnii, the distended chorion loses its villi, and thins out, and, at the same time, displaces before it the decidua reflexa, which becomes similarly thinned out. At the end of the fourth month, the parietal decidua and the reflexa unite, and the ovum exists as it remains till the end of pregnancy.

Attached to the uterus by the placenta, the ovum is composed of the amnion and the chorion, thin membranes, of great tenuity, and it is covered by the decidua. In the liquor amnii swims the fœtus, attached to the cord, which gains in size and in length. It is especially important to remember that the placenta is relatively larger than the fœtus, and, above all, more solid and resisting.

The second factor consists in the modifications of the uterus. These, we have seen, concern both the cervix and the body, and are characterized by increase in size, in capacity, in weight, by change in form, in situation, in consistency, in thickness, and above all by modifications in the serous, muscular, and mucous layers. These changes, and modifications, we have already sufficiently noted. Let us recall only the transformation of the inter-utero placental mucous membrane into a species of spongy tissue, the whole of the interstices of which are filled with blood in which the villi of the placenta are plunged, and are united to this tissue by epithelial bands from the mucous membrane; and further, let us recall the progressive development of the muscular tissue, which, through the exercise of its fundamental property, contractility, becomes the active, essential agent, which expels the fœtus. Let us add, finally, the shedding of the uterine mucous membrane, a process which to-day, it is admitted, concerns not alone the parietal decidua, but also the superficial part of the inter-utero-placental mucous membrane.

It is apparent, now, why it is that miscarriage may be different, according to the period of gestation at which it occurs, and the conditions which determine it.

Having stated the above general views, we begin at once the study of miscarriage.

*Frequency.*—Is miscarriage a frequent accident? According to hospital statistics, it is rare, but nevertheless it is of very common occurrence. The reason for this discrepancy is that miscarriage during the early weeks is generally not noticed. Many women believe that the menses are simply retarded, and although they may suspect a miscarriage from the passage of clots, or crampy pains greater than they usually suffer when menstruating, they do not consult a physician, and even if they did there would still be doubt, seeing that the ovum is not likely to be found in the clots which have been passed. Even if the woman knows she is miscarrying, she does not go to the hospital, but household remedies are usually administered. It is only in his private practice, therefore, that the physician can really be certain, and even then only in part, of the miscarriage. The same uncertainty exists in regard to the frequency at different periods of pregnancy. While many authors believe that miscarriage occurs oftener from the third to the fourth month, Jacquemier, Depaul, Cazeaux, state that this is true only in the first two or three months.



Depaul is even more precise, and places the period of greatest frequency at two and a half to three and a half months, from thence diminishing in frequency up to term. Opposed to this opinion is Jacquemier, who, without agreeing fully with Madame Lachapelle, in whose experience the sixth month was the time of election, rather than earlier in pregnancy, declares that at this month it is settled that miscarriage occurs with certainly as great frequency as in the earlier months. This view, while true of premature labor, appears to us exaggerated as applied to miscarriage, and we believe with Depaul that the latter is of greatest frequency from two months to three and a half. Still we are speaking now purely of certified miscarriages, and it still holds true that many an ovum is shed unnoticed during the first four to six weeks; this is not astonishing when we remember that it is only at three months, to three and a half, that the placenta is developed, and that up to this time the feebleness of the adhesions which bind the ovum to the uterus, and the ease with which extravasations may take place between the chorion and the decidua reflexa, render it an easy matter for the ovum to be disturbed.

Is miscarriage more frequent in case of female than of male fœtuses? Morgagni and Desormeaux have so held, but their opinion is based on absolutely no statistical data. Jacquemier is in doubt on this point; Cazeaux is inclined to agree with Desormeaux, because at term the proportion of boys to girls is as 16 to 15, and therefore it is possible the miscarriage of females may be more frequent.

*Causes.*—These may depend on: 1st. The father; 2d. The mother; 3d. The ovum; 4th. Criminal attempts or external violence.

1st. The father may be the cause of miscarriage through constitutional or acquired means. Men too young or too old; those whose constitution is weakened by debauchery, or excesses, or disease, these are likely to beget a fœtus not fit for development. Further, the influence of syphilis in the father is, to-day, admitted universally, and the lesions presented by the fœtus are so distinctive in such cases that they point at once to syphilis of the father.

2d. In women who are very young, with body incompletely developed, and menstruation not normally established, with tissues delicate and feeble; in women who are old, with tissues dense, and brittle—in these miscarriage is frequent. Depaul absolutely denies this, but Jacquemier affirms that it is not unusual to see women miscarry with the greatest ease the nearer they are to the age when aptitude for conception usually ceases. We have, ourselves, seen three children, of thirteen, thirteen and a half, and fourteen years, respectively, confined at term, but these children in their physical development were in advance of their age.

As for the temperament of the mother, it has been claimed that the nervous, the bilious, the sanguine, were, in turn, causes. This seems to be true, in particular of the latter. Many women, indeed, who are of

full habit, and lose profusely at their periods, miscarry readily, and this usually at a time which coincides with the menstrual epoch. As for the form of temperament, nothing has been proved; indeed the nervous is often dependent on functional uterine disease, and to this, therefore, must we look for explanation of the miscarriage.

On high temperature as a cause Depaul attaches much importance. In warm climates, uterine hemorrhages are of common occurrence, and these in turn may provoke miscarriage. We refer here only to climatic temperature, and not to elevation in the mother, the result of disease.

In mountainous countries, further, miscarriage is frequent, and we are told by Saucerotte and Jourdanet that the women of such regions are accustomed to resort to the valleys in order to avoid miscarriage.

Madame Boivin and Madame Lachapelle admit, as a further cause, epidemic influence, but, although such is the case with animals, it cannot be considered so in the human female. It is especially during famines and sieges that this cause has been supposed to hold, but, evidently, here there are other factors at work.

Finally, there are a number of women in whom there exists a habit of aborting, either because the genital system functionates badly, or because the menses are irregular, often scanty or painful, or else, because the genital system seems to lack vigor. These women, pale, feeble, and subject to leucorrhœa, possess, frequently, this trait in common with those of the sanguine temperament, that they suffer from menorrhagia; but they are always irregular in menstruation. Stolz has further pointed out that stout women are often sterile, and that, when they do conceive, they are predisposed to miscarriage, doubtless because local nutrition is at fault, and the fluids intended to nourish the fœtus are insufficient for its development.

Every acute or even chronic disease of the mother may become a cause of miscarriage, when such diseases affect profoundly the respiration, the circulation, or the temperature. Of these diseases, there are certain which act more powerfully than others. (See Pathology of Pregnancy.)

Diseases of the uterus: metritis, endometritis, interstitial, and submucous fibroids, versions, flexions, organic disease of the cervix, especially of the body. Still further: adhesions of the broad and round ligaments, of the tubes and ovaries, since they may interfere with the development of the uterus. Again, inflammations of the bladder, of the rectum; neighboring tumors, pelvic deformities, which prevent the regular development of the uterus or retrovert it.

Finally, there are certain women who, without special cause, miscarry over and over again, and it would seem as though in them there existed special irritability of the uterine fibre. The sphincter of the uterus seems to be weakened, and, when pregnancy ensues, the least effort overcomes it. This has been called laxity of the fibres of the cervix. This irrita-



bility of the uterus determines the premature appearance of contractions, the cervix yields, the membranes rupture, and miscarriage occurs, without other cause than this excessive irritability of the uterine fibres.

Jacquemier has studied, in particular, uterine congestion as a frequent cause of miscarriage, and we reproduce his views: "Active or passive congestions of the uterus are the most frequent causes of miscarriage. They excite the uterus to contract abnormally, and determine often extravasations between the uterus and the placenta. These extravasations are the result of rupture of the vessels which go from the uterus to the placenta. Indeed, in many miscarriages, the determining factor is the existence of hemorrhage, or its manifestation internally or externally.

"All stout women are not equally predisposed to uterine congestion. Those who are plethoric, and have hemorrhages apart from pregnancy, are equally more inclined to puerperal hemorrhage than others. The very existence of pregnancy inclines to further congestion. This organ is then much more vascular than before. New blood-vessels are sent ramifying through the placenta and the decidua, and these vessels are soft in texture, and easily torn. The moderate and regular contraction of the uterine muscular fibre for the moment empties the uterus of the excess of blood which distends these vessels; but let this contraction be over strong, spasmodic, or local, and the connection between the ovum and the uterus may be changed, and hemorrhage occur between it and the uterus. Further, it should be remembered that at the dates corresponding to the suppressed menstrual periods, the uterus is still further temporarily congested, and every accoucheur has noted the frequency of miscarriage at dates coinciding with the menstrual cycle."

It remains to note as causes of miscarriage: tight clothing, which interferes with the abdominal circulation, moral emotions, mechanical shaking, such as results from carriage or horseback riding; external traumatism, which acts either directly on the uterus, or indirectly by determining congestion of the organ; violent muscular efforts; operations on the genital organs; efforts at criminal abortion; drugs which have an oxytocic influence. Many of these causes, as Jacquemier truly says, only suffice when they act with great intensity, or in women who are predisposed to miscarry.

*Causes residing in the Ovum.*—Here are included all the diseases of the placenta, of the membranes, of the cord, of the fœtus itself. Let us only recall the alterations in the placenta, the hemorrhages and their results, the alterations in the villi, the premature rupture of the membranes, shortness of the cord, anomalies, knots, stenosis or phlebitis of the vessels of the same; in a word all the diseases which may cause the death of the fœtus.

*Symptoms.*—One great fact dominates the symptomatology of miscarriage, and this is uterine hemorrhage, profuse or moderate. At times,

says Jacquemier, it is the provoking cause of miscarriage; again, it is not caused by the contractions of the uterus, but the separation and the expulsion of the ovum are accompanied, from the start, by a slight flow which frequently assumes, in character, the proportions of a hemorrhage.

The causes of miscarriage produce the following three results: 1st. Either the ovum is abruptly severed from its attachments, and the miscarriage is an immediate phenomenon. This is rare; 2d. Or uterine contractions, premature, are determined, and there results immediate separation of the ovum; 3. Or, finally, there results uterine congestion, which entails rupture of blood-vessels, and separation of the placenta. Then there follow uterine contractions, and these are secondary, consecutive. This is the most frequent form, and it is here that are observed the prodromic phenomena of miscarriage.

*Signs of impending Miscarriage.*—If, in certain instances, miscarriage results suddenly, without the women being aware of it, except through the appearance of the ovum, this is not always the case, and there are usually prodromic signs, more or less marked, and which vary with the etiological factor at work. Often these symptoms are simply an exaggeration of those common to the menstrual period, a feeling of malaise, of general weakness, accompanied by pain in the loins, radiating to the rectum and to the bladder. At the same time, the touch reveals certain changes in the cervix, accompanied by flaccidity of the vagina and increased secretion. Three circumstances, above all, influence these symptoms, which vary accordingly: 1st. Imminence of hemorrhage; 2d. Causes acting directly or indirectly on uterine contractility; 3d. The death of the fœtus.

Where hemorrhage is imminent, plainly it is congestive phenomena which are in the foreground; phenomena not limited exclusively to the abdominal organs, but affecting the whole body, as evidenced by the accelerated circulation, by the force and fullness of the pulse beat, by congestion of the face, or again, by irregular chills, by pain and tension in the loins and the abdomen, increased by the least fatigue. Rarely, true uterine contractions exist; usually the woman is conscious of these, without being able to exactly locate them. Often a slight show appears, ceases under rest or appropriate treatment, and the pregnancy goes on to term. Again these symptoms may recur, and, at length, after two or three similar recurrences, the ovum is expelled. These congestive symptoms almost always coincide with a menstrual epoch, and similarly the miscarriage occurs.

In other instances, instead of congestive phenomena, the signs are characteristic of uterine irritability, merging, on the slightest provocation, into contraction. The least fatigue, the least effort, results at once in pain in the loins and abdomen, with sensation of weight in the rectum and bladder, and, finally, true uterine contractions, appreciable often to



the hand where the woman is thin, or the uterus has risen above the brim, set in. In such cases, the cervix is less changed, remaining firm, and resisting, and it is only when the miscarriage is well under way, that blood appears.

When the fœtus is dead, the phenomena are far different. When the fœtus has developed sufficiently to allow us to feel its movements, and to hear the pulsations of its heart, we may, so to speak, be present at its death, by following the slow disappearance of these signs of fœtal life; and then it is that the women experience all those sensations which we have referred to when speaking of the death of the fœtus. But, when the ovum has not reached such a developmental stage as to allow us to appreciate the signs of life, the diagnosis becomes difficult, and the precursory phenomena are obscure, and not easy to differentiate. It is exceptional, in such instances, for miscarriage to follow at once on the death of the fœtus. Usually it is only at the end of six to ten days, and often longer, that the fœtus is expelled. Where the fœtal death results from acute febrile disease of the mother, miscarriage, on the other hand, follows soon, and the precursory signs are masked under the symptom the outcome of the maternal disease. When, however, the fœtus succumbs to a slow intoxication, or from accidental cause, then the precursory signs are sharply accentuated. To the positive signs of fœtal death, are joined symptoms from the side of the mother; paleness, feebleness, lassitude, a sensation of something abnormal. At times a gentle evening rise of temperature, a feeling of weight in the pelvis, the cessation of the sympathetic signs of pregnancy, swelling of the breasts, exudation of a milky fluid from the nipples, followed by decrease in size of these organs; relaxation of the cervix, patency of the external os; above all, the appearance of a red discharge, which may increase markedly, and become sero-sanguinolent of stale and disagreeable odor. Again, this discharge is intermittent, ceasing for a few hours, or days, and reappearing with greater intensity. From time to time, appear true uterine contractions, at first gentle, and then intense, and followed by greater discharge. Then these contractions cease, and all is quiet and normal, until, at last, labor frankly sets in.

*Symptoms.*—Two phenomena always accompany miscarriage: hemorrhage, and uterine contraction. These symptoms are variable, according to the stage of pregnancy, and according to the life or death of the fœtus. When the miscarriage occurs during the early weeks of pregnancy, whether the fœtus be dead or alive, makes no difference. The uterine tissue is denser than the normal, but the muscular fibres have only begun to develop. It is not the contractions of the uterus which are going to cause the shedding of the ovum, but it is uterine congestion and the resultant hemorrhage which produce this phenomenon, and dilatation of the cervix occurs but imperfectly. As at the time of menstruation, the cervical canal opens, and becomes patulous, but without true dilatation,

and clots and ovum are so soft that they readily pass through this canal. The resistance offered is lessened by the softening of the uterine tissue, and it is not the ovum which gives rise to trouble, but the clots which surround it. The ovum is lost within these clots, and the miscarriage is, usually, soon accomplished. The hemorrhage, often no more than is lost at the menstrual periods, is accompanied, or at once followed, by a few colic-like pains, or uterine contractions, and these suffice to expel the ovum. If the process lasts over long, occasionally, it is because the uterine mucous membrane is detached with difficulty, often in shreds, as is seen in pseudo-membranous dysmenorrhœa, which has often been mistaken for miscarriage. At times, shreds are passed for a few days, accompanied each time by hemorrhage and contraction; then the discharge becomes sero-sanguinolent and serous, and the miscarriage is ended. The cervix remains patulous for a few days, but it retains its length, and the uterus quickly regains its form, consistency, and normal dimensions. In such cases, the ovum is passed entire, and, if it seem torn, this is because the scarcely formed cavity, between the decidua reflexa and parietalis, is mistaken for the cavity of the ovum. The shreds, which are seen, do not belong to the ovum, but to the decidua which the uterus furnishes to the ovum as an outer covering.

Miscarriage from the first to the second month, differs notably from that of the early weeks. The uterus, indeed, has developed with the ovum, has become proportionately hypertrophied, especially in its muscular tissue, since the mucous coat is intended to be shed with the ovum, and replaced by another. Miscarriage here, then, consists in: 1st. Separation of the ovum. 2d. Separation of the mucous membrane. 3d. Expulsion of the ovum.

At this period still, spontaneous miscarriage frequently occurs, because the bands which unite the ovum to the uterus are very fragile, and it is, in particular, at the menstrual epoch that the accident occurs. The miscarriage may occur entire—that is to say, the ovum may be expelled *en masse*, intact, or with ruptured membranes. If the catamenial or other congestive factor be strong, hemorrhage results, and the blood, escaping into the uterine cavity, tears these fragile bands, often even tears the chorion, penetrates this membrane, reaches the amnion, ruptures it, and gains the interior of the ovum, as is proved by the cases of Breschet, Dance, Blot, Dohrn, Hegar, Henning, etc. The ovum, therefore, is expelled with ruptured membranes, and not entire. If the hemorrhage be less abundant the ovum is simply detached, and this, being a foreign body, is expelled by the uterus, either entire, or with ruptured membranes, but ruptured here from another cause. We insist on this point, because we are opposed to the opinion of Gallard and of Leblond, who state that the expelled ovum is, in the early months, always entire, with membranes intact, and who believe that when the membranes are rup-



tured, it is a sign of criminal abortion. Miscarriage, it is undoubted, has greater chances of resulting in an intact ovum, the younger this is. But, even as early as the fifth week, the ovum may be expelled with torn membranes, and to call such rupture proof of criminal attempts is in opposition alike to the experience of scientific and practical observation.

That which characterizes, in particular, miscarriage at this period, is the initial hemorrhage, contractions of the uterus only supervening secondarily. At the outset there exists congestion, then hemorrhage, and it is only when the ovum is entirely detached, or nearly so, that contractions appear to expel it. Now, it is precisely because of this tardy appearance of contractions that we often obtain an intact ovum. Since the hemorrhage affects almost complete separation of the ovum, only a few uterine contractions are necessary to complete the detachment, and the ovum falls on the cervix. Then it only has to overcome the resistance of this portion of the uterus. That which delays the completion of the miscarriage is not the ovum, but the decidua. As for the ovum, it slowly insinuates itself in the cervix, which dilates enough for its passage, but surrounded as it is by clots, it passes without rupture.

In other rare instances, the contractions of the uterus are the initial phenomenon. At first faint, irregular, these contractions approach nearer one another, and become intense enough to detach the ovum. Here, the hemorrhage is secondary.

The ovum detaches itself slowly, progressively, little by little, each act being preceded by contraction, and accompanied by hemorrhage, which has not the same characters as at first. It is now intermittent, coinciding with the contractions, and the more intense these latter, the more abundant. This hemorrhage only ceases with the expulsion of the decidua. In this instance the ovum is living, and resists destruction as far as in it lies. It is no longer a foreign body, of which the uterus tries to rid itself as soon as possible; it is a living being, which, engrafted on the maternal organism, requires, for its separation, heroic and persistent efforts. Whence the longer duration of the miscarriage, whence the alternation of rest and pain, the intermittent character of the contractions which is typical of uterine action, in particular during miscarriage. It is apparent, therefore, that for us the vitality of the foetus plays an important part in the symptoms of miscarriage, and it is this vitality which entails on miscarriage a portion of its gravity.

In case the ovum is dead, a number of days may pass without the woman suffering at all to speak of, and then appears a gentle flow of darkish blood, which may last six or eight days, in the absence of uterine contractions. At length these supervene, a digital examination is made, the cervix is found more or less dilated, the internal os open, and the finger may pass in and touch the ovum. Finally, the ovum engages in the cervix, which opens still further, and it falls into the vagina, where it may

remain some time before expulsion. The amount of hemorrhage accompanying the process may be slight, there may be none at all. The ovum, indeed, having died some time before, the uterine and utero-placental circulation have become deeply modified through the cessation of pregnancy. Uterine congestion is, thence, relatively slight, and therefore the amount of blood lost is also slight.

If the death of the ovum be recent, and the result of accident or traumatism, if miscarriage follow soon on the death, the hemorrhage precedes by but a few hours the onset of contractions; frequently even they appear together, and the hemorrhage, if the act of miscarriage be a trifle prolonged, may be excessive and dangerous.

