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# IV.—PYURIA IN TYPHOID FEVER.

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The cases here reported have been under observation between September 1st and December 31st, 1894, and are those cases of typhoid fever which presented pyuria as a complication at one time or other in the course of the disease.

The cases number ten out of a total of sixty cases admitted between the dates mentioned, or very nearly 17 per cent. The histories of the individual cases will be found at the end of the report; that which follows is a general review of the results of their analysis:

*The Appearance of the Pus.*—The pus was sometimes present on admission, so that the day when it appeared could not be determined; in both of the cases in which this occurred the admission was before the twelfth day of the disease. Of the remaining eight cases the pus appeared in four between the 10th and 15th day; in three between the 22nd and 28th day, and in one on the 42nd day. It would seem then that whilst pus may appear at any period of the disease, it occurs most commonly either at the end of the second or in the fourth week.

With regard to the duration of time during which the pus was present, this varied largely; in one case it was only found for seven days; in two others it was still present on the patient's discharge, forty, and ninety days respectively having elapsed from the time of its appearance; in six cases it lasted from twenty to fifty-five days, and in the one fatal case it was only found on the day of death. The question of the duration of the pus is important from a prophylactic point of view, for, as we shall see later, the pus was always accompanied by, and presumably caused by, bacteria, the bacterium found being in some cases the typhoid bacillus; and when we consider the large number of bacilli excreted daily in such a case, we can realize the danger of infection from this source. The quantity

of pus in the urine varied both in different cases, and in the same case at different times; as a rule there was a large quantity present in every case at one time or another. In only one case was the quantity noted as moderate when at its height, and in one other as small all through its course. The manner in which the pus appeared in the urine was not always the same; in some cases a few pus cells would be noted at first, and there would be a gradual increase to the maximum amount; in others a moderate amount of pus would appear suddenly, and in still others a very large amount would appear suddenly. By suddenly we mean within twenty-four hours, and this comparatively abrupt appearance is not very hard to explain in these cases. The amount of urine being as a rule diminished, the patient requires to urinate much less frequently than normally, and if bacilli are once introduced into the bladder, they have under these conditions an excellent chance to multiply. The conditions which govern the persistence of bacteria in the bladder are mechanical ones, and we know from experimental evidence that, though bacteria can readily develop in the normal bladder, they are washed away by the act of urination so frequently that they soon disappear; in fever, however, the urine is passed much less frequently than is normal, and is often only imperfectly discharged from the bladder, leaving a residue swarming with bacteria to contaminate the next urine discharged from the ureters.

In most of the cases under consideration the mode of onset was gradual, though in two of them a moderate amount of pus appeared suddenly in the urine, and in two a large amount.

The elements commonly associated