If, finally, the ovum has been dead a long time, it rests quietly in the uterus for a considerable interval, and then, of a sudden, the woman loses blood, violent contractions supervene, and in a few hours, at times almost at once, the uterus expels this foreign body, with scarcely any premonitory symptoms. This variety of miscarriage is of unusual occurrence where the fœtus is dead, and still more so where it is alive, and it is only as the result of violent traumatism, and during the first five to six weeks of pregnancy that we see it. It has occurred twice in our experience.

When the ovum is living, and the process of miscarriage is prolonged, it may be expelled in two different ways: either entire, as is claimed by Gallard and Leblond, or else in two pieces, so to speak, as ordinarily happens at the second and the third month. Then the ovum is not a foreign body with nothing binding it to the uterus. It is no longer hemorrhage which causes it to separate, but it is the contraction of the uterus, and the ovum, still partially attached to the uterus, is incompletely pushed towards the cervix by these contractions. Pushed by the uterus at the time of contraction, it tends, during relaxation, to resume its normal place; but the contraction augments, the cervical canal opens, the ovum engages within it; the contraction now ceases, and the ovum lies between two forces, the cervix, on the one hand, which tends to retain it, the body of the uterus, on the other, which tends to pull it back on the cessation of contraction. Whence traction, which, if the adhesions resist, tends to inevitably rupture the ovum, a rupture all the more likely the greater the vitality of the ovum, and the stronger its adhesions. The miscarriage will, therefore, occur at divided periods; the fœtus will issue first, the remainder of the ovum later, and this remainder will sometimes be expelled only after the lapse of a number of days. It is in these instances that hemorrhage may be profuse and serious. For apart from its intensity, the woman is exposed to a renewal as long as the placenta remains in the uterus. The uterine contractions are irregular, intermittent, appearing for a while, and then disappearing, and this very prolongation of labor is of grave import for the welfare of the woman. We will see further on



that there is another danger, depending on retention of the placenta, and on the alterations it may suffer.

The prolongation of labor, in these cases, depends, on the one hand, on the weakness of the uterine contractions, and, on the other, on the resistance of the cervix and the adhesions of the decidua.

Weakness of contraction is to be expected at this period. The uterus has by no means attained the muscular development it will later; the muscular layer is only in process of formation, and contractility, hence, can be present only incompletely. Again, the cervix, at two months, has changed simply through a little softening at the tip. It has still its normal length. At labor at term, the cervix, which has been softening throughout pregnancy, first disappears, then dilates, being represented simply by a ring, the result of the disappearance of the external os, and the opening of the internal. In case of miscarriage, however, the cervix neither softens, nor dilates, but only opens sufficiently to allow of the passage of the ovum. It retains its entire length; the two orifices remain at the same distance, one from another; the ovum is obliged to pass through a canal, the more rigid the less advanced the pregnancy. Whence, therefore, an additional resisting force it has to overcome, and whence, also, the likelihood of rupture, the greater the more intense the uterine contractions, the rigidity of the cervix, and the length of the labor. Miscarriage may last for days, and even for weeks. The process is started by the uterine contractions, the ovum tends to become detached, but unequally; pushed against the cervix, it engages in the canal, and it tears. What happens then? The fœtus, which is so small and weak, passes out first, and easily. The cord, scarcely formed, breaks, and the ovum may be lost in the discharges. The true miscarriage, however, has not occurred; the membranes and the placenta must still detach themselves, and it is only at the end of a few days that these are shed, and the miscarriage is ended. These, then, are the two stages at this period of gestation. The cervix closes after the escape of the fœtus. A second labor is needed for the expulsion of the remainder of the ovum.

From two and a half to three and a half months the conditions are still more different. The placenta has been definitively formed, it is relatively larger than the fœtus, it is attached more firmly to the uterus. In case of accident or of hemorrhage, the ovum will no longer separate entire, but only by portions from the uterus. Therefore miscarriage in two stages becomes the rule, and in one the exception. The uterus is far from having acquired its definitive structure, the muscular fibres are still in a rudimentary condition, and hence, the uterine contractions are too feeble to detach the placenta. Whence the infinite duration of the process, at times. Furthermore, there is marked disproportion between the dilatation of the cervical canal and the body which has to pass through it. The cervix, indeed, still neither dilates nor retracts; whence, again, the likeli-

hood of rupture of the membranes. Under the influence of contractions, the internal os opens, the ovum enters the canal, and remains there for a number of days. Then, at a given time, as a result of a contraction, or of some effort on the part of the woman, the ovum ruptures, and the embryo is expelled through the cervix, and often breaks the cord; if not, the embryo remains attached to the cord until traction, or effort of the woman, breaks it. The placenta stays in the uterus, and, whether separated or not, a new labor is necessary for its expulsion. The cervix closes, and new contractions are needed to re-open it for the passage of the placenta. If this organ has entirely separated, hemorrhage is ordinarily not abundant, except at the time of expulsion; if separation be incomplete, the hemorrhage lasts until detachment has occurred. In any case, no effort should be made to remove it, before its engagement in the cervix, otherwise, there is risk of tearing it, and of leaving portions in the uterus, and still another labor will be necessary for the expulsion of the remnants; and if this new labor should not supervene, the placental shreds may putrefy, and, as we will see, entail grave complications.

The above is not all. There is another element which we must remember, and this is the decidual membrane. In labor at term this membrane is really decidual, because it has lost its vitality; but in miscarriage, it is still living, and adheres strongly to the uterus; and instances are not rare where miscarriage is divisible into three stages, one for the fœtus, one for the placenta, one for the uterine mucous membrane.

Very infrequently, in our opinion, the ovum is expelled entire at this period of gestation, and then the fœtus is dead.

From three and a half to the seventh month, miscarriage approaches, progressively, nearer in character to labor at term. Two stages are the rule. The muscular fibre of the uterus is more developed, the uterine mucous membrane is detached the more readily, and while considerable time elapses between the expulsion of the fœtus and that of the placenta, this interval is relatively less. It is exceptional to see the expulsion of the placenta delayed beyond twelve to twenty-four hours. The nearer to the seventh month the less profuse the hemorrhage; but even up to the fifth month, it may be very considerable.

Such are, in outline, the phenomena of miscarriage at various stages of gestation. We now consider, in detail, each of these phenomena, the hemorrhage, the uterine contractions, the modifications of the cervix.

*Uterine Hemorrhage.*—This is intimately connected with miscarriage, and if every hemorrhage does not determine the process, we may, nevertheless, say that there can occur no miscarriage without hemorrhage. The very structure of the ovum, even during the first months, necessitates this. Immediately at conception, the ovum becomes surrounded by vascular villi, its detachment is, therefore, necessarily accompanied by hemorrhage. Again in case of premature detachment of the ovum, the



separation occurs but slowly, and here is another source of bleeding. The appearance of hemorrhage, therefore, in the early months of pregnancy, should always awaken the anxiety of the accoucheur. In the vast majority of cases, it is an indication of impending miscarriage.

[It is well to recall further causes of hemorrhage, slight in amount usually, during the early months of pregnancy. Up to the sixth or eighth week it is still allowable to think of a return of the menses. At a later period, although there are a few undoubted instances on record, menstruation can hardly occur without imperilling the ovum. Frequent causes of hemorrhage are, slight separation of the ovum, the result, not infrequently of violent or often repeated coitus, erosions of the external os, cervical polypi or tumors, carcinoma of the cervix, lacerations of this organ. The point we desire to insist upon is that in every instance where a gravid woman complains of hemorrhage, both a digital and specular examination should be made to determine if one or another of the above causes be not at the bottom of it, instead of impending miscarriage.—Ed.]

This hemorrhage is sometimes preceded by signs of uterine congestion, sometimes is sudden in appearance. It may be internal, external, or mixed. "When the hemorrhage is internal, it may be limited to the membranes, to certain portions of the placenta, constituting what has been called placental apoplexy. It may then, if slight, not determine quickly either labor, or the expulsion of the fœtus, or its death. One or another of these result only after the repetition of such hemorrhage. In other instances, it may be profuse, and may spread throughout the entire placenta, the whole ovum separating without the appearance of the least blood externally." (Jacquemier.)

The precursory signs of miscarriage, it is understood, are more or less intense, according to the amount of separation of the ovum, which follows on the hemorrhage. The uterus, distended by blood and clots, begins to contract, and this contraction becoming more frequent, the cervix opens, and the clots, with a little fluid blood, pass out. The hemorrhage has become external.

When the hemorrhage is external, it may begin by a simple trickling of a reddish fluid, only becoming later hemorrhagic in character, or else announce itself at once by the appearance of clots and blood. Sometimes the blood is black, followed only later by red. The duration of the flow is variable. It may begin with the miscarriage and persist continuously to the end; again it may appear only with the contractions. At times it ceases not to recur until the expulsive act, and then profusely. The amount lost is very variable, from a few drops on. It comes, we believe, from both the arteries and the veins, and as a result of the rupture of the mucous membrane and detachments of the placenta, which leave open the uterine sinuses. The blood, hence, is rather venous than arterial.

*Uterine Contractions.*—Like those which occur at term, these are painful, although less intense, and they differ in regularity and in rhythm. Instead of pains progressively increasing in duration and in intensity, and which are separated by intervals less and less long, the contractions of miscarriage recur frequently at very long intervals only, during several days, until they finally become established, and expel the fœtus.

*Changes in the Cervix.*—These are not at all comparable to those which have occurred at term. Jacquemier thus describes these changes: under the influence of the uterine contractions, there occur alterations in the cervix, which are the first indices of effective labor. These contractions are, for some time, obscure, irregular, as though continuous, with momentary exacerbations. The cervix is shortening and softening, the ora are opening, first the external, and then the internal, the vagina is relaxing, and is covered by a thick, abundant mucus. The body of the uterus sinks into the pelvis. Only after the above changes have occurred, do the contractions become regular, and truly intermittent. This period of labor may last a number of days. Once the cervix softened and relaxed, dilatation supervenes quickly enough, if the contractions are good. This dilatation is accomplished as follows. As the cervix softens it shortens—[Does it not rather seem to shorten, from the very fact of the softening? This matter is in dispute.—Ed.]—and the external and internal os approach one another. The internal os insensibly opens more and more, and the contractions act on the external os, the border of which becomes thin, and cutting, as dilatation progresses. The ovum presents at this orifice, and is projected out by a pain. These expulsive pains not only dilate the cervix, and drive out the ovum, but they cause rupture of its adhesions to the uterus. Whence the premature hemorrhages which ordinarily accompany miscarriage, and which, in labor at term, or in advanced stages of pregnancy, are only seen after the expulsion of the fœtus. As soon as the entire ovum has been expelled into the vagina, the pains and the hemorrhage cease.

The phenomena which follow the regular expulsion of the ovum are very similar to those of labor at term, but less accentuated the earlier the period of gestation.

*The Lochial Discharge.*—This is scarcely noticeable after very early miscarriage, and more and more marked thereafter, especially when the decidua mucous membrane separates but slowly. The sero-sanguineous discharge then lasts a long time, and in the uterine and vaginal excretions are found blackish *débris*, often very fetid. Truly, as Garimond has well said, we are dealing not with the lochia, but with a discharge caused by the fact that the miscarriage is incomplete. It ceases with the expulsion of the last shred.

*The Lacteal Secretion.*—This is present, as we have already stated, before miscarriage, in cases where the fœtus dies, but it ordinarily recurs after



the expulsion of the ovum. Usually this is the case in multiparæ, and after the third month. Joulin has related a case where milk was secreted six weeks after impregnation.

Finally, involution takes place more rapidly than after labor at term, at least as regards the cervix, which closes much more quickly, and also regains its length and consistency sooner. The same does not apply to the body, and it is not unusual, after miscarriage, to find the body of the uterus remain larger than the normal; and in case of frequently repeated miscarriages, this incomplete involution merges into hyperplasia, the more so, indeed, because the precautions taken after miscarriage, particularly in the early months, are far less than after term.

After-pains do not follow miscarriages in the first months; usually they are not present till after the fifth in multiparæ. When they do exist, it is usually proof that the miscarriage was incomplete, and that shreds of the decidua are still in the uterus.

*Diagnosis.*—In the diagnosis of miscarriage there are included a number of questions: 1. Is the woman pregnant? 2. Pregnancy assured, are the symptoms those of pure uterine congestion or of beginning miscarriage? 3. Is miscarriage inevitable? 4. Is the miscarriage complete, or are there still in the uterus shreds of membrane, of placenta, or of decidua?

Is the woman pregnant? If the diagnosis of pregnancy is easy, after the fourth month, when the fœtal heart, and the active movements, of the fœtus are appreciable, it is far from being so in the earlier months when all we possess are the probable signs. There is nevertheless one sign which may be of the highest importance, and this is the suppression of the menses. If the woman was regular up to the time of suppression, if this latter has occurred without morbid cause, if the rational signs of pregnancy are present, if, in case of a nullipara, the mammary areola, and Montgomery's follicles are present, then the chances are great that we are dealing with pregnancy. If, under such circumstances, persistent lumbo-hypogastric pains appear, with momentary exacerbations; if, at the same time, there appear an abundant bloody discharge, persisting, and mixed with clots; if at the same time, the cervix is softened, and the external os is open, we are nearly certain that we are in the presence of a miscarriage. One point only is in doubt, if we have not been present from the start, and have not seen the discharge and clots,—this is if the miscarriage is complete or not.

When, on the other hand, the woman is naturally irregular, the diagnosis is far more difficult. The suppression of the menses loses its value in diagnosis. It is not exceptional, indeed, to meet women who menstruate only every two to three months, in whom the breasts swell, the abdomen enlarges, and who present the signs of pregnancy in its beginning, and yet are not so.

According to Madame Lachapelle, the hemorrhage precedes and accompanies the pains, and increases with the intensity of the pains, and is always attended by clots, in case of miscarriage. In case of dysmenorrhœa, on the other hand, uterine contractions always precede the hemorrhage, and diminish as the hemorrhage increases. Further, clots are always less abundant than in case of miscarriage. In miscarriage the os is open, and the cervix modified in consistency, while it remains closed and is not softened in dysmenorrhœa. Clots coming from the empty uterus are triangular, while in miscarriage they have no special shape. All these signs are more than hypothetical, and hence are of little value.

Still further, there are certain women who, during the first three months of pregnancy, suffer from slight hemorrhages which do not seem to have a tendency to provoke miscarriage. Such women may not know that they are pregnant, believing themselves to be menstruating. These slight hemorrhages differ, however, from the menses, in that they do not correspond to the menstrual epoch, either in time, quantity, or duration.

We see, then, that there are many sources of error, and it is only by obtaining all possible information, and by examining the discharges and the clots that we can reach a nearly certain diagnosis.

[The decision as to whether the woman is pregnant or not, it seems to us, may almost infallibly be reached by a sign not mentioned by the author, and this is Hegar's sign of early pregnancy, which we have described in the first volume, under the Diagnosis of Pregnancy.—Ed.]

The woman is pregnant, then, but are the symptoms purely those of simple uterine congestion, or is miscarriage imminent?

In the majority of instances, as Cazeaux justly says, "We cannot tell whether, even when pains have ceased, if the congestion has been relieved before vascular rupture, and hemorrhage between the placenta and the uterus have killed the fœtus. Even though the fœtus be still alive, we know nothing about the extent of placental separation. Often, indeed, the fœtus, deprived of a greater part of its respiratory means, is placed in the same condition as an adult in whom a greater part of the lungs has been destroyed; there remains only insufficient respiration and nutrition, it dies little by little, and it is only after the lapse of eight to fifteen days, often at the next menstrual epoch, that it finally succumbs." Jacquemier, further, has insisted that the first placental apoplexy predisposes to others, since it interferes with the development of the placenta.

*Miscarriage has Commenced.*—Is it inevitable, or can it be caused to cease? Generally it may be said that as long as the fœtus is not dead, miscarriage may be prevented. But, if at the fourth month, we possess certain signs of the life or the death of the fœtus, the same does not hold true before this period, and, as we have seen, it is during the first three months that miscarriage most frequently occurs. The fœtus once dead, the miscarriage will necessarily occur sooner or later. One sign alone, may



be of value, and this is the cessation of all the rational signs of pregnancy; but there are many women in whom these signs are so little marked as not to be noticed.

However intense the pains, however in character like uterine contractions, however much the profuseness of the hemorrhage, or however marked the changes in the cervix, we are yet not justified in considering the miscarriage inevitable if the ovum be intact, and the membranes not ruptured. In certain exceptional cases all these signs have disappeared, and the pregnancy has continued.

There are other instances again where the diagnosis is still more difficult. For instance: The woman had been certainly pregnant, she has passed through, apparently, a miscarriage, having lost much blood, and suffered greatly from the contractions of the uterus. Clots have been passed and with them a body, which a midwife or a physician has examined, and pronounced an ovum, and furthermore it is stated that the miscarriage is complete. This body has been thrown away, and the accoucheur, hence, cannot examine it. The bloody discharge continues, the woman does not regain her strength. Now has she really miscarried, and did the body really constitute the ovum? Is the miscarriage, if one has occurred, complete or incomplete? Here the diagnosis is difficult, and often cannot at once be made. If the ovum has really been expelled, the hemorrhage will shortly cease, the cervix and the body of the uterus will return to the normal. If the miscarriage be incomplete, at the end of a certain interval the hemorrhage and the uterine contractions will recur, and the remnant be expelled, or else some pathological factor will supervene pointing to the retention of ovular remnants in the cavity of the uterus. Not infrequently a portion of the placenta remains behind, the woman will bleed irregularly, and have occasional contractions until it has been shed. Sometimes this placental remnant undergoes complete changes in the uterus, and these are two in number: either this remnant becomes converted into a fibrinous polyp, (Fig. 28), as has been noted by Kiwisch, Virchow, Scanzoni, Sallinger, Frankel, Duncan, etc.; or else, more frequently, the remnant empties itself of the blood which it contained, becomes hard, takes the shape of the uterine cavity, and is transformed into what has been called placental polyp. (Braün, Schroeder, Valenta, Frankenhauser, Martin, etc.)

In other instances the diagnosis is still more difficult; where a placental tuft, or remnant of membrane or of decidua, remains in the uterus, and undergoes change. Here, instead of abruptly ceasing, the discharge persists, being black in color, and composed of detritus, and further—a very characteristic phenomenon—is intensely fetid. At the same time the woman's health is compromised. She suffers from chilly sensations, and has fever, effects which we will study when we speak of puerperal complications.

*Prognosis.*—For the fœtus, of course, it means death, since it is expelled before it is suitable for extra-uterine life. For the mother, it is grave, for, even if life is rarely compromised, health very frequently is; everything depends, however, on the progress of the miscarriage, and on the period of gestation at which it occurs. The prognosis is the graver, of course, where pregnancy is advanced, and the fœtus and the foetal annexes are shed separately, because to the dangers of miscarriage are added those of retained placenta, and its consecutive alterations. Generally, in a word, the prognosis is most unfavorable in cases where the miscarriage is the result of criminal manipulations or of disease of the mother. If we compare the process of miscarriage with confinement at term, aside from puerperal fever which is more common after the latter, the former

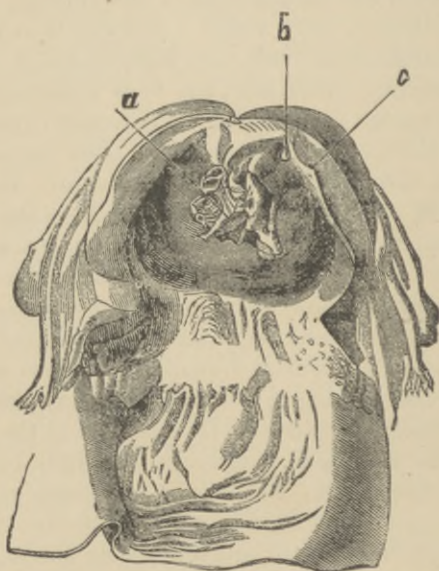


FIG. 28.—FIBRINOUS PLACENTAL POLYPL.—*a*, Fibrinous polypl. *b*, Placental site. *c*, Uterine cavity.

predisposes to metritis, to displacements. The complications of miscarriage, above all of note, are: profuse hemorrhages and retention of a portion of the ovum. Garimond insists on a third, faulty position of the fœtus. In our opinion this does not constitute a serious complication, for up to the fourth month the fœtus is too small to give rise to trouble, and at five and six months, the fœtus is so soft and compressible that it readily passes whatever the presentation. What really constitutes the gravity in these cases is the hemorrhage which accompanies the prolongation of labor, and which may be so profuse as to become very disquieting.

Although vertex presentations are the rule in labor before term, it is still true that the frequency of pelvic and of transverse presentations in-



creases considerably the further from term the pregnancy is interrupted. If we conjoin the statistics of Veit and of Hugenberger, we find that of 1517 children born at the seventh, eighth and ninth month, 76.1 per cent. were cephalic presentations; 19.9 per cent. pelvic; 3.7 per cent. transverse; while of 355 children born at the fifth to sixth month, only 54.6 per cent. were cephalic presentations; 40.2 per cent. pelvic, and 5 per cent. transverse. In these figures, however, are included macerated fœtuses, where the presentation alters from change in the centre of gravity. But even if these cases be left out, the law remains an exact one. For, according to Veit, of 379 children (eighth to ninth month), there were 84.7 per cent. cephalic, 13.7 per cent. pelvic, and 1.6 per cent. transverse presentations; of 43 children (fifth to sixth month), 62.8 per cent. were cephalic, 27.9 per cent. pelvic, and 9.3 per cent. transverse.

#### COMPLICATIONS.

I. *Hemorrhage.*—This always accompanies miscarriage in the early months. Generally intermittent, it is usually well borne by the woman; at times, however, it may be because of difficulty in the separation of the decidua, it may be because of special hemorrhagic tendency, or of a natural atony of the genital system; it becomes very profuse, and is accompanied by syncope, small pulse, cold extremities, in a word, by all the symptoms indicative of great loss of blood. It is particularly at from two months to three and a half that such hemorrhages are noted, and whenever miscarriage occurs in two stages. The reason is that, in such cases, the ovum separates but slowly, and that the cervix closing up after the expulsion of the embryo, a second labor is necessary for the shedding of the remainder of the ovum. Now, we have seen, that this second labor may last a number of days or weeks, and all this time the woman loses blood, often profusely. The hemorrhage, therefore, is grave, not only from its profuseness, but from its duration. If it does not compromise the life of the woman, it does her health, leaving her in a state of anemia, from which she may recover but slowly.

II. *Retention of the Ovum, and of the Placenta.*—“From the study of the means of union of the placenta to the uterus, Meyer states that this union, very intimate in the early months of pregnancy, becomes less so as pregnancy advances, through the retrograde processes which occur in the decidua serotina and in the utero-placental vessels; and that retention of the placenta depends, on the one hand, on the feebleness and irregularity of the uterine contractions, and, on the other, on the firm adhesions of the placenta to the uterine wall in case of miscarriage, whether these adhesions are normal or due to a pathological process. In the early stages of pregnancy, the placenta is divisible into two portions, the maternal and the fœtal. The bond of union between these is feeble, and the fœtal villi are easily separable from the maternal portion of the placenta. Still,

the uterine mucous membrane, and, in particular, that between the uterus and placenta, adheres firmly to the uterine wall, whence one of the reasons why it is often retained in the uterus after miscarriage. Up to the end of the third month, this mucous membrane separates slowly and with difficulty. Afterwards, the changes which it undergoes renders its shedding easier, and, consequently, its retention unusual. Up to the third month, hence, we observe either the retention of the entire placenta, or, oftener, of the serotina and the adjoining parts of the foetal placenta. This retention is due to: 1. The firm adhesion of the maternal placenta to the uterine wall. 2. The ease with which the foetal portion separates from the maternal. 3. The feeble development of the muscular tissue of the body of the uterus. 4. The slight dilatation of the cervix. 5. The pathological processes which are often the cause of miscarriage, and which may exist in the uterus, in the foetal annexes, in the organs neighboring on the uterus.

When the miscarriage is not determined by premature involution of the decidua, or by pathological processes which necessitate the complete separation of the decidua, the expulsion of the product of conception is usually incomplete. Either the entire placenta, or shreds of the decidua, or of the serotina, remain in the uterus. Now the expulsion of these remnants may require an interval of many weeks, and even months."

The placenta retained in the uterus may undergo cystic degeneration, as has been pointed out by Meckel, Scanzoni, Muller, Virchow, and others.

We would further mention as causes of placental retention, the diseases of this placenta, and endometritis.

These placentas, thus retained for a longer or shorter time in the uterus, may: *a.* Be expelled not altered, not putrid. *b.* Altered and putrid. *c.* With symptoms of septic fever. *d.* Without such symptoms. *e.* Be absorbed. *f.* Remain indefinitely in the uterus.

*a. Retarded Expulsion without Alteration.*—When the placental adhesions are not firm, and the probable cause of retention is functional trouble of the uterus, or slight mechanical obstacles, then the efforts of nature may suffice for its elimination, and this occurs shortly through uterine contractions alone. It is about the tenth to the fifteenth day that the placenta begins to separate, and that hemorrhage reappears; but the interval may be months, and the only sign accompanying the shedding is sub-involution, and one of its consequences, hemorrhage. The placenta may be slightly degenerated, but this is not always so; it is especially the case when we are dealing with shreds of the ovum. Baudelocque has noted such retention for many months. Cazeaux says: "When we examine these placentas they are not altered, and have no odor, and they may be as fresh, even after weeks, as though extracted immediately after miscarriage. The integrity of the vascular connections has given them lease of



life, and explains the innocuousness of this prolonged retention. Schöller has noted retention for eleven weeks; Metz for two and a half months; Prost, 103 days; Plasse, 15 weeks, and Reichmann, 13 weeks.

Unfortunately, the above is not always the case, and hemorrhage may be so profuse as to compromise life. Hecking cites a case where the placental remnant was passed only at the end of four and a half months. During this entire period the woman had profuse hemorrhages.

During retention, the uterus retains its increased size. Sometimes the vaginal portion of the cervix is shortened, the external os open, the lips softened and swollen, the internal os patent. The lower segment of the uterus is full and distended, the boundary between cervix and body is not marked. Again, the cervix is closed, and has resumed its shape; and again, the internal os alone is closed. The functional troubles of the uterus are manifested by pains, occurring, usually, when the placenta partially detaches itself. From time to time, the women have pains in the back, in the abdomen, frequent desire to urinate. The lochial discharge, instead of being almost *nil* as after completed miscarriages, persists, remains reddish, sometimes is fetid: but what predominates is hemorrhage, which may be profuse, even though the placental remnant be small. Finally, the woman may have slight rise of temperature.

(b.) *Expulsion of the Placenta Altered and Putrid.*—1st. Without symptoms of septic infection.—In these cases the marked phenomena are localized in the uterus and its neighborhood. The lochia become fetid, and this persists, until the placenta has been expelled, either spontaneously, or by instrumental means. Inflammatory symptoms from the uterus, or the adjacent organs, not rarely supervene, but these are accompanied only by slight fever, and hemorrhage. Even as the lochia may be putrid without the presence of micro-organisms, even so the placenta may become putrid in the absence of such organisms. The alterations are purely chemical in nature, and consist in the production of alkaloids of very penetrating odor; fermentative microbes are not present, and, therefore, there is no danger of serious intoxication. 2d. With septic infection.—Degeneration of the placenta may occur before the expulsion of the fœtus. Kauffmann has reported a case of miscarriage at the fourth month, where, before the expulsion of the fœtus, the woman had chills, hemorrhages, high temperature, with escape of putrid clots. Two-thirds of the placenta remained in the uterus after the expulsion of the fœtus, and the woman died in four days, of septic fever.

When the retained placenta putrefies, and septic fever supervenes, it may be acute, or sub-acute, from the start. The woman may die quickly after the expulsion of the fœtus. At other times, the progress is less rapid; it may last from weeks to months, and end in cure or in death. In these instances, to the signs we have already noted as

following on retention of the placenta, are joined those which are characteristic of placental putrefaction. The lochia become sero-sanguinolent, blackish, and contain remnants of placenta or membrane, intolerably fetid. When injections are administered, this odor is diminished, but it quickly reappears. At the same time there are symptoms of metritis, metro-peritonitis, and all those of septic infection—chills, fever, diarrhœa, change in the appearance.

(c.) *Absorption of the Placenta.*—May this occur? The fact is admitted by Velpeau, Lagemard, Maslieurat, and denied by Madame Boivin, and others. Hegar has lately studied the question, and he thus tabulates the reported cases: 1st. Cases in which no discharge, either bloody or serous, purulent or putrid, has been observed, in which the placenta might have passed away. Such are the cases cited by Nägele, Gabillot, d'Outrepont, Villeneuve, Porcher, Charleston, Maslieurat, Lagemard; 2. Cases in which there has occurred more or less abundant discharge of putrid sero-sanguinolent fluid. Such are those of Salomon, Schmidt-muller, Burger, Steinberger, Kyll, Ovalide, Velpeau, Dubois, Planque, Ingleby, Glover, Morlane, Deubel, Villeneuve, Delpierre, Godefroy. Hegar first establishes the fact that cases in the second category can not be of placental absorption, and that they must be considered as instances of retention of the placenta with degeneration. But is this also true of the cases in the first category? By resorption of the placenta authorities understand not absorption of putrefied and loose placenta, but of those still adherent to the uterus, neither liquefied nor putrefied. And in the seven observations noted, the existence of an adherent placenta had been assured. No uterine or vaginal discharge, containing remnants, had been present; on the contrary the lochia are said to have been diminished, without odor. Both cord and membranes had been expelled. With the exception of slight fever, and a few after pains, nothing in particular was noted. In five cases menstruation reappeared from the seventh to the thirteenth week, and in those there speedily occurred another pregnancy, and normal confinement.

Certainly, at first sight, absorption seems incontrovertible. Hegar proposes three hypotheses: 1. Either the accoucheur was in error in observation, or there was deception on the part of the patient; 2. Or there occurred retention of the placenta, and consecutive alteration; 3. Or true absorption took place. In conclusion, without absolutely denying the possibility of absorption he does not consider as credible the cases heretofore recorded. It is most likely that the retained portions were liquefied, and broken up, thus passing away in the vaginal excretions.

(d.) *Indefinite Sojourn of the Placenta in the Uterus.*—It is granted by Hegar that the placenta, and even the entire ovum, may remain in the uterus even up to the death of the woman. They undergo retro-



grade metamorphosis, and this is the explanation of those curious cases where, after death, foreign bodies, containing foetal débris more or less altered, have been found in the uterus of women of the age of 75, 80, and 90. Such are recorded by Kilian, Böhmer, Sandifort, Vallisnieri, Morgagni, Van Swieten, Camerarius, Dedek, Niemann.

#### THE TREATMENT OF MISCARRIAGE.

Whatever the causes of miscarriage, we have seen that they induce one or another of the three following phenomena: 1. Either they determine the death of the foetus, and thus necessitate miscarriage; 2. Or else they induce congestions, hemorrhages, which, by causing the premature detachment of the ovum, thus compromise, either directly or indirectly, the existence of the product of conception; 3. Or, finally, they excite premature contractions of the uterus, and then follow expulsion of the ovum and of the foetus. To combat these causes, such is the indication which the prophylactic treatment of miscarriage, as it has been called, must fulfil. When this prophylactic treatment has failed, or has not been instituted, and the miscarriage seems inevitable, then, by means of the *curative treatment* of miscarriage, we still seek to stop it, and thus allow pregnancy to continue, or else, if we cannot, to avoid complications, and to successfully overcome them.

*Prophylactic Treatment.*—"The death of the product of conception within the uterus, whenever it is not accidental, or caused by independent disease of the foetus, or of its appendages, is the result of one of the pathological causes, usually hereditary or acquired, which we have mentioned." This sentence, which we have quoted from Jacquemier, resumes in a word the greater portion of the indications for prophylactic treatment. We say the greater part, because it only applies to those cases where the product of conception is dead, before the symptoms of miscarriage are evident; and in a large proportion of cases the ovum is expelled living, and long before term, under the influence of some local morbid state of the mother, without one being able to lay its death to any special diathetic cause. When this diathesis exists, and causes the death of the foetus, we must determine it, and fight it by appropriate treatment, before we allow a second pregnancy. If the woman is of a lymphatic, chloro-anemic constitution, we must have recourse to tonic and strengthening means; the preparations of iron, or arsenic, sea baths, hydrotherapy, mineral waters containing sulphur or iron, used as baths or douches, quinine, these are indicated; but, be it understood, such treatment must be continued for a long time, in order to give good results, and a second pregnancy, supervening too rapidly, not only would not go to term, but the woman would lose the little benefit which had resulted from the treatment.

Among these diatheses, there is one which leads all the others, and

this is the syphilitic, and we have seen already how frequent it is, and also how deadly to the product of conception. We have seen also that, in habitual miscarriage, syphilis, possibly latent, either of the father or of the mother, is the cause. Anti-syphilitic treatment, therefore, as well for the father as for the mother, especially the latter, should be rigorously enforced.

In regard to syphilis, we would make the following statements: 1. Syphilis may be latent both in the father and in the mother, and yet neither possess any symptom, and it may be only the recurrence of miscarriages without known cause which awakens the suspicion of syphilis. 2. Both father and mother may be syphilitic, either recent or old, and both may know it. 3. Very often the father alone is syphilitic, and the mother is ignorant of the symptoms she has had or still has. 4. In rare instances it is the mother who is contaminated, and the husband has escaped contagion.

In any instance anti-syphilitic treatment must be resorted to. The following is our practice in this respect: 1. Syphilis is latent, and there are habitual miscarriages. We give a teaspoonful of Van Swieten's liquor every morning during four to five months, interrupting the treatment for a few days in case of colic and gastralgia; then the treatment is interrupted during two or three months, and resumed for four weeks. At the end of a few months we allow a second pregnancy. 2. Syphilis exists in both the father and the mother. Here it is necessary to subject both to treatment. 3. Syphilis exists in but one of the couple. The suspicions of the other must not be awakened, but the treatment must be as persistent.

[The preparation of mercury used will depend on the preference of the individual physician. The most efficient means of bringing the system rapidly under the influence of the drug is by inunction with the oleate of mercury, and, further, thus there is less risk of interfering with the digestive organs. In this country the biniodide of mercury is usually preferred to Van Swieten's liquor, which is entirely too irritating to the digestive tract. The necessity of tonic treatment in conjunction with the mercurial, should never be forgotten.—Ed.]

<sup>1</sup> Under diathetic affections, we would class ulcerations of the cervix, and chronic endometritis. Especially is it of importance in these cases to subject the woman to local treatment, in order to cure these affections before allowing a second conception.

[There is one cause of miscarriage, the importance of which is not recognized by the author, and this is laceration of the cervix. Although in certain instances, laceration of the cervix would seem to favor conception, because the cervical canal being widely open, the spermatozoa have readier access to the uterine cavity, still, remembering that this laceration is a direct irritant to the uterus, keeps it in a state of congestion, and



is at the bottom of a chronic cervical catarrh, we must believe that this is a frequent cause of habitual miscarriage. Many cases have been recorded of late years where this habit has been broken up through the repair of the lacerated cervix. In any case, therefore, where this lesion exists, and the woman habitually miscarries, the operation is indicated as a prophylactic measure.

In cases of habitual miscarriage, where the causal factor is apparently impoverishment of the mother's blood, the tincture of the chloride of iron, together with the chlorate of potash, administered daily throughout pregnancy, will frequently enable the woman to go to term.—Ed.]

Aside from diathetic and uterine affections, there are a number of causes which call for prophylactic treatment. Pregnancy itself, we have seen, through the influence which it exerts over every organ in the body, predisposes to miscarriage, especially by causing abnormal irritability of the uterus; and again, in certain women, the uterus is in such a condition of atony, that it becomes congested with the greatest ease. It is in such cases that rest in bed is absolutely indicated. But we must be careful not to err to the other side, for too much rest may cause loss of appetite and weaken our patients. Ordinarily, we only require our patients to stay in bed at the time corresponding to the menses, for two days before, during this time, and for forty-eight hours afterward. Usually, at the fourth month it is no longer necessary to follow this rule. In this manner we have often been able to carry to term, women who had before miscarried a number of times. If the irritability do not yield to rest alone, and if, above all, the pain in the back persists, accompanied by slight uterine contractions, then opiates should be associated with rest. Opium should be administered in enemata fifteen to twenty drops morning and evening for a few days, taking the precaution to avoid constipation. In women who object to enemata, suppositories of belladonna and the chlor-hydrate of morphia will be of service. It is remarkable the amount of opium which the gravida can take. We have often administered from forty to one hundred drops of the tincture of opium in twenty-four hours, without causing narcotism.

Phlebotomy is often of great assistance, and this too in women who are not plethoric. General bleeding from the arm is, in our opinion, far preferable to local. It should be practiced with the woman in the recumbent position, in order to avoid syncope. Depaul, Devilliers, Triaire, agree with us in thinking that general venesection is preferable to local.

In a certain number of instances the means indicated above do not suffice. The symptoms of miscarriage, hemorrhage, uterine contractions, appear. What are the means at our disposal?

*Curative Treatment.*—Miscarriage, as we have seen, is absolutely inevitable only if the fœtus is dead, or the ovum is not intact. Up to the

fourth month, signs of foetal death are absent, and yet we ought to act, always, as though we were certain of the vitality of the foetus, that is to say, turn all our endeavors toward preventing the miscarriage. In the presence of hemorrhage and of uterine contractions, especially if neither is marked, we must act quickly.

The first thing to do is to put the woman to bed, keep her absolutely quiet, and administer opium enemata. At the outset we give twenty-five drops of the tincture with a syringe, in order to be certain that she receives the entire dose. At the end of six, or of twelve hours, according to the urgency of the case, this is renewed, and so on for twenty-four to seventy-two hours, if necessary. When opium is thus administered continously for a number of days, each morning the woman should receive a large enema of glycerine and water, in order to avoid constipation.

Venesection, on the appearance of hemorrhage, we cannot quite counsel, although, if the woman is plethoric, and has a full pulse, with signs of congestion, we do not hesitate to withdraw a slight amount of blood from the arm.

Hohl has advised the use of the sulphate of quinine. Plantard, on the other hand, absolutely rejects it. The Italians have advised tannic acid. Richardson, and Barnes, the nitrite of amyllum. We prefer, above everything, laudanum, and if this fails, but little can be expected from other means.

[The *viburnum prunifolium* in drachm doses, repeated every few hours, is often of value in attempted miscarriage. Chloral hydrate may also be tried, particularly where the main symptom is uterine contraction. Quinine should not be used, for whilst it has not the property of evoking uterine contractions, it certainly may intensify them when present.—Ed.]

Unfortunately, in many cases, all treatment fails, either because the foetus is dead or the ovum has partially separated, or because the membranes have ruptured. Then miscarriage is inevitable, and the proper treatment is all-important.

Miscarriage, as we have seen, necessitates hemorrhage, and, whilst usually this is moderate in amount, it may be profuse, and compromise not only the health, but the life as well, of the woman. Whilst, further, in the early weeks, the ovum may be expelled entire, it may also be shed in two portions, and the remaining membranes, placenta, or decidua, may undergo degeneration, and entail puerperal accidents of grave import to the health, and the life, of the woman. When we bear in mind the concise description, already given, of the manner in which the ovum is expelled, and how the phenomena differ according as the ovum is shed entire or not, according as the foetus is alive or not, it is at once apparent that our efforts lie in two directions: 1. To fight against hemorrhage. 2. To end the miscarriage as soon as possible, and



to avoid retention of any portion of the ovum, and the deplorable consequences. These precise indications are met very differently by different accoucheurs. Certain ones limit their endeavors to the control of the hemorrhage, assisting, as far as may be, uterine contractions, and thus accelerating the separation, and the expulsion of the ovum, never resorting to instrumental or manual intervention, except where placental retention entails serious accidents. Others, on the other hand, insist on the necessity of speedy interference, in order to stop at once the hemorrhage, and to render impossible the retention of the afterbirth, and the accidents this entails. These two methods of action are championed and opposed with zeal. It is in particular in connection with retention of the afterbirth that opinion varies most markedly, the practice in regard to hemorrhage being nearly uniform.

*Methods of Controlling Hemorrhage.*—When it is not profuse, and stays within moderate limits, it is usually sufficient to insist on absolute rest, to administer cold drinks, and to apply cold cloths over the abdomen, and over the thighs. But, if it be serious, if it be profuse, more energetic action is requisite, and three methods are at our disposal: 1. Administration of ergot. 2. The tamponnade. 3. Ergot and the tamponnade associated. We prefer this method.

(a). *The Administration of Ergot.*—This drug, it is claimed by those who advocate it, has a double action. On the one hand by exciting, and increasing uterine contractility, it quickens the separation of the ovum, and the dilatation of the cervix; on the other hand, by causing contraction of the blood vessels, it stops hemorrhage. These two actions call for brief consideration. In order that ergot may act forcibly on the uterine muscle, this must have acquired its full development, and contraction be already present. And these two conditions are rarely present in case of miscarriage. The uterine muscular fibre is but little developed during the early months of pregnancy, and, on the other hand, hemorrhage is often profuse, before contraction sets in. Again, the contractility evoked by ergot differs notably from that which is peculiar to the uterus; it is a species of tetanic retraction, which, when it affects the cervix, not only does not cause dilatation, but causes rigidity. Ergot then may act directly opposite to the desired end, and, by interfering with dilatation of the cervix, shut up the ovum, or its remnants, in the uterine cavity. On the other hand, it has been proved by the researches of Parola, of Beatty, of Laborde, and, above all, of Lee, and his pupils, that ergot acts on the blood vessels, causing considerable, although transitory, diminution in the force of the circulation; that it further acts on the heart, making its pulsations more feeble, and slower; and that it also acts on the capillary network, determining its contraction, and diminishing the amount of blood it contains in a notable manner. Finally it produces a contraction of the vessels of the spinal

cord, and of its membranes, decreasing the amount of blood there circulating.

Ergot, therefore, is a powerful hemostatic, and should not, hence, be rejected in the treatment of miscarriage.

(b.) *The Tamponnade*.—Well applied—see in this connection the section on obstetrical operations—it certainly will stop the hemorrhage, and, if it fail, it is because it is imperfectly applied. The tampon opposes the external appearance of blood, and thus favors coagulation in the uterine cavity, and the pressure which it exerts on the cervix, bladder, and rectum, tends to increase uterine contractions, and thus accelerates dilatation, the separation of the ovum, and its expulsion. The sole objection to it is the pain caused by pressure, and the interference with the functions of the rectum and the bladder. The danger of converting external into internal hemorrhage is slight, owing to the small size of the uterine cavity at four months; and if, at a later period of gestation, we ought to watch the tampon more readily on this account, we still believe that it is to it we should resort under conditions of which we will speak later. (See *Placenta previa*. Vol. III.) We believe, however, that there is a better method than the use of either ergot or the tampon alone, and this is the combination of the two.

(c.) *Tampon and Ergot Associated*.—The tampon is first applied, and left *in situ*, not a few hours, as is the custom of Barnes and the Germans, but for 24 to 36 hours according to the case, and we administer to our patients thirty grains of ergot, in eight divided doses, at first every ten minutes, and then, after an interval, every hour. We prefer ergot in powder form, to the subcutaneous injection of ergot, and we only resort to the latter when the former disagrees.

[With us a reliable fluid extract of ergot, administered in drachm doses every three hours, will be preferred to the powdered drug. Better still, than either, is the aqueous extract of ergot by suppository, for thus no risk is run of causing digestive troubles. An excellent combination is the aqueous extract of ergot (gr. v.) and the alcoholic extract of *Cannabis Indica* ( $\frac{1}{2}$  gr.), repeated every four hours. *Cannabis Indica*, when pure, has marked hemostatic powers, but its administration should be carefully watched, since certain patients are peculiarly susceptible to it.—Ed.]

We thus obtain together the effects of both ergot and the tampon. Frequently, in removing the tampon, the ovum is found more or less engaged in the cervix. If then the hemorrhage be slight, and the contractions energetic, the tampon need not be reinserted, but the case may be left to nature. If, however, the contractions are feeble, if the hemorrhage is again intense, a new tampon should be inserted, and ergot again administered. In certain cases, where the ovum is engaged, we may simply give the ergot, since retraction of the cervix is no longer



to be feared, for the ovum in its canal acts partially as a tampon, and partially from its irritating effect on the cervix determines uterine contractility. But, and this is a point of prime importance, we must be careful not to interfere with this engaged ovum: it must be allowed itself to escape from the external os, and it must never be extracted until it is in the vagina. Otherwise only a portion would be removed, which would mean recontraction of the cervix, and retention of a portion of the ovum, and its consequences.

Unfortunately, however, matters do not always progress after the above fashion, and in many instances to the hemorrhage are joined the complications entailed by the prolonged retention of the placenta, remnants of the membranes, and of the decidua, in the uterine cavity. If, at times, the retention of the placenta means only more profuse hemorrhages, the cases are far more frequent where the placenta putrefies, and determines in the woman phenomena which may prove fatal. And therefore it is why every writer has taken great interest in this subject of retention of the afterbirth.

At the outset, one capital point should be remembered: In many cases the prolonged retention of the placenta is admirably supported by the woman. It continues to live in the uterine cavity, without alteration, and, at the end of a longer or a shorter time, it is expelled perfectly fresh, without other accident than more or less hemorrhage. Nothing is more variable than the time during which this retention may obtain, and to endeavor, as Guéniot has done, to fix the limit of what he calls normal retention, seems to us rather the result of visionary theory than of clinical experience. We protest, therefore, against this view. Our colleague forgets that miscarriage is constituted not by the expulsion of the embryo, but by that of the placenta. Miscarriage is simply delivery, and to endeavor to set precise limits, is to contradict a fact of experience. Nothing is more irregular than miscarriage, and the time requisite for its full completion may vary from hours to days, and this without further accident to the woman than hemorrhage, which we can control by ergot and the tampon.

[In addition to the combined use of the tampon and of ergot, there is a further agent which we can strongly recommend, from the fact that it has been of marked service to us, in cases of uterine inertia, by invoking contractions, by intensifying them, and thus hastening delivery, and checking hemorrhage. This agent is the Faradic current. A mild current is all that is requisite; the main point in its application being the intermittency of its application. The patient should hold one electrode, it is an indifferent matter which, and the other should be passed to and fro over the abdomen. A strong current is to be avoided, in order not to produce spasm of the uterine muscular fibre. A further useful point

about this method, is the fact that the patient's suffering is markedly diminished, although the pains are rendered more effective.

A word about the tampon will here not be out of place. As the author says with truth, the tampon, in order to be effective, must be applied well. The only way to efficiently tampon the vagina is, with the patient lying in the left lateral position, to insert them through the Sims speculum. The posterior cul-de-sac should first be thoroughly packed, then the anterior, and finally the vagina underneath. The tampons further should be carbolized, in case it is likely they will remain in place for a longer interval than a few hours.—Ed.]

We may have to face one of two conditions: 1. The placenta, although in the uterine cavity, is in part engaged in the cervix. 2. The placenta is entirely in the cavity above the cervix.

In the first instance we advise ergot, with or without the tampon, according to the amount of hemorrhage; and, if the ovum has passed completely, or nearly so, through the external os, digital extraction—but only when we are perfectly sure it is not at all adherent to the uterus.

In the second instance, we make, with Guéniot, five subdivisions: 1. Miscarriage has occurred, but the afterbirth is incomplete, and there is no complication calling for immediate action. 2. The same exists, but with complications. 3. Miscarriage has occurred, but there is uncertainty as to whether it is complete or not. 4. Miscarriage is certainly complete, but there are complications calling for interference. 5. Miscarriage is in progress, inevitable, and more or less advanced.

At the outset, it is apparent that, where all is normal, there is no call for interference. All authorities agree that here expectation is the proper conduct. The difficulty is to draw the line where justifiable interference begins. But when delivery is prolonged, ought we still to abstain, ought we to wait, or ought we to interfere actively in order to forestall the complications which almost infallibly will result, and interfere, further, at a time when it is far easier than later, when we may be forced to action? Such is the problem, the answer to which divides obstetricians into two opposing forces. The one insists on active intervention, in order to terminate the process as soon as possible, and thus prevent complications. The other, having deep faith in the powers of nature, only allows interference in case of serious complication.

The following propositions may be laid down as acceptable to all authorities: 1. It is necessary to interfere in case of complication, opinions only varying as to the manner of interference. 2. In miscarriage during the first two months, since hemorrhage may be completely controlled by the tampon, and since the placenta is small, pliable, and may become disintegrated and discharged in the lochia, septic complications are not apt to be pronounced or serious, and are easily mastered by



antiseptic injections and tonic treatment, aided by alcohol, and the sulphate of quinine. 3. At a more advanced period of pregnancy, mechanical means of delivery, other than manual, are very difficult of application, and expose the woman to the danger of metritis, and peritonitis.

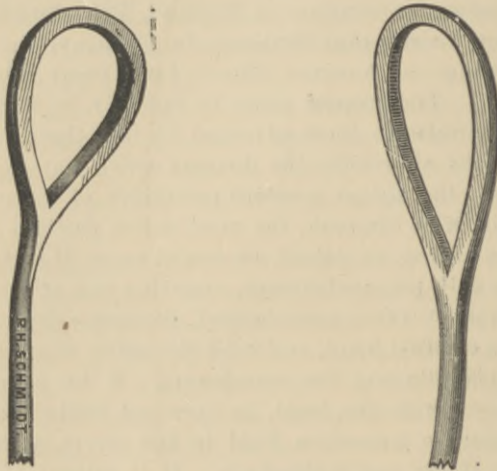
In the first two months, therefore, retention of a portion of the ovum, no matter for how long, calls for no active interference, unless serious accidents supervene, and then we must extract these remnants as soon as possible. It is, then, after two months, that opinions vary.

*Views of those in favor of active interference.*—To speak simply of our contemporaries, we mention, in England, Tyler Smith, Murray, Hall Davis, Priestley, Leishmann, Simpson—in Germany, Spöndly, Botters, Veit and Fehling—in America Mundé [and many others.—Ed.]—in France Guéniot. The reasons given by Spöndly, in favor of active interference, are similar to those advanced by the others. The frequency of retention of the afterbirth; the dangers which may supervene in prolonged delivery; the almost constant possibility of manual extraction. Veit is possibly, with Simpson, the most active partisan of interference. If the cervix is dilated, or patent, he acts at once; if it is not dilated, he dilates at once with prepared sponge, removing this at the end of sixteen hours. The woman is then anæsthetized, the uterus depressed as much as possible by the external hand, and with the index finger of the other he removes the placenta and the membranes. If he cannot sufficiently depress the uterus with the hand, he does not hesitate to forcibly drag it down by a double tenaculum fixed in the cervix, as is also done by Simpson, and Hegar and Kaltenbach. It is evident that he does not always succeed, for he speaks of the possible persistence of hemorrhage after this method. In order to stop this he washes out the cavity with a solution of carbolic, and then applies to the endometrium, the sub-sulphate of iron, or pure phenic acid.

Botters and Mundé go further still, and not only resort to Veit's method, but proceed to curette the cavity of the uterus with Simons' scoop, or the metal curette of Thomas. They then similarly cauterize the endometrium.

[The author is here in error, certainly as regards Mundé's practice. It is not his custom, nor indeed of any of us in this country who practise interference because thereby the woman's safety is at once assured and she herself not at all endangered, to use Simons' scoop, or any variety of sharp curette, for the removal of the retained placenta, or shreds of the ovum. The former, indeed, has devised the special instruments which we figure below, for the purpose of loosening the adherent placenta, and for its removal from the uterus. His curettes have no cutting edge, and are applicable to cases where there is a large mass to remove, and where, in consequence, nearly always the cervical

canal is wide open, and will hence admit them. Where we are dealing with small shreds, and the os is less patent, the *dull* curette of Thomas answers every purpose. As to whether the patient will be injured by such instrumental measures, or not, depends purely on the manner, and on the gentleness with which they are resorted to. The position of the woman should always be the left lateral, and the removal should always be through Sims speculum. Then the cavity should be carefully dried by a cotton applicator, and tamponed by means of the slide applicator, the cotton on which has been saturated in the



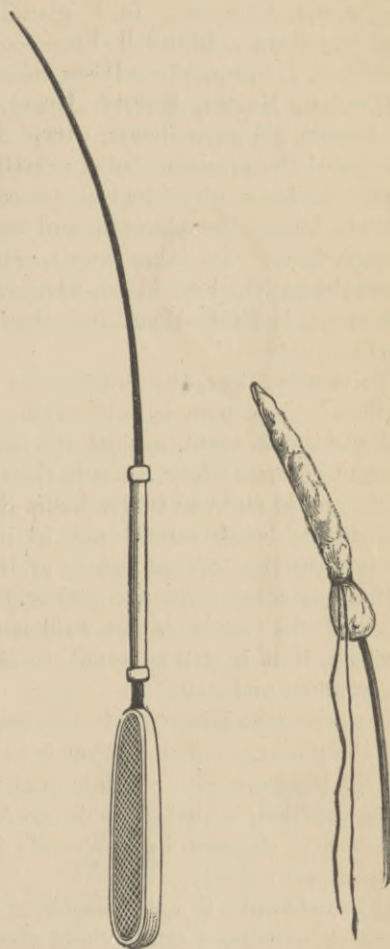
FIGS. 29 and 30.—MUNDÉ'S PLACENTAL CURETTE. (2 sizes.)

compound tincture of iodine. These manipulations are painless, and if performed gently, even as every intrauterine manipulation should be, can do the patient absolutely no harm. On the contrary, she is spared the danger from profuse hemorrhage, which might occur in the absence of the physician, and notwithstanding the ergot, she is spared the risk of septic infection, general or local, she is spared the mental anxiety to which otherwise she is subjected. Active intervention does not mean unnecessary interference. Nature is ever to be given a chance. But when we see that her efforts are futile, certainly it is but rational to assist her after a method which, rightly performed, bodes no harm to the patient, but is full of good. Those of our readers who have carefully studied the graphic pen pictures wherein Charpentier delineates the possible dangers which may, at any moment, follow on prolonged waiting, will at once agree that the procedure advocated in this country, particularly by Mundé, is far preferable, if it be only free from risk, and this we are amply satisfied is the case. Miscarriage is fraught with more



danger to the woman than labor at term, because, as Goodell aptly puts it, the process is like plucking immature fruit. We believe, however, that timely, active intervention, resorted to with care, will rob miscarriage of its dangers, and not at all substitute new ones. American women, and German too, can stand the practice we advocate, not because they differ at all from the French, but because French accoucheurs, with scarcely any exception, have yet to learn the manner how to assist their patients rationally in case of prolonged miscarriage.—Ed.]

Truly, indeed, as Pajot says, the German womb is very sluggish to be able to resist such treatment, which, further, it seems to us, is directly contrary to the aim of those who resort to it. [His objections are purely the result of the fact that the method of active intervention is not understood. That the *sharp* curette will wound the endometrium, we grant, but then the *sharp* curette is not advocated, certainly in this country; that deep cauterization of the endometrium may in turn produce trouble, we grant, but then we do not argue for such cauterization. The compound tincture of iodine is used as a gentle styptic and disinfectant, and produces no slough, on the separation of which new hemorrhage will occur. We make these criticisms because our author, being opposed to active intervention, is not always just to the method.—Ed.]



A.  
FIG. 31.—A.—SIMS' SLIDE  
APPLICATOR.

B.  
B.—THE SAME, WITH  
COTTON TAMPON ATTACH-  
ED.

*Views of those Opposed to Active Intervention.*—The authorities who counsel waiting for the appearance of some complication before interfering, are just as many. We mention: Viardel, Leboursier du Coudray, Lachapelle, Capuron. In England, Ramsbotham, Davis, Lee, Dewees, Ingleby, Burns, Blundell Fleetwood Churchill, Grailly Hewitt. In Germany, Höning, who advises resort to Kristeller's method of uterine expression, Martin, Kehrler, Hegar, Schroeder, Scanzoni, Spiegelberg. In France, all accoucheurs, except Guéniot, are in accord, and Cordes has stated the prevalent belief exactly, when he says: "Miscarriage only ceases to be a physiological process, when the organism refuses to tolerate longer the placenta, and ceases to expel it, even as it will any foreign body. In other words, when uterine contractions supervene, when the patient loses blood, when the hemorrhage, or sero-sanguinolent discharge, is fetid—then, and then only, ought we to aid the failing forces of nature."

To resume, then, the practice we would recommend in case of miscarriage: A woman is miscarrying, the process is inevitable: tampon and administer ergot, against the hemorrhage. Remove the tampon at the end of twenty-four hours to thirty-six, if the contractions are feeble, at the end of eight to twelve hours if they are energetic. Then examine the cervix, being careful not to injure the ovum. If the ovum is engaged in the cervical canal, or if it be in the vagina, and if it is entirely detached from the uterus, this is a *sine quâ non*, remove it at once; if the cervix is not sufficiently dilated, if the ovum has not engaged, if it is still adherent, in case of persisting hemorrhage reapply the tampon, and wait.

If the woman miscarries in two stages, if the foetus has been expelled, and the placenta remains, what is to be done? Usually nothing: nature can do the work, the placenta may remain seven to fifteen days, before being expelled: whilst there is no complication, wait, at least till the placenta is engaged in the cervix and detached from the uterus, and then extract quickly.

If the placenta is not engaged, and the cervix is closed: wait, and, in case of hemorrhage, tampon and give ergot, never the latter alone.

If the placenta, still adherent, is in part engaged in the cervix: give ergot, for the cervix can no longer retract, since its canal is filled by the placenta. If the placenta is at the fundus, and adherent: wait still in case there exists no complication; interfere rapidly, in case of accident. If it be hemorrhage—the tampon and ergot. If it be putrefaction of the placenta—recognize this, and extract at once.

How are we to recognize putrefaction of the retained placenta or membranes? Ordinarily this is an easy matter. The first symptom is fetor of the lochial discharge, fetor which, at times is such as to permeate, and extend beyond, the lying-in room. The discharge, further,



loses its normal character, and diminishes in quantity, becoming black in color, or deep brown. It is no longer bloody, or sero-sanguinolent, but is composed of reddish-black detritus, the débris of the retained mass. Involution ceases, and the uterus becomes sensitive to pressure. At times, slight tympanites supervenes, with or without diarrhœa, and this too may be fetid. The woman has chills. Sometimes the chill is violent and single, sometimes many, separated by intervals of one or two days; there exists fever, with elevations even to 104°-105° F. The pulse ranges to 120 and above. The temperature shows marked remissions, often, but the pulse remains high, and thus it may be day after day, until the woman dies. At times again, these remissions are not marked, the fever being continuous. The general condition alters for the worse, the eyes are sunken, anorexia, vomiting, and diarrhœa exist; the woman grows weaker, and, if we cannot suppress these symptoms, the woman dies of septic poisoning.

[A truly classical picture of sepsis! Has the physician any business to allow the woman to enter into such a state? Is he doing his full duty by her, when he sits, with folded hands, awaiting the onset of sepsis before acting? His condition is one of armed expectancy. He knows what he will do in case of the onset of sepsis, but action then, however prompt, may be of no avail—the woman may still die of septicemia. Seeing then, that in no given case of retained placenta or secundine can it be predicted whether sepsis will develop, or not, which is the wise course, we had almost said the non-criminal course, to do at the outset what may eventually be forced upon us, or to do it when it may be too late for good, and when certainly action is far more difficult? Again, we repeat, *the immediate removal of the secundines is safe, and easy, and guarantees the woman forthwith against sepsis.*—Ed.]

When the first symptoms of sepsis appear, we must not hesitate, but we must immediately extract the placenta, or the secundines, and this, it is understood, is all the more difficult the more completely the cervix has closed. If the cervix is permeable to the finger or to instruments, the operation is easy. If closed, then we must dilate at once with sponge, or laminaria, with a branched steel dilator, or with Barnes' bags. We prefer the latter in urgent cases. Dilatation once accomplished we must proceed to extraction, and this must be done by the finger, or by instruments, according to the case. We reject absolutely both traction on the cord, and intra-uterine injections. The former will simply end in rupture, the latter will disinfect, but will not detach the secundines or the placenta. We further reject, cold applications, electricity, expression, ergot—all these are too slow.

When the cervix has been dilated, the woman is chloroformed, and, lying on the back, the hand on the abdomen depresses the uterus as much as possible. The index finger of the right hand is then introduced

into the uterine cavity as deeply as possible, and the adherent remnants are detached, and brought out by the finger, which is bent like a crook. This procedure is repeated until the uterus is empty. If the finger do not suffice, because the placenta is too friable, or firmly adherent, instruments—like Prof. Pajot's curette—take the place of the finger. The cavity should then be washed out, through a double-current catheter, with plenic acid solution, and these injections practiced every day, as long as the catheter can be inserted. Vaginal injections are still to be continued by the nurse. Intra-uterine injections must always be given by the physician. At the same time, both quinine and alcohol should be administered. Certainly 15 grains of the former should be given daily—the object being to keep the patient under the continuous action of the drug.

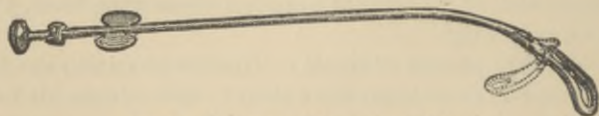


FIG. 32.—ARTICULATED CURETTE OF PAJOT.

[Since the introduction of antipyrin into our therapeutic list, it has obtained a deservedly high rank amongst antipyretic measures, and in all cases of high temperature in the puerpera, exclusive of course of malarial influences, in particular when the rise is of septic origin, this drug should take the place of quinine. It should be given boldly, preferably by rectum, at first, and then repeated in smaller doses *pro re nata*. Forty grains by rectum, and twenty by the mouth is a fair average dose to begin with. The drug should always be guarded by alcohol, and the pulse carefully watched, in order that digitalis may also be administered in case of evidence of cardiac failure. The occasional appearance of sub-normal temperature, of urticaria-like eruptions, and of even slight syncope, should be borne in mind, when giving the agent. These occurrences are, however, exceptional, and need not alarm.—Ed.]

Alcohol may be given in any form. Aconite we have little confidence in, although, in certain cases, it has seemed of value. Nourishing diet is, of course, indicated.

We cannot insist too strongly on the use of antiseptic injections—intra-uterine as long as odor exists. The utility of these injections is incontestable.

[In case the extracted placenta or secundines were intensely fetid, we would advise, after the uterine cavity has been thoroughly emptied and cleansed, the insertion of a suppository containing ten to twenty grains of iodoform. This may modify, markedly, further absorption of septic products. For the intra-uterine injections we know of nothing



better than the Chamberlain glass tube, without the terminal opening. A small size, suitable to miscarriage cases, may be obtained.—Ed.]

Between four and five months, there is another complication, at times, and this is where the foetus presents by the breech, and the head, through forcible traction on the breech, is torn off, and left in the uterus. Extraction may be very difficult.

The woman who has miscarried, should be subjected to the same rules as those applicable to the puerpera at term. Prolonged rest is needed, and this is hard to obtain, for women are apt to look upon miscarriage as a slight affair. And after miscarriage, metritis, peritonitis, flexions and versions of the uterus are very frequent, and they may entail sterility, or impress the habit of miscarrying.

[All the more liable is the woman to such affections, when the treatment advocated by the author in case of incomplete miscarriage is the rule. If the woman recovers from the immediate complications of the miscarriage, she infallibly possesses a sub-involuted uterus, an endometritis, and, if not at once, very likely later, a retroversion. These are further reasons, therefore, why the ultra-expectant treatment deserves condemnation.—Ed.]

## CHAPTER VI.

### EXTRA-UTERINE PREGNANCY.

**E**CTOPIC gestation, doubted by the ancients, who, with their primitive ideas in regard to fecundation, could not understand the possibility, only assumed rank in medical literature when the ovum was discovered, and its presence in the ovary attested. The earlier instances of this anomaly from normal gestation were considered as curiosities, unexplainable, and they were simply noted without further comment. Certain accoucheurs, Mauriceau amongst them, denied absolutely the possibility. Nevertheless, Ambroise Paré, Amand, Röderer, Smellie, and Astruc, have reported incontestable instances.

Levret first subdivided pregnancy into false, into true, and into vicious, when the fœtus is situated elsewhere than in the uterus. At the same time, Andreas Lindemann, distinguished tubal, ovarian, and ventral pregnancy. Lauerjat, Dionis, and others, cite examples of the kind. It was only later, however, that these apparently supernatural events received an explanation, at the period when the ovum was detected in the ovary, and from this time forth, extra-uterine pregnancy was admitted as a distinct morbid phenomenon, and was carefully investigated. Baudelocque, Joseph Jacobi Plenk, Stein, Denman, Gardien, Capuron, Velpeau, and others, have left us detailed monographs. It was only, however, on the appearance of the works of Négrier, Raciborsky, and of Coste, that, the phenomena of menstruation and of fecundation having been well established, we possessed a rational account of ectopic gestation; and, if now, we have cause for wonder, it is not as to the existence of ectopic gestation, but at its comparative rarity, dependent, as says Schröder, not so much on the small number of fecundated ova which reach the abdominal cavity, as on the fact that these ova do not often find there conditions favorable for their development, and hence perish and undergo absorption.

The existence of ectopic gestation once established, opinions have differed widely in regard to classification; and since the days of Baudelocque, what innumerable varieties! Whilst one or another form has been admitted without protest, still another has been rejected. To speak only of ovarian pregnancy, it required the labors of Coste, Max Mayer, Kiwisch, Virchow, Dezeimeris, to prove its possibility.

To-day, the numerous reported cases of ectopic gestation prove, not only that the fecundated ovum may develop on any of the genital



organs, even the cervix (Chavanne), but also that it may engraft itself on any one of the abdominal organs, and undergo all its developmental phases. Whence the fact of the numerous sub-divisions, according to the anatomical site of the ovum; Dezeimeris made ten sub-divisions, and Hubert de Louvain twelve; Triadou, in his work, makes four sub-

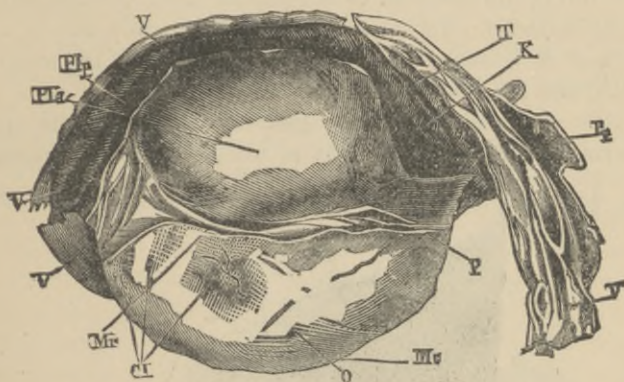


FIG. 33.—VIEW OF THE LEFT OVARY, IN VERTICAL SECTION.—VVV, Veins traversing the lateral, median and superior borders of cyst. *Plp*, Portion of left broad ligament. *Plac*, Portion of broad ligament extending over the foetal sac. *T*, Portion of the left tube. *K*, Foetal cyst.

divisions: ovarian (fig. 34 to 36), abdominal (fig. 43), tubal (fig. 38 to 40), and interstitial (fig. 37). Cazeaux admits five varieties: abdominal, tubo-abdominal, tubal, tubo-uterine, interstitial. Nägele and Grenser accept the four varieties of Triadou, and Schroder agrees with Cazeaux,

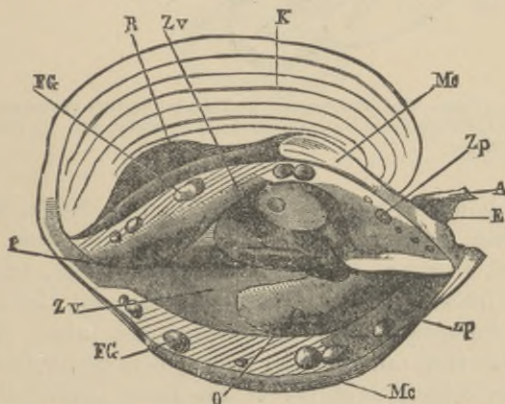


FIG. 34. *FG*, Graafian follicles.—*R*, Point of cyst rupture. *Zv*, Vascular zone of ovary. *K*, Foetal cyst resting on posterior wall. *Zv*, Remnant of fimbriated extremity of broad ligament. *E*, Remnant of the parovarium.

but adds a sixth variety, which he calls tubo-ovarian, or tubo-abdominal. Depaul, arguing from a practical, rather than from an

anatomical standpoint, makes only two varieties: tubal and abdominal, each one of these admitting sub-division. Thus tubal pregnancy may, in a measure, be also interstitial, and abdominal may be either primary or secondary.

In the first variety of abdominal pregnancy, the fecundated ovum, instead of entering the fallopian tube attaches itself to the peritoneum, and contracts adhesion. In the second, the pregnancy was, at the outset, tubal, and it becomes peritoneal when the tube ruptures in the early months, and the ovum lives in its second situation.

Depaul thus excludes a variety of gestation which was first described by Dezeimeris, and where the ovum is found under the peritoneum.

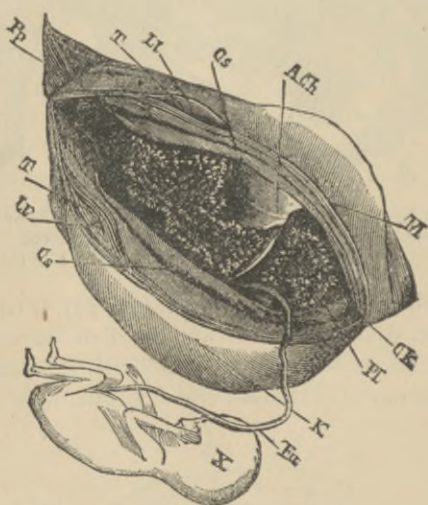


FIG. 35.—FETAL SAC OPEN.—*Pp*, Peritoneum. *Tt*, Tube in the wall of the cyst. *Lt*, Canal of the tube. *Ach*, Amnion and chorion united. *Ck*, Cavity of the fetal cyst. *Pl*, Placenta. *K*, Fœtal cyst. *Fu*, Cord. *X*, Fœtus.

The cases cited, however, by him, and by Loschge, Hélié, Baudelocque, Decord and Pelvet, Saviard, Bernard Calvo, Leven, Noël, Von Horn, Lobstein, Gallard, Fleuriot, Nonat, Hecker, and others, prove its possibility. In these instances the ovum develops between the layers of the broad ligament independently of the ovum and tube. According to Cauwenberge, the ovum can only find its way here under two conditions: either a Graafian follicle ruptures at the lower border of the ovary, which is not covered by peritoneum, and, since this does not tear, the very situation of the ovum renders impregnation impossible; or else, it engages between the proper covering of the ovary and its peritoneal envelope, on the thin and irregular border of a torn follicle, and the nature of the obstacles in the way of fecundation of an ovum in this



situation, authorizes us in considering very rare, if not in absolutely rejecting, cases of this nature. We would add, further, that recent views in regard to the structure of the ovary, proving as they do the absence of the *membrana propria* of the ovary, must modify considerably the opinions which have been held in regard to ovarian pregnancy. The fecundated ovum must needs develop in the interior of the Graafian follicle, and the walls of the cysts must be made up by the thinned-out walls of the vesicle, and, more or less, also, of the peritoneal covering.

Whatever the case, we may well limit ourselves to Depaul's classification—the tubal and the intraperitoneal, for they are, in truth, the only ones where diagnosis can be positive. We would add, further, that tubal pregnancy, through early rupture, often kills the woman, and the diagnosis is only made post-mortem. Nevertheless, we will see that in

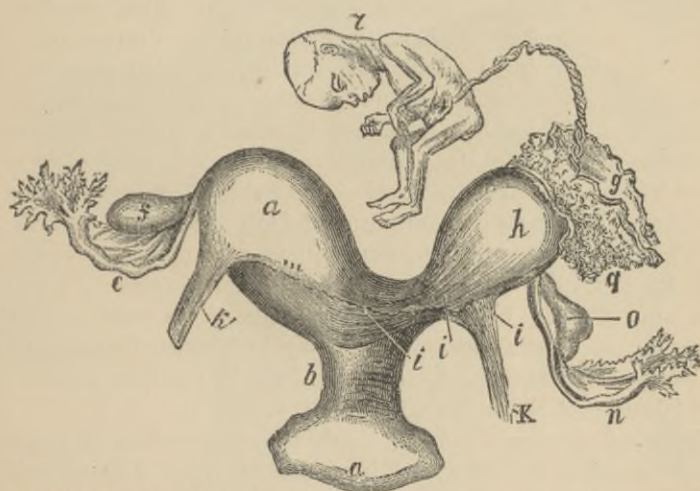


FIG. 36.—PREGNANCY IN A LEFT RUDIMENTARY CORNU. (After Heyfelder and Kussmaul.)—A Right half of uterus. b, Left half. c, Vagina. e, Right tube. f, Left ovary. h, Rudimentary cornu. k, Left round ligament. mm, Limits of the peritoneum. n, Left tube. o, Right ovary. q, Placenta. g, Membranes. r, Fœtus. k' Right round ligament.

many instances the diagnosis has been made at the very beginning of the pregnancy.

To the above varieties, Keller adds another form, which he calls *extra-abdominal*. Here the ovum develops in inguinal, and chiefly, crural herniæ. It is consequently situated not only outside of the uterus, but of the true abdominal cavity as well. Here belong the cases of Widerstein, Müller, Skrievan, Genth. Finally, we mention the cases of gestation in the cornu of a uterus bi-cornus—such as those reported by Stoltz, Rokitansky, Kussmaul (fig. 37.)

*Causes of Ectopic Gestation.*—Here, also, there is divergency of opinion. Of the incontestable causes we note: Everything which may interfere

with the migration of the ovum into the tube—such as imperforate, or congenitally imperfect tube; its obliteration by old pelvic inflammatory remnants, by mucus, by polypi; tumors of the uterus (cases of Stoltz, of Böhmer); pelvic tumors compressing the tube; pelvic adhesions, occluding the orifice, or preventing free movement; organic affections of the uterus (cancer), traumatism, causing the rupture of the uterine wall, and allowing the escape of the ovum into the abdominal cavity (cases of Tuefferd, Braxton Hicks, etc.) More singular causes still: that of Lecluyse, where pregnancy was consecutive to an antecedent Cesarean section, the uterine wound not having healed and the ovum escaping; that of Koeberlé, where the body of the uterus had been amputated, and through a fistulous opening in the cervix the spermatozoa had passed, and fecundated the ovum. This occurred two years after the operation. Finally, moral causes—violent fright, great exertion during coition, or immediately after. Velpeau cites such instances. Here, however, there is simply a coincidence, for impregnation does not occur at the time of coition, but some time, possibly days, thereafter.

Certain cases might also be explained by what is termed, in Germany, the external or internal transmigration of the ovum, that is to say, where an ovum expelled by the ovary of one side is caught into the tube of the other. The cases of Conrad and of Langhaus would seem to prove this. That this transmigration occurs in case of uterine pregnancy, is proved by the cases of Rokitansky, Oldham, Scanzoni, Kussmaul, Spaeth, and others. We mention here, also, those rare cases where both uterine and extra-uterine pregnancy have existed simultaneously. These have been recorded by Goessmann, Cook, Landon, Clark, Behm Tuffnel [Browne of Baltimore—Ed.], and others.

*Pathological Anatomy.*—All authorities are agreed as to the ovum, but when it comes to the site of implantation, what differences! The difficulties are, indeed, often very great, and interpretations vary according to the skill and the patience of the observer. When it is necessary to recognize the ovary or the tube in the midst of exudation, in the presence of the lesions produced on neighboring organs by the foetal sac, and to determine precisely the point of implantation, the difficulties are often not surmountable; and it suffices to recall the instances cited by Velpeau, in order to understand, how what one authority calls an ovarian gestation, another will consider tubal, or tubo-ovarian. Nevertheless, certain varieties of ectopic gestation, formerly considered inadmissible, are to-day accepted without protest—ovarian pregnancy, for example (fig. 34—36).

Now that we know that the ovary is composed of two substances, the one, central, spongy, vascular, the bulk of the ovary, made up of muscular fibres, vessels, and laminated fibres; the other, superficial, containing the Graafian follicles, the ovular layer of Sappey, that is to say, and that



we know that the ovary does not possess a tunica albuginea, there can be question of but one variety of ovarian pregnancy—where the point of insertion of the ovum is in the Graafian follicle itself. But the fecundated ovum, in the follicle, may develop in two ways: If the follicle is open, the ovum, in the course of its development, may project outwardly, so that the foetal sac lies outside of the ovary, and is extra-peritoneal, whilst



FIG. 37.—INTERSTITIAL PREGNANCY.—*aa*, Body of the uterus. *b*, Cavity of the uterus, wherein lay the decidua. *c*, Cavity in the uterus, where lay the placenta. *ddd*, Foetus, with the capillary network. *c*, Vascular portion of the placenta, still united to uterus. *ff*, Fallopian tubes. *g*, Ovaries. *ii*, Cervix, opened anteriorly. *kk*, Vagina. (*Breschet.*)

the point of implantation of the ovum remains in the ovary, and is intra-peritoneal; if, on the other hand, the tear in the follicle closes, the ovum develops entirely in the ovary. We then witness the same phenomena as in ovarian cysts, only the growth is far more rapid. The ovarian tumor may contract no adhesions, but, furnished with a long pedicle it carries with it, in its growth, its peritoneal covering. This

is not always the case, but, usually, the ovary, containing the foetal sac, contracts adhesions to the neighboring organs. The tube of the same side, lengthened out, becomes mixed in the sac, in which its terminal fibres are lost. We can, therefore, no longer speak of external and internal ovarian pregnancy. We deal only with different phases in the development of ovarian pregnancy.

Cauwenberghe has studied the pathological anatomy of ectopic gestation carefully, and we will adopt his division. 1. The pathological anatomy in so far as it concerns the maternal organs. 2. That which concerns the product of conception.

1st. *Site of Implantation of the Ovum*—What are the modifications in the maternal organs produced by the implantation of the ovum? When the ovum reaches the uterine cavity, it finds the soil prepared for it from which it may obtain the elements indispensable to its development. The modifications in the uterine mucous membrane produced during menstruation, the swelling, the vascularization, are the beginnings of the work to be continued by conception, and the ovum, on its arrival in the uterine cavity finds the conditions most favorable for its development. Conditions are very different when the ovum engrafts itself in some other portion of the maternal organism. Nature must supply at once the elements necessary for development in the unusual site. In a word, the ovum must find not only the site, but the conditions necessary for its development, conditions which must approach, as far as possible, the normal. Therefore, as soon as the ovum engrafts itself, a more thorough vascular system develops at the site. The peritoneum becomes vascular, large veins appear in the sub-peritoneal tissue, the arteries, in the neighborhood, double in size, and thus is formed a species of vascular erectile tissue, where the placenta is implanted (Hohl). Whatever the site, the ovary, tube, or abdominal cavity, the modifications are the same. All observers agree on this point, difference of opinion being only in regard to the extent of the changes.

The genital organs do not watch with indifference the changes occurring around them, but they, as well, undergo modifications, which are evident, even if not clearly explainable. The vaginal walls thicken, and soften; the secretion of the vaginal mucous membrane increases, the uterus increases little by little in size, rises in the abdominal cavity, its walls thicken, its vessels increase in size, and the cervix presents the appearances of early pregnancy. Finally, a true decidua is formed, analogous to that which is expelled in case of miscarriage. At the same time, the breasts alter, and a true secretion of milk takes place. The two chief phenomena, however, concern the cervix and the decidua.

The changes in the cervix deserve special notice, for they may assist notably in diagnosis. Although the modifications recall in a measure those which exist in case of uterine pregnancy, in the immense majority



of cases they are not in harmony with the period of pregnancy. The cervix softens, and the external os changes a little, but only in so far as usually happens in the first two months of gestation. The lower portion of the organ is alone affected. The internal os remains closed, even in multiparæ, and the consistency of the cervix is more like that of a non-pregnant woman, than of a pregnant. Whilst, further, in normal gestation the cervix is usually situated behind, and to the left, owing to the right lateral inclination of the uterus, in ectopic gestation the cervix usually lies in front and above. This is a point strongly insisted upon by Depaul.

As for the decidua, it is usually found. Where the decidua has not been noticed in certain reported cases, this is because it was very thin, or else had already then expelled. The modifications which, in normal

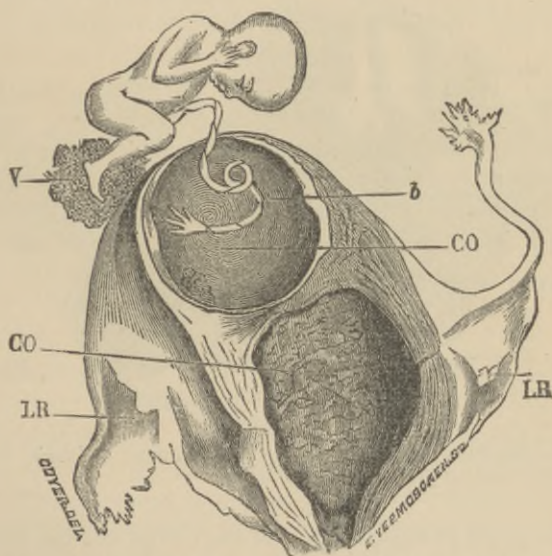


FIG. 38.—INTERSTITIAL PREGNANCY. (Poppel.)—CO, Cavity of ovum. b, Placenta. v, Chorionic villi. LR, Round ligaments.

gestation, occur in the uterine mucous membrane in order to form the decidua, are, according to Cauwenberghe, independent of the ovum. These changes begin even before the ovum has reached the organ. Further, this membrane is essentially transitory. At first voluminous, it soon becomes the seat of true atrophy, of active absorption, and this explains why at term scarcely any traces often remain. It may be asked, then, if, in extra-uterine pregnancy, this useless decidua will not undergo the same atrophy, this same absorption, which results as soon as it is no longer necessary to the development of the ovum, in normal cases; and why, further, in similar cases the retrogressive phenomena

will not occur more rapidly in certain cases than in others, and if we may not thus explain the instances where the decidua has been lacking—for such instances exist. It is particularly in case of abdominal gestation that the increase in the size of the body of the uterus has been denied, as well as the formation of the decidua; there exist a number of authentic observations of this nature on record. (Fleury, Depaul.)

It is accepted, however, that this decidua exists in extra-uterine pregnancies, but this decidua can only form in the uterus, and those authorities who have searched in the ovary, and in the tube, and even around the ovum for the decidua, could not, of course, find it, for it does not exist there. It is through sympathy that the uterus produces the decidua, and it alone can make it, for it alone possesses a mucous membrane from which it can be formed. And this is so true, that the further from

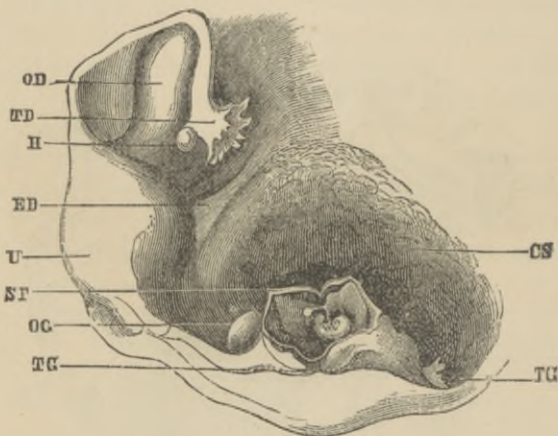


FIG. 39.—TUBAL PREGNANCY.—OD, Right ovary. TD, Right tube. U, Uterus. H, Hydatid. ST, Foetal sac. OG, Left ovary. TG, Left tube. CS, Clots.

the uterus the point of implantation of the ovum, the less is the decidua developed; and it is exclusively in case of abdominal gestation that its absence has been noted.

Schroeder, however, claims that, in case of tubal gestation, the mucous membrane of the tube swells similarly to that of the uterus, and that a normal decidua, frequently also a reflexa, forms there. The appearance may be the same, but the structure differs; for the mucous membrane of the uterus alone possesses the peculiar glands and special cells which play so great a part in the evolution of the decidua, and the mucous membrane of the tube, notwithstanding its swelling, can never present the histological structure of the uterine decidua. Contrary, therefore, to the opinion of Lee, Fleetwood Churchill, Breslau, and others, we cannot admit, in tubal pregnancy, the presence of a true decidua in the tube,



and the microscopic appearances, described by Conrad and Langhaus, seem entirely to prove this.

2d. *Anatomy of the Fœtus and its Annexes.*—Here there is no difference in opinion. The embryo always possesses its two peculiar membranes—the chorion and the amnion, at least during its period of development, and it can not be otherwise: each is inherent to the very evolution of the ovum, each is a direct outgrowth from the ovum; without them the ovum can neither exist nor develop. Where difference of opinion begins is in regard to the elements which constitute the protecting envelope around the product of conception, as it grows in its abnormal site.

*In Ovarian Pregnancy*, the ovum develops in the thickness of the Graafian follicle.

*In Interstitial Pregnancy*, it is the substance of the uterus itself which forms the bed of the ovum and its membrane.

*In Tubal Pregnancy*, it is the walls of the tube, and the peritoneum.



FIG. 40.—PREGNANCY IN LEFT TUBE. (Spiegelberg, after Sommer.)

*In Abdominal Pregnancy*, two alternatives offer: the pregnancy is either primary or secondary. In the first case, where the ovum escapes from the Graafian follicle, instead of entering the tube it falls into the abdominal cavity, and there engrafts itself at some point, and undergoes development. Dezeimeris is wrong when he denies the existence of a protecting cyst. All authorities agree that it exists, and it has been described by Jacquemier, Kiwisch, Gerlach, Hohl and others. This cyst may vary according to the variety of pregnancy, and to speak only of the sub-peritoneal pelvic variety, which is almost always secondary, the cyst is exclusively formed of peritoneum; at times, however, a portion of the uterus, deprived of its abdominal serous coat, enters into the formation of the sac.

Usually, the formation of the cyst is, even as the pregnancy, necessarily secondary, and the following are the stages: Originally interstitial, or tubal, or ovarian, the cyst ruptures, and then either the ovum remains in place, the membrane alone projecting through the rupture site, or else

it falls entire into the abdominal cavity. In both instances rupture is accompanied by hemorrhage, which, often fatal, may at times be limited, and the woman recover. The exuded blood becomes organized; a new membrane is formed which, merging into the true cyst wall, renews it. Again, it may be the clot which becomes organized and repairs the rent.

Often finally, during the course of an extra-uterine pregnancy, an exudation occurs around the cyst, and this forms a second sac, surrounding the first more or less. The ovum is thus enveloped in two membranes, and resists the better external influences: the internal cyst may alter without danger to the mother, and the fœtus, thus protected, develops the better.

Finally, in any variety of ectopic gestation, and even uterine, the product of conception may, through change in the gestatory organ, pass

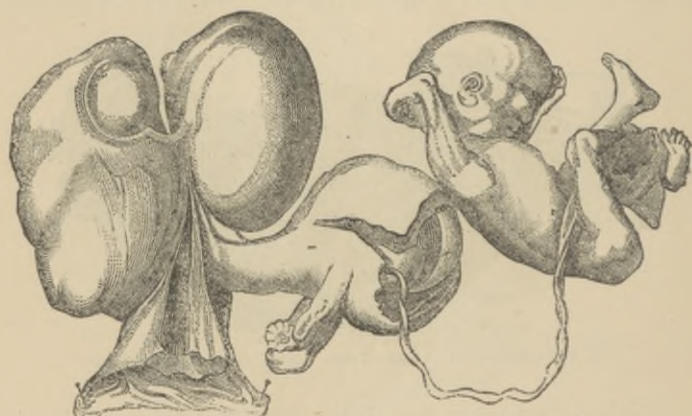


FIG. 41.—TUBAL PREGNANCY, WITH FIBROUS TUMORS. (After Harley.)

into the peritoneal cavity, whilst the placenta remains attached to the site where the ovum was implanted. Ordinarily the fœtus dies, nevertheless there are many recorded instances where it lived. In Walther's case, for example, ovarian pregnancy, the fœtus developed for four months amidst the abdominal viscera, and was found, at the end of gestation, as free, and without cyst, as at the time of its escape from the ovary.

Triadou has recorded a case of Richet's (ovarian), where microscopic examination by Jouon, revealed the following nature of the cyst: Composed of a cellular layer, with vessels, thicker in the posterior than in the anterior wall. Of another layer  $\frac{1}{16}$  of an inch in thickness, composed of epithelial cells with very large nuclei. Of a further layer,  $\frac{1}{16}$  of an inch in thickness, composed of connective pigmented tissue. Finally of a granular fat layer, in contact with the amnion, and inclosing fat débris, and other not recognizable elements.



*The Placenta.*—This differs from that of normal pregnancy, in situation, in shape, and in volume. In its situation there is no regularity, although, from the researches of Koeberlé, it would seem frequently to be attached to the anterior wall of the abdominal cavity. In volume and in form it differs markedly. Sometimes it is double, and triple the size of the ordinary placenta; sometimes it is much thicker; sometimes it is spread over a large extent of surface; sometimes it is divided into a number of vascular portions, distributed over many of the abdominal viscera. The insertion of the cord is usually central, but there is nothing constant about this. The manner of placental insertion differs

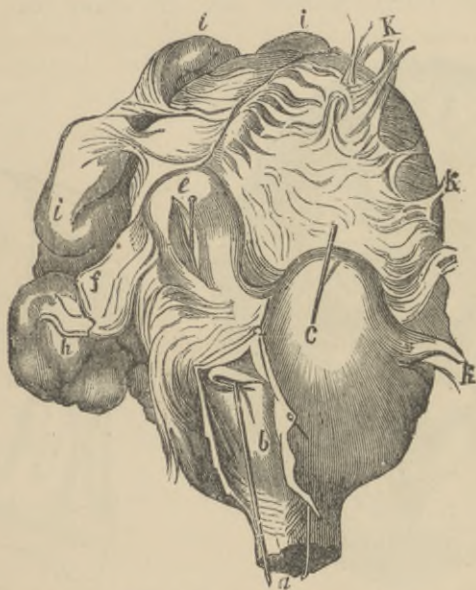


FIG. 42.—ABDOMINAL PREGNANCY. (After Dreesen.)—*a*, Anus. *b*, Vagina. *c*, Bladder. *d*, Os uteri. *e*, Fundus uteri. *f*, Broad ligament. *g*, Left tube. *h*, Cecum. *i*, Intestines. *kk*, Peritoneal adhesions.

scarcely at all from the normal, and the placental villi float in trenches filled with blood analogous to the uterine sinuses. In tubal pregnancy, according to Kiwisch and Oldham, there exist, at least in the first months, ramification of the villi and the maternal blood vessels, very much like the disposition of the placental vessels in carnivora.

*The Fœtus.*—Up to term, the fœtus develops even as in normal pregnancy; but when the fœtus has gone beyond term in the abdominal cavity, it may assume very different appearances. Occasionally it lives beyond term, as is attested by the cases of Grossi, Schmidt, Bayle, and others, and then it corresponds, in appearance, to the stage of gestation—

advanced ossification of the skeleton, teeth, etc.; again, it is purely like an infant born normally at term. These instances are, however, exceptional. Usually, the fœtus dies before term, or at term; and, if the mother survives, it undergoes manifold changes. Lempereur has, especially, studied these changes. "After having established the fact that, in normal pregnancy, the fœtus, according to the period at which it dies, undergoes dissolution, mummification, and maceration, he studies the alterations which occur in case of prolonged uterine gestation. He admits, at the outset, that prolongation of uterine pregnancy is possible, as is attested by the observations, in cows, sheep, rabbits, of Sherman, Boutrolle, Huzard, and, in the human species, of Oldham, Cheston, Bompar, Penker, Shorland, Harris, Schultz, etc. He shows that, in such cases,

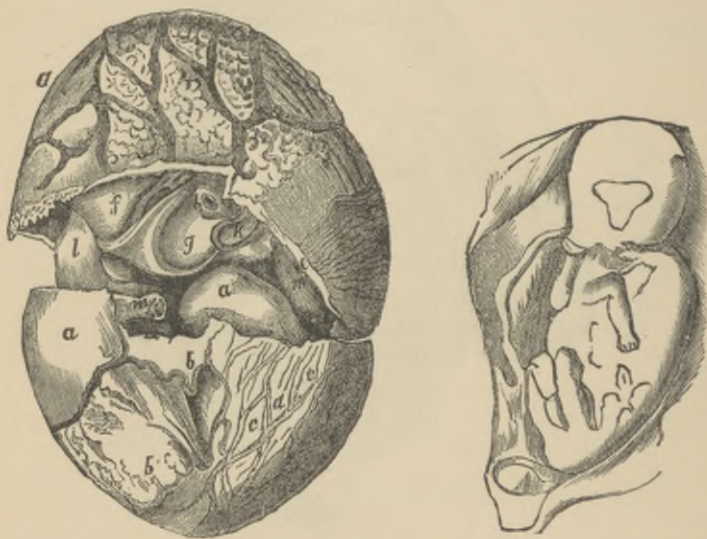


FIG. 43.—TRANSFORMATION OF FŒTUS INTO A LITHOPEDION.—*a*, Calcareous capsule. *b, c*, Vessels on the wall of the cyst. *d, e, p, g, h, i*, Fœtal parts.

FIG. 44.—EXTRA-UTERINE PREGNANCY.—Transformation of the fœtal cyst.

the fœtus may undergo maceration, and putrid decomposition in case there is access of air to the uterus, mummification, ossification, and, finally, saponification. Passing then to ectopic gestation, he shows that the alterations are similar. Rejecting the dermoid cysts as products of conception, he shows that, in the early months, dissolution, mummification, and maceration, may take place—in a word, the changes peculiar to intra-uterine gestation. The fœtus, further, may undergo other changes—such as changes into adipocire, or steatose. Through organic adhesions to the maternal organs, this fœtus lives a parasite at the expense of the mother. These adhesions, however, allow only imperfect nutrition, and fatty de-



generation sets in." Whence, according to Cauwenberghe, retrograde metamorphosis, progressive atrophy, which may result in calcareous degeneration or in complete disappearance of the soft parts, and only the skeleton remains (fig. 43 and 44). It is understood, then, that the fœtus may remain for years in the abdominal cavity, without risk to the mother, and all authorities give examples of the lithopedion. The best known is that of Leinzell, which was found in 1720 in a woman of 94, who had carried it for 46 years. In certain exceptional cases, the fœtus, although dried up, is so well preserved that the tissues have their normal structure. (Cases of Wagner and of Virchow.)

It is, especially, in abdominal pregnancy that these transformations are noted.

*Symptomatology and Progress.*—It is only, as Depaul says, by accumulating observations, and carefully studying those cases where there has been error in diagnosis, that we can hope to establish the differential diagnosis of ectopic gestation, and all authorities agree in the statement that, in the early months, this is almost impossible. Nevertheless, there are a number of symptoms which are well nigh constant. Usually, during the first days following conception, there are present the symptoms peculiar to pregnancy—the nausea and vomiting, the longings, salivation. Vomiting is slower to appear, and, at times, ceases abruptly, without discernible cause. These symptoms are, however, insufficient. The menstrual phenomena are of higher value. All authorities insist on important modifications in regard to menstruation. Suppression, even as in uterine pregnancy, exists, but this suppression is less constant. Sometimes, the menses persist during the first months, and are normal in regard to time and duration, and only disappear later; again there is suppression, at the outset, then they reappear, only to disappear again. In any event, women at times conceive again, and bear to term one or more healthy children, whilst the fœtus, developed or not, remains in the abdominal cavity. Usually bloody, or sero-sanguinolent discharges, mixed with mucus, take the place of the menses. Accompanying them are colicky pains, and in the discharges it is not uncommon to find pseudo-membranous debris, the remnants of the decidua. These discharges reappear when the fœtus attains term, and when false labor sets in, and Duguet is inclined to think that the expulsion of the decidua corresponds to the death of the fœtus. The case he reports would seem to prove this. But such is not always the case, for the decidua may be shed a longer or shorter time before labor, and this will explain, in a measure, its absence in those cases where it has not been noted. Duguet is further inclined to think that these hemorrhages are especially marked in case of tubal pregnancy. Another symptom, which certain observers consider pathognomonic, is a peculiar pain, very variable, in site, in intensity, in appearance—often

appearing at the beginning of pregnancy, usually it is only at the end of about three months that it is noted. At first dull, a simple sensation of weight, of abdominal tension, generalized, it later becomes localized at the umbilicus, or in the inguinal or sacral regions, and thence irradiates into the thighs and legs. Walther says that, in one of his cases, the pain was so intense that the patient only found relief in the knee-chest position, and that the least motion caused her to utter awful shrieks. Often continuous, except when the abdomen is palpated, when it increases in intensity, this pain is subject to exacerbations dependent on varying causes. At times the access is accompanied by discharge of clots, and decidual débris. The pain is then like that of miscarriage, intermittent, irregular, like true uterine colic, which disappears only concurrently with profuse hemorrhage. Again, the pain is like that of peritonitis, and seems dependent on localized attacks, which are not sufficient to cause the death of the woman, but result in the formation of adhesions, and false membranes, which bind the foetal cyst to the neighboring organs. Finally, sooner or later, these pains increase in intensity, are accompanied by tearing sensations, and symptoms of internal hemorrhage: these are the first symptoms of rupture of the foetal sac. These last symptoms may appear suddenly, whilst the woman is enjoying good health, and, of a sudden, she is at the point of death. The pain, further, may diminish, instead of increasing with the progress of gestation. Usually it persists until the foetus dies, and then ceases; occasionally it is present until the foetus has been expelled or extracted.

When gestation proceeds to term, pains of another character supervene. These are those of labor, returning with the intermittency and periodicity of true uterine contractions. In appearance a true labor, it is in reality a false. It may last two to three days, be followed by absolute remittency, and reappear again at variable intervals. Usually the death of the foetus coincides with this false labor; but it is not always so, and the observed cases, where the foetus has lived several months beyond term, justify our assertion.

Finally, in a number of instances, these pains have lasted even longer. In a case recorded by Hohl, they reappeared every four weeks, until the return of the menses. In Schmidt's case, they reappeared eight times, during the eight years' retention of the foetal sac. Lospikler (a six years' case) witnessed their return every year.

What is the true cause of the pains? Must we, with Dezeimeris, seek it in uterine contraction? Does it reside in contractions of the foetal cyst? It has been proved that the foetal sac contains numerous muscular fibres, and the assertions of Zwanck, of Naegele, of Rapin, of Baudelocque, of Hohl, that they have seen the sac contract, cannot be doubted. This fact, however, does not exclude the uterus from contracting through



sympathy; and although Hohl, by introducing a sound into the uterus, during violent pains, found absolutely no contraction of this organ, we believe with Cauwenberghe that the increase in size of the uterus, the hypertrophy of its muscular tissue, the presence in the cavity of numerous membranous remnants, and of old and new clots, the expulsion of the decidua, the production of even profuse hemorrhage coincidently with the pains, which decrease with the emptying of the uterus—that these facts prove that the organ plays a part almost equal to that of the sac in the production of the pains.

To the above probable signs, are joined certain which may almost be termed absolutely diagnostic. These are furnished by the local examination.

1st. *External Examination.*—By this means we may determine the presence of a tumor in the abdomen, a tumor which, unlike the uterus, does not occupy the median line, but lies usually to the right or left, and further which, instead of presenting the soft and elastic feel of the gravid uterus, is harder, more resisting, and above all painful to pressure. Varying in size from that of a nut to that of an orange, this tumor tends ever to increase, and soon palpation determines the presence of foetal parts, and of active foetal movements, whilst auscultation reveals the foetal heart.

[Be it ever remembered, however, that the gravid uterus, after the third month, when it appears above the pelvic brim, reveals to the palpating hand those intermittent uterine contractions, which are characteristic of the uterus containing an ovum, which are absent always when we are dealing with an ectopic gestative cyst, and which phenomenon at once, when appreciated, tells us that we are palpating the gravid uterus, and nothing else. Of course there may also exist an ectopic gestation, for the two forms may coincide; but, we would strongly insist, that the presence of intermittent uterine contractions, appreciable to the hand of the accoucheur, means *uterine* pregnancy, and their absence negatives uterine pregnancy. In very obscure cases, this sign, by its absence, will give us the courage to prove the uterus empty by means of the sound.—Ed.]

Such is not always the course of events. The tumor may suddenly disappear, and acute pain, and the signs of internal hemorrhage, followed by sudden death, leave us in doubt, except in case of autopsy, of the nature of the tumor.

As the tumor develops, it changes in shape; its outline is less distinct; fluctuation is apparent; and we may obtain true abdominal ballotement.

The cases where diagnosis is relatively easy, are very rare, and then we have to depend on other symptoms, still from the side of the abdomen. In case of ectopic gestation, the abdomen is more tense. The tumor is irregular, not spherical, and, if we are able to palpate carefully, two

tumors may be distinguished—the one smaller, resistant, elastic, like the gravid uterus at two to three months, the other larger, irregular, projecting, in which ballotement, or the foetal parts, are readily apparent. Palpation, however, is often impossible except under anesthesia, [and in view of the safety of ether, in any case at all doubtful, anesthesia should be resorted to.—Ed.]

By means of percussion we learn scarcely anything. As for *auscultation*, we may affirm, if we hear the foetal heart-beat, that we are dealing with pregnancy. The uterine souffle is often absent in ectopic gestation. [Similarly is it often absent, or not heard, in case of uterine gestation. A similar souffle has often been detected over uterine fibromata and ovarian cysts. The value in diagnosis, therefore, of absence of the souffle, is very slight.—Ed.]

2d. *Internal Examination*.—Depaul believes that it is by means of the touch we will obtain the most positive information. If the uterus increases in size, it is never as in normal pregnancy. Its tissue becomes, true enough, softer, more boggy, but never in proportion to the age of the supposed gestation. The form is not spherical, but flattened, and far from sinking into the pelvic cavity in the early weeks, it tends to rise to the right or left, or behind the symphysis. According to Depaul the latter is the usual position.

The cervix undergoes changes, but these are never as marked as in ordinary gestation, and the changes further do not correspond to the period of pregnancy. It deviates with the uterus, to the right or left, usually behind the symphysis, so as to be, at times, inaccessible to the finger. (Depaul.) When the finger can reach it, we may observe softening and patency of the external os, the more readily in cases where the woman has previously borne children; but at the end of a certain time these changes disappear, especially when the foetus dies, as though the uterus underwent retrogressive changes.

As the gestation progresses the cervix becomes more and more inaccessible, and we simply feel through the vagina, a larger or smaller mass, more or less immovable, through which it is sometimes possible to perceive more or less resisting or voluminous parts. This tumor, in certain cases, may fill the whole pelvis, lying at times behind the uterus, at times between it and the bladder.

B. *Rectal Examination*.—This gives more precise information in regard to the form, the volume, and the position of the uterus, and the dimensions of the tumor.

Such are the signs ordinarily attainable. There are two, in particular, on which Depaul lays great stress. The one, is the fact that the foetal parts discernible are more superficial than in ordinary pregnancy, in certain cases it seems as though they were just under the skin, so that the head may be distinguished from the breech; the second is the



peculiar form of the tumor, its transverse diameter is longer than its vertical, and the tumor inclines rather to the left than to the right, whilst in uterine pregnancy the reverse is generally the case.

[These signs are also open to doubt. In uterine pregnancy, the walls of the uterus may be so thinned out as to give to the hand the sensation of the foetal parts being immediately underneath, and again in abdominal pregnancy, of which it is ordinarily question when gestation has advanced far enough to allow palpation to be of value, the walls of the sac may be so thickened as to interfere with our feeling the foetal parts at all. Further, in case of transverse presentations in uterine pregnancy the transverse diameter is increased over the vertical, and if the breech of the foetus lies in the left uterine segment, so will the inclination of this organ be the reverse of the customary. Indeed, there are certain obscure cases of ectopic gestation, those for instance where experienced observers have diagnosticated ovarian cyst and normal pregnancy, where apparently nothing short of the uterine sound will make the differential diagnosis—even anesthesia fails to help us. It is here, we believe, that the absence of intermittent uterine contractions will not only give us the courage, but justify us in passing the sound. All observers are agreed that this rhythmical action of the uterus is peculiar to this organ when gravid, and to nothing else. The distended bladder, and sub-peritoneal fibroids, have also been said to contract, the former by Pajot and Tarnier, the latter by Pinard, but only the veriest tyro would mistake either of these conditions for gravidity. These remarks are applicable purely to abdominal gestation. In the interstitial form, and the tubal, we will, of course, obtain contractions, although possibly not rhythmic.—Ed.]

When the cyst ruptures, the symptoms will suggest the diagnosis, [but then diagnosis may be of no use to save the mother.—Ed.] These symptoms are: sudden acute pain, syncope, followed shortly by signs of internal hemorrhage, and death may soon close the scene.

If the hemorrhage is less profuse, these signs become less marked, and they are replaced by chills, intense, and frequently repeated, and by the symptoms of acute peritonitis. Death may here also follow, but not so rapidly.

Cure may, however, follow. If both the foetus and the mother have escaped destruction, gestation may go on to term, and then false labor set in. This labor may kill the woman. If she resists, she may live a greater or less time, carrying the foetal tumor, which, in its turn, undergoes changes, which we will refer to shortly.

*Duration.*—This is far from being settled for all the varieties. It is readily apparent that when the ovum develops in the tube or ovary, and more still in the thickness of the uterine tissue, there is a limit to possible distention, and pregnancy thus necessarily is interrupted, or con-

verted into the abdominal variety. In the latter, however, the ovum is contained in a large cavity where it may increase freely. Whence, then, great differences in the duration of the various varieties.

Those of least duration are the interstitial. Rarely do they exceed the fourth, usually they end at the third month. According to Hecker, of 26 cases:

|                           |   |   |   |          |
|---------------------------|---|---|---|----------|
| Pregnancy lasted 4 weeks, | . | . | . | 1 case.  |
| “ “ about 3 months,       | . | . | . | 2 cases. |
| “ “ 3 months,             | . | . | . | 12 “     |
| “ “ 4 “                   | . | . | . | 3 “      |
| “ “ 5 “                   | . | . | . | 1 case.  |

In 7 cases, the duration was not noted.

Next come the tubal pregnancies. If we consider together the 45 cases mentioned by Hecker, and the 43 by Cauwenberghe, for these 88 cases the duration:

|                 |   |   |   |   |           |
|-----------------|---|---|---|---|-----------|
| 4 to 5 weeks in | . | . | . | . | 3 cases.  |
| 4 to 6 “        | . | . | . | . | 17 “      |
| 6 to 7 “        | . | . | . | . | 9 “       |
| 6 to 8 “        | . | . | . | . | 13 “      |
| For 2 months in | . | . | . | . | 4 “       |
| 3 “             | . | . | . | . | 17 “      |
| 4 “             | . | . | . | . | 11 “      |
| 5 “             | . | . | . | . | 4 “       |
| 6 “             | . | . | . | . | 2 “       |
| 7 “             | . | . | . | . | 2 “       |
| 9 “             | . | . | . | . | 6 “       |
| —               |   |   |   |   |           |
| Total,          | . | . | . | . | 88 cases. |

Of the 4 cases which reached term, Cauwenberghe considers authentic only the two cases of Lamm and Ssobel Schsiboff. To these we must, however, add those of Haussner, of Rosshirt, of Saxtorph.

These cases are all doubted by Stoltz, who contends that the tube, distended by the product of conception, must always rupture in the early months of pregnancy. Neither can he grant the so-called secondary gestations, where the ovum becoming free through rupture of the tube, continues to develop in the abdominal cavity and the sub-peritoneal cellular tissue.

Ovarian pregnancies last a little longer. The majority extend beyond the third month, but those passing as far as the seventh, eighth, and ninth month, are nearly as rare as the tubal beyond the fifth month. Thus Cauwenberghe in 39 cases found:

|                    |   |   |                |   |   |
|--------------------|---|---|----------------|---|---|
| From 3 to 8 weeks, | . | 5 | From 5 months, | . | 3 |
| 2 months,          | . | 4 | 6 “            | . | 5 |
| 3 “                | . | 8 | 7 “            | . | 3 |
| 4 “                | . | 7 | 9 “            | . | 4 |



The variety in which duration is the longest is the abdominal. Here, however, a distinction must be made. Shall we consider as pregnancy, those cases only where the fœtus continues to live, or should we include those cases where, after death, the fœtus has remained years in the abdomen of the mother? We contend for the latter, because as long as the fœtus is in the abdomen, it is liable to changes which may compromise the mother's life, or call for surgical aid. We cite below the table which De Smedt has compiled. It concerns 185 cases.

## Duration was

|                              |           |                        |          |
|------------------------------|-----------|------------------------|----------|
| 15 days, . . . . .           | 1 case.   | For 20 years . . . . . | 2 cases. |
| 3 weeks, . . . . .           | 1 "       | 22 " . . . . .         | 1 case.  |
| 1 to 2 months, . . . . .     | 18 cases. | 25 " . . . . .         | 1 "      |
| 1½ to 2½ months, . . . . .   | 4 "       | 26 " . . . . .         | 3 cases. |
| 3 months, . . . . .          | 5 "       | 28 " . . . . .         | 3 "      |
| 3 to 5 months, . . . . .     | 22 "      | 30 " . . . . .         | 6 "      |
| 6 to 8 " . . . . .           | 15 "      | 33 " . . . . .         | 3 "      |
| 9 " . . . . .                | 18 "      | 35 " . . . . .         | 1 case.  |
| 10 mos. to 1 year, . . . . . | 6 "       | 39 " . . . . .         | 1 "      |
| 1 to 2 years, . . . . .      | 24 "      | 40 " . . . . .         | 2 cases. |
| 2 to 3 " . . . . .           | 10 "      | 46 " . . . . .         | 4 "      |
| 4 to 10 " . . . . .          | 23 "      | 47 " . . . . .         | 2 "      |
| For 11 years, . . . . .      | 1 case.   | 50 " . . . . .         | 2 "      |
| 15 " . . . . .               | 4 cases.  | 54 " . . . . .         | 1 case.  |
| 16 " . . . . .               | 2 "       |                        |          |

Indeed the duration of this variety of gestation, once the fœtus has passed term, and the woman has resisted the effects of the false labor wherein the fœtus was killed, is purely subordinate to the changes the fœtus undergoes, to their nature, their progress, and the ability of the female organism to resist them. In this respect nothing is more variable, for traumatic causes may at any time join hands with the foetal changes, hasten their progress, and thus determine spontaneous expulsion, or call for surgical interference, at any unexpected moment.

*Termination.*—Although, in the majority of instances, extra-uterine gestation terminates with the death of the fœtus or immediately after, yet often the woman is able to survive the grave dangers surrounding her at this period. She may rally, keeping her babe in the depths of her abdominal cavity, and enjoy relative health until her death, which may be due to some action of this foreign body, or else to causes aside from it. We may, therefore, from the present standpoint, divide ectopic gestation into two categories. Where the pregnancy ends during the course of gestation, or at the term of complete foetal development, before or immediately after its death, instances of what Cauwenberghe has called *recent* pregnancies; and where the pregnancy ends only after a variable interval, after a longer or shorter stay of the fœtus, which has become

a foreign body, in the body of the mother, instances of *ancient* pregnancies, according to the same authority.

De Schmedt prefers the following divisions: 1. The cyst ruptures at a variable period of pregnancy, and this rupture entails hemorrhage fatal to fœtus and mother. 2. The fœtus continues to develop and is subject to the modifications which we have already considered. 3. The fœtus determines in the neighboring organs a more or less acute inflammatory process, and is eliminated through various channels. This division only differs from the former in that it makes a special class of the cases where the fœtus undergoes retrograde changes. Now it is precisely these changes which, according to their nature, determine complications, or are not perceived.

We will follow the first classification.

1st. *Recent Pregnancies.*—A. *Rupture of the Cyst.*—This rupture, which is the rule in certain varieties of ectopic gestation, may not occur at all in others; and although extremely grave, it is not always fatal, since of 232 cases, Cauwenberghe only found 71 where the women died. This rupture is usually sudden, and occurs the earlier in gestation where the sac is interstitial, tubal, or ovarian. In abdominal gestation, it rarely happens before term, at the time of the false labor. The consequences are usually fatal to mother and to child, although not always so, as witness the case of Schöller, Mayer, Wegscheider, Campbell, Virchow, and others.

Accompanied by hemorrhage, which Bernutz and Goupil say proceeds from the dilated ovarian veins, from the tube, from the ovary, from the cyst, it determines, at times, such shock that this alone may cause death. Usually, however, it is the profuseness of the hemorrhage, and the complications, which induce the fatal end. Again, the organism is not so deeply affected, and the pregnancy continues, the fœtus as well having escaped destruction. Further still, it causes the death of the fœtus, and, according as this remains in the sac, or escapes into the peritoneal cavity, we may witness new complications. The gestation, in either event, becomes ancient, through the formation of a new sac, and this we consider further on.

B. *Without Rupture of the Cyst.*—When this does not occur, gestation may end in three ways:

1st. False labor sets in, usually at term, it ceases shortly, and the woman, whether the child is alive or not, recovers relative health; 2. The organic troubles which accompany this abnormal pregnancy, instead of diminishing, increase, and the woman, worn out, dies of marasmus; 3d. The presence of the cyst amongst the abdominal viscera, sets up chronic peritonitis, and the woman dies from inability to withstand these repeated and prolonged shocks.

If we examine the reported instances of each variety separately, we



find that, for the interstitial variety, of the 26 cases of Hecker, all terminated fatally from rupture of the cyst. For the tubal variety, of 46 cases, 28 died from rupture, 1 from rupture of a vein, 13 passed into the category of old pregnancies, 2 ended in cure, 2 through expulsion of the foetus through the uterus.

For the abdominal variety, of 128 cases we find:

|  |    |
|--|----|
| Transferred into ancient pregnancy, . . . . .                | 85 |
| Abdominal section, and one case by rectal section, . . . . . | 11 |
| Elytrotomy, 1 case through rupture of the vagina, . . . . .  | 6  |
| Rupture of cyst, . . . . .                                   | 7  |
| Separation of placenta, fatal hemorrhage, . . . . .          | 1  |
| Death at term, . . . . .                                     | 5  |
| Peritonitis and cyst rupture, . . . . .                      | 3  |
| Marasmus, a little before term, . . . . .                    | 3  |
| Peritonitis consecutive to rupture, . . . . .                | 2  |
| Acute peritonitis, . . . . .                                 | 1  |
| Chronic " . . . . .  | 1  |
| Metrorrhagia at term, . . . . .                              | 1  |
| Osteomalacia, . . . . .                                      | 1  |
| Ascites, . . . . .   | 1  |

Of the ovarian cases: Of 44, 19 died from rupture of the cyst; 17 were transformed into the ancient pregnancy category; 2 died of peritonitis without cyst rupture; 1 case of rupture of cyst, consecutive abdominal pregnancy, fatal chronic peritonitis; 1 case of retention of urine, death; 1 of fatal metrorrhagia; 1 case transformed into abdominal pregnancy, and went to term; 1 case, gastrotomy, success for mother and child; 1 case, hanging of the mother during pregnancy.

Referring back to the abdominal variety, the 85 cases, transformed into ancient gestation, are decomposed as follows:

In 22, mummification, etc., and cure.

In 3, death, hectic fever, no cyst rupture.

In 3, ascites, death, foetus dead.

In 57, elimination by vagina, the abdominal walls, the rectum, the bladder, and 33 recovered.

Total number of recoveries—55 cases.

2. *Ancient Pregnancies.*—These are characterized by the presence of a dead foetus in the midst of the abdominal organs, surrounded by a cyst more or less isolated from the viscera, or forming adhesions to them. Mattei has collected 100 cases, and he thus classifies them according to termination:

|  |           |
|--|-----------|
| By mummification, . . . . .                    | 12 cases. |
| Without external opening, . . . . .            | 2 "       |
| Elimination through abdominal walls, . . . . . | 38 "      |
| "    "    vagina, . . . . .                    | 7 "       |
| "    "    bladder, . . . . .                   | 8 "       |
| "    "    rectum, . . . . .                    | 30 "      |

This table accords with that of Cauwenberghe, who, for 180 cases, resumes as follows :

|      |  |           |
|------|--|-----------|
| A.   | Women dying from cause not depending on the pregnancy, after having carried the foetal débris for a number of years, . . . . . | 42        |
| B.   | Women dying from complications due to the presence of the cyst, without external opening :                                     |           |
| 1st. | From inflammation, . . . . .   | 9         |
| 2d.  | “ septic fever, . . . . .  | 1         |
| 3d.  | Opening into peritoneum, . . . . .   | 2         |
| 4th. | Hectic, and marasmus, . . . . .  | 4         |
| 5th. | Ascites, . . . . .   | 5         |
| C.   | Opening of the cyst through anterior abdominal walls :   |           |
| 1st. | Spontaneous opening, cure, . . . . .   | 23        |
|      | “ “ death, . . . . .   | 1         |
| 2d.  | Surgical extraction, cure, . . . . .   | 14        |
|      | “ “ death, . . . . .   | 3         |
| 3d.  | Gastrotomy, cure, . . . . .  | 8         |
|      | “ death, . . . . .   | 4         |
| D.   | Opening of cyst into bladder, extraction of bones :  |           |
|      | Cure, . . . . .  | 7         |
|      | Death, . . . . .   | 3         |
| E.   | Fœtus eliminated by vagina :   |           |
| 1st. | Spontaneous expulsion, cure, . . . . .   | 1         |
|      | “ “ death, . . . . .   | 2         |
| 2d.  | Operative extraction, cure, . . . . .  | 3         |
| F.   | Opening into intestines, elimination of fœtus in whole or in part, with and without interference :                             |           |
| 1st. | Cure, . . . . .  | 18        |
| 2d.  | Death, . . . . .   | 30        |
|      | Total, . . . . .   | 180 cases |

The above table gives, in general, the manner of issue of ectopic gestations, but in a number of individual instances, death occurred under peculiar circumstances: Richets' case, where a woman on the road to recovery, was seized with epidemic puerperal fever; Depaul's case, which died of cholera; Depaul's second case, where the uterine sound pierced the uterus, and resulted in fatal peritonitis; two other cases of Depaul and Boinet, where the women died of hemorrhage resulting from separation of the placenta; a case of Guichard d'Angers, where the sound caused peritonitis; Spiegelberg's case, where both mother and fœtus died of eclampsia; Wurm's case, where the woman died with symptoms of intestinal obstruction.

*Diagnosis.*—The diagnosis is divisible into two categories: 1st. We must establish the fact that we are dealing with pregnancy, and that it is ectopic. 2d. Establish the variety of ectopic gestation present.

It would seem as though, from an enumeration of the symptoms, the diagnosis ought to be easy, nevertheless ectopic gestation has often been



overlooked and only recognized post-mortem. In the absence of the foetal heart and the active movements of the foetus, the diagnosis of pregnancy itself is frequently difficult, the greater the difficulty when the pregnancy is ectopic. We agree with Depaul, however, that we will usually reach the diagnosis, by remembering the signs furnished by palpation and the touch. But what number of errors committed since the case of Huguier (uterine pregnancy mistaken for ectopic), to that of Duboué, where first pregnancy in the uterus, then ectopic gestation, then the use of the sound, and again uterine pregnancy, were diagnosed? What the result in a case like Depaul's, where hydramion complicated? What, where both intra- and extra-uterine pregnancy concomitantly exist? What, in case of ovarian cyst, and ectopic gestation (Guéniot)?

At the sixth month, in the presence of the foetal heart, and the foetal movements, felt often just under the surface, in the presence, further of the form, volume, and situation of the tumor, the diagnosis may be easy, but later the difficulties may increase. If the case is first seen after foetal death, the signs of pregnancy are obscure. The uterus has retrograded, and the tumor has changed greatly. The absence of history, further still, increases the difficulty, and it is only by careful elimination that we may form an opinion as to the nature of the tumor.

[The errors in diagnosis committed by various authorities are here cited. They might be increased by a long list taken from the clinical records of this country. Sufficient the statement that the following amongst other mistakes have been made: uterine pregnancy (and the reverse has occurred); retroversion of the gravid uterus; pelvic hemocele; multilocular cyst of the ovary; anteversion of the uterus; fibrocystic tumor of the uterus, etc.—Ed.]

As for the differential diagnosis between the varieties of ectopic gestation, there is only question during the early months, for later it is rare to meet with anything but abdominal pregnancy.

*In Tubal Pregnancy*, the pain is deep, dull, fixed; the tumor is movable, the uterus is to the side opposed to the tumor and adhering to it. [On the contrary, in many of the reported cases of tubal pregnancy in this country, the tube has been detected behind the uterus, and consequently not so very movable.—Ed.] According to Heim, it is in this variety that the pain is most characteristic.

*In Ovarian Pregnancy*, pain is still a factor, but the tumor is further from the uterus and consequently more movable.

*In Abdominal Pregnancy*, the uterus is less developed, it may be more readily isolated from the tumor. The foetal movements are more easily felt. At times the foetal parts are felt under the skin, as it were. The tumor is larger, and has attained greater development, [intermittent rhythmic contractions cannot be evoked.—Ed.]

Such are the diagnostic signs as stated by the authorities. They are

very vague, and if it is possible, at times, to diagnosticate ectopic gestation in the early months, it is usually not possible to state its variety.

[Nevertheless, if, in the early months, a woman has missed one period, has had irregular discharges preceded by cramp-like pain in the abdomen, if, further, certain of the rational signs (nausea, etc.,) of pregnancy are complained of, and on careful examination an oval-shaped tumor is found posterior or to one side of the uterus, we may always think with a great degree of certainty of tubal pregnancy. Examination by the rectum under anesthesia will assist our diagnosis, and it is peculiarly necessary to reach a diagnosis of this form of gestation early, for, as we point out further on, we possess a certain means of arresting the gestation before the mother's life is imperiled by rupture, and this means further is of absolutely no danger to her. In this country the weight of opinion certainly is that tubal pregnancy may ordinarily be diagnosed early, and of late years the number of instances where this has been done have greatly increased.—Ed.]

*Prognosis.*—This is always ominous, both to the child and the mother, either in the present, or in the future.

*Treatment.*—Authorities are in agreement as to there being two divisions of the cases in regard to treatment: 1st. The woman is in the fourth to the fifth month of pregnancy; 2d. she has passed this period, she is near term, or has passed it.

Since, in the early months, it is nearly impossible to say with what variety we are dealing, we are authorized, says Keller, to consider it tubal, since this is the one which most endangers the mother's life. Since now, tubal pregnancy nearly always results in the death of the mother, we must stop the gestation, as soon as it is recognized. We must, then, determine the easiest and safest method of accomplishing this.

Van Ritgen has advised the employment of meagre diet, and to weaken the mother further by administering daily purgative salines and ergot. But such treatment whilst likely to diminish the size of the fœtus, will not kill it, and therefore does not produce the desired result. As for ergot its action is *nil*. More radical methods were then thought of, and Heim, and Osiander, even counseled extirpation by the knife. But this means has never been put into practice before rupture. [After rupture it has a number of times, by Lawson Tait, in particular, and with success. In less than three years he has performed laparotomy in case of ruptured tubal gestation, in 21 cases, with success in 20. He advocates, also, operating in these cases, even as he would for distention of the tube by serum, pus, or blood. He does not trouble himself about exact diagnosis, indeed he has lately stated his belief that it was impossible to reach an early diagnosis of tubal pregnancy, and herein he is unquestionably in error. He would operate because the exami-



nation reveals a tumor, probably tubal, and because the symptoms complained of can be traced to the tubal enlargement. His principle is correct, for it is as easy a matter to remove a tube distended by a product of conception, as one distended by pus or blood. But, as we will see, his advice is not justifiable, except in the presence of rupture, because we possess a less radical, less dangerous, and just as effective means of disposing of tubal pregnancy.—Ed.] There are other methods which seem less dangerous, although just as effective. For instance, puncture of the foetal cyst, as proposed by Scanzoni. Martin resorted to it through the abdominal walls (abd. preg. of  $2\frac{1}{2}$  months), the patient died. Braxton-Hicks, and Simpson punctured through the vagina. The patients also died. Greenlagh was more successful in a case at two months. Depaul asks, if in these instances it was really ectopic gestation, for we have seen how difficult the diagnosis is, if not impossible, at such an early stage of pregnancy.

Joulin proposed to kill the foetus by the injection into the sac, of morphia, or strychnia, in sufficient quantity to kill the foetus, but not sufficient to be toxic to the mother. Friedreich resorted to this method a year after with perfect success. Koeberlé also obtained a good result. But in Fournier's case, as recorded by Depaul, the injection caused inflammatory symptoms in the mother, requiring laparotomy, and ending in the maternal death.

Paul Dubois recommended electricity, and Bachetti thus endeavored to kill the foetus, and the mother recovered. Braxton-Hicks failed by this method: Duchenne, of Boulogne, rejected it.

Finally, Dr. Malin proposed compression of the tumor between sandbags, but this has never been tried.

[The method, above all others, applicable to tubal pregnancy, is electricity. This may fairly be called an American method, because, up to the present, with but one or two exceptions, it has been practised only here, but with such uniformly happy results as to lead us to reject every other proposed means of treating tubal pregnancy when diagnosed before rupture.

Puncture of the sac has been rejected by American authorities because of its nearly uniformly fatal results. Braxton-Hicks, Goodell, Simpson, E. Martin, Gallard, Depaul, Wetzell, and others, have placed on record cases where, in consequence of the method, the mother died. The method, further, if not fatal to the mother, is by no means certain as regards death of the child.

Injection of the sac has been successful in a number of instances, but, as proved by Friedreich's second case, the method is tedious, as well as dangerous. Lately another case has been recorded by Rennert, making the fourth treated by this method, where the mother recovered, the

foetus, in the fifth month, was killed, and where, notwithstanding most careful antiseptic precautions the mother narrowly escaped death.

Extirpation by the vagina, attempted once successfully by Thomas, has been also attempted by the late Albert H. Smith, who opened with the cautery, the patient dying of gangrene of the peritoneum; by Battey, of Georgia, with the bistoury, the patient dying of exhaustion. This method, therefore, may fairly be called dangerous, and be rejected.

Laparotomy is strongly advocated, as we have stated above, by Lawson Tait, but prior to rupture of the tube, no American authority will herein agree with him. To mention only one, and him on account of his exceptionally large experience with these cases, Thomas, of New York, says, "the growing triumphs of abdominal surgery are apt to lead to the conviction that laparotomy should, as a rule, be the procedure of election in these cases. From this view I unqualifiedly dissent," for the reason that he, in conjunction with Lusk, Mundé, Goodell, Garrigues, Rockwell, and a host of other distinguished gentlemen, know of a safer and just as effective method, which we now consider as the method *par excellence* in the treatment of tubal pregnancy, prior to the fourth, perhaps the fifth month of gestation—electricity.

Either the galvanic or Faradic current, may be used. The current from a twenty-cell galvanic, or from a pocket Gaiffe Faradic, is of sufficient strength. One electrode is placed over the abdomen, and the other in contact with the tumor *per vaginam*, or *per rectum*. In case of the galvanic current, it should be rapidly interrupted. This current should never be too strong, else, as in the case recorded by Mundé, shock may result. Electricity should be used every other day until the tumor has markedly diminished in size. The death of the foetus is known by the cessation of the growth of the tumor, and of whatever rational, or physical signs of pregnancy may be present. This method, when compared with all the others, is seen to be absolutely free from danger: it has proved successful in every case where it has been tried. Thomas himself has had over six—eight?—and all the cases included amount nearly to forty. Mundé, in the early part of this year, gives the figures as about thirty-five. A further advantage of this method is that, in case of an error in diagnosis, *it can do no possible harm*. The method is applicable to every form of ectopic gestation prior to the middle or end of the fourth month, and prior to rupture of the cyst. It has been claimed against the method that it is likely to cause rupture of the cyst. Our best answer to this objection is that rupture has never been produced.

It is in place to mention here the fact that in case of interstitial pregnancy, the effect of the electricity may be to convert this form of ectopic gestation into uterine, by driving the foetus from its sac into the uterus. Such instances have been reported by Mundé and others, and Gar-



rigues has recently recorded a case where the fœtus went to term in the uterus, after having been expelled from its interstitial sac.

Up to the present, the use of electricity in early ectopic gestation has been almost entirely limited to the United States. In the old world, men's minds are slow to receive methods practiced in this new world. It is safe to predict, however, that electricity will yet become the only method of treatment of ectopic gestation prior to rupture of the cyst, and that through this means the dreadful mortality from gestation of this nature will be reduced by fully three-quarters.—Ed.]

The means which we have outlined are rational, but the difficulties in application are great, and the greatest of all is to reach certain diagnosis in the early months.

This diagnosis, we have seen, is reached often only at rupture of the cyst, and when the symptoms of internal hemorrhage are marked. What must then be the course of action? Must we, as Depaul counsels, limit our efforts to fighting the symptoms of hemorrhage, and of supervening inflammation? or, as Keller counsels, resort to gastrotomy, and extract the sac and fœtus? Stoltz admits the justifiability of extirpation only when the tumor is movable; when the sac is adherent to the peritoneum, to the intestines, the bladder, the uterus, etc., it would be folly to touch it.

Depaul, in view of the fact that symptoms of internal hemorrhage, and of peritonitis, may occur aside from ectopic gestation, and that we have no means of knowing the exact cause, is opposed to all surgical measures. Keller, on the other hand, backed up by the weight of authority of Velpeau, Kiwisch, Duparcque, and Keoberlé, favors operation. We must, he says, check the hemorrhage, remove the cause, cleanse the peritoneal cavity.

Cauwenberghe agrees with Depaul, and so do we. Practise, indeed, one of the gravest of all operations, at the time when the woman is in deep shock! The time required to open the abdomen, to search for the source of the hemorrhage, to apply the ligatures, to cleanse the peritoneum, might better be given to compression of the aorta, and the dangers to which the woman is exposed during the operation, in fact and in consequence, are greater than those for which it is attempted, since numerous cases prove that the woman may rally from the symptoms, and the infant continue to live in the new locality where rupture places it.

[Although rupture does not always mean the death of the mother, it may, as reported cases prove. The surgery of to-day is tending to the belief that, in the presence of symptoms of internal abdominal hemorrhage, immediate laparotomy is not only justifiable, but the proper duty of the attendant as well. It is an emergency, above all others, requiring nerve, but it is one from which we may no longer shrink. Over twenty years ago, an American, Stephen Rogers, advocated immediate laparot-

omy in case of tubal rupture; Veit, of Berlin, performed it; Thomas, of New York, would have done so, a few years past, had he not been overruled; Briddon, of New York, in 1883, performed it, the patient rallied for forty-seven hours, and then died of shock—in this case, however, laparotomy was not resorted to on the first symptoms of rupture; Tait, of Birmingham, has repeatedly operated, with almost uniform success. Other instances might be mentioned,\* but our point here is simply to show that laparotomy is justifiable, and likely to save the mother if performed *in time*. We have no desire to dogmatize; we simply aim at pointing out the drift of surgical opinion. The operation itself, whether the sac be adherent or not, is only a little more difficult than extirpation of the adherent pyosalpinx, or diseased ovaries, on account of the hemorrhage, the amount of blood in the abdominal cavity. A specimen recently presented by Mundé to the New York Obstetrical Society proved conclusively that, however easy the removal of the cyst and fœtus might be, the checking of hemorrhage is another matter. In the specimen referred to there existed a rent in the posterior wall of the uterus, where the tube had been adherent. This rent was in part the source of the hemorrhage, and had an operation been attempted it could only have been successfully ended by hysterectomy. It is well to remember, therefore, that this latter operation may be called for.—Ed.]

After the fourth to the fifth month the conditions are no longer the same.

The diagnosis may be assured, and we are dealing, nearly always, with the abdominal variety. It has been proved that, in these cases, the fœtus may go to term, and live. Although the physician ought to succor the mother, his duty as well is, as far as possible, to save the child. Gastrotomy best subserves these two indications. When should it be performed?

Whilst Zang and Velpeau have proposed to extract the fœtus as soon as it is viable, in order to avoid the complications which may occur between seven and nine months, Depaul favors a little longer waiting, in the interests of the child. But he would not wait "till the ninth month. Although certain women have gone to term, and passed it, before the phenomena due to fœtal death have manifested themselves, I should fear whilst waiting for nature's danger signal, to lose altogether the advantages accruing from hastier action. We need simply to be in no doubt as to the infant's viability. This, for ectopic gestation, must be placed at the end of the eighth or the beginning of the ninth month, for the fœtus does not develop as quickly as in uterine gestation. I

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\* As these pages are passing through the press, we are able to record the first successful primary laparotomy in case of ruptured tubal cyst ever performed in this country. The operator was Johnstone of Kentucky, and the case is recorded in the New York Med. Rec. February 26, 1887.—Ed.



would then only interfere at this period, except where labor sets in earlier, and at a stage when I might count still on the viability of the infant."

Keller favors waiting for the pains. Other authorities do not accept this opinion; Sabatier, Siebold, Gerdy, amongst others, nearly absolutely reject it.

[In this country, Lusk probably states the prevalent opinion. "If we accept Parry's statement as approximately correct—that in 499 cases of extra-uterine pregnancy, including 174 of ruptured cyst, the mortality was 67.2. per cent.—it is evident that much remains to be done in the way of perfecting the primary operation before its admissibility, except under desperate conditions, can be recognized. In ten cases reported by Litzmann, only four children survived the third day." Thomas says, "If there is a living child in the abdomen, remove it at the end of the ninth month. The life of the child should be saved at the expense of increased risk to the mother."—Ed.]

The capital point, however, is not to touch the placenta. This must be left to be eliminated, when the maternal blood vessels have become obliterated. The chief dangers after gastrotomy at term, are septicemia, secondary hemorrhage, and peritonitis.

The following cases we borrow from Keller: 1st. Schreger, 1836, pregnancy at term, mother and child saved. 2d. Heim, child saved, mother died. 3. Mattfeld, child saved, mother died of hemorrhage and peritonitis. 4th. Dr. N., child living, mother died. 5th. Lecluyse, mother died of peritonitis, child a little after. 6th. Sale, uterine and extra-uterine pregnancy, children living, mother dead. 7th. Muller, mother and child living. 8th, Ringen, and 9th, Gardien, mothers and children living.

Keller cites other cases where gastrotomy might have been performed at term, since the child did not die till after. He concludes from his observations: Often, in abdominal gestation, the condition of the mother, at term, is very good. 2d. Expectation is far from being always favorable to the mother, and often complications ensue soon after foetal death. He therefore favors gastrotomy.

In certain special cases it has been proposed to substitute vaginotomy for gastrotomy. Of three cases of the kind, in the first the mother died in a few days of acute peritonitis, in the second, a living child, although not at term, was extracted, in the third, the success was complete for mother and child.

What should be our course of action, if we only see the woman after foetal death? Depaul counsels expectancy. If the pregnancy has reached term, or nearly, he would only interfere in case of symptoms showing that the foreign body was not being tolerated. In case complications pointing to inflammation, or cyst decomposition, occur, he would interfere at once, since the success of the operation depends on the health,

and the condition of the woman. When term has been passed, and the foetus is dead, we need only think of the mother. Now the formation of a lithopedion is rare, and sooner or later, nature attempts the elimination of the foreign body. The cyst inflames, and the gravest complications may ensue. The cyst may open through the abdominal walls, rectum, vagina, bladder, even the perineum, as two cases of Pigeolet prove. It is evident, to what dangers the woman is exposed during this work of elimination: peritonitis, hemorrhage, sepsis, marasmus. Therefore gastrotomy is indicated. Conditions differ according to whether adhesions are present, or the cyst is free. Where the latter is the case, it has been proposed to cause the formation of adhesions by practising gastrotomy by means of caustics instead of the bistoury.

We append the operations practiced by bistoury and caustic, in so far as we have been able to collect them:

*Gastrotomy by the Knife.*

|              |                       |            |            |
|--------------|-----------------------|------------|------------|
| Keller, .    | 13 recoveries.        | Keller, .  | 5 deaths.  |
| Jessop, .    | 1 recovery.           | Depaul, .  | 2 “        |
| Ross Jordan, | 1 “                   | Tarnier, . | 1 death.   |
| Lawson Tait, | 1 “                   | Meadows, . | 1 “        |
|              | Total, 16 recoveries. | Scott, .   | 1 “        |
|              |                       | Haberly, . | 1 “        |
|              |                       | Tait, .    | 1 “        |
|              |                       | Boinet, .  | 1 “        |
|              |                       | Total,     | 13 deaths. |

*Gastrotomy by Caustics.*

|               |                      |           |          |
|---------------|----------------------|-----------|----------|
| Rousseau, .   | 1 recovery.          | Depaul, . | 1 death. |
| Beauvoisin, . | 1 “                  |           |          |
| Duboué, .     | 1 “                  |           |          |
|               | Total, 3 recoveries. |           |          |

[Meadows, of London, has had a successful case. Thomas three successful, where gastrotomy was performed by the knife.

It is gastrotomy then, and not vaginotomy which should be resorted to, except in those rare instances where the foetal sac bulges in the vagina. All authorities are agreed on this point. Tait, Freund, and Thomas, and others. Further the same point is proved by Parry's statistics, and also by those of Deschamps, which are the most recent we have. The following table, compiled by him, is of interest, as showing the issue in 59 cases which went beyond term, out of 114, reported between 1875 and 1880.



|             |   |
|-------------|---|
| In 11 cases | formation of lithopedion or encystment. |
| In 19 “     | opening into rectum with 8 deaths.      |
| In 3 “      | “ “ vagina “ 1 death.                   |
| In 1 case   | “ “ uterus “ 1 “                        |
| In 5 cases  | “ at umbilicus “ 0 “                    |
| In 18 “     | secondary laparotomy “ 4 deaths.        |

To quote then a statement made by us, a year ago, when reporting a case of abdominal gestation: “When nature establishes an outlet in the abdominal wall, the patient is more likely to recover, than when she establishes an outlet elsewhere; and thus she endeavors to teach us the point at which incision should by preference be made.”

The mortality from secondary laparotomy had, in 1880, been lowered to 22.3 per cent. When Parry wrote it was 38.8 per cent. We have a right to expect better results in the future, especially when we find Bandl and Lusk advocating the secondary operation, as soon as the maternal blood vessels have had a chance to shrivel, instead of waiting, as has been the custom, until the woman is in the grasp of sepsis, or of peritonitis. Indeed, with electricity for the early months, and timely laparotomy in the later, ectopic gestation bids fair to be robbed of its terrors and murderous results.—Ed.]

Gastrotomy, then, in ectopic gestation, should receive the careful consideration of observers. The ever-increasing betterment of the results after ovariectomy, lead us to hope for the same after gastrotomy. Every observer should publish his cases: thus alone may we be enabled to reach an effective method of treatment.















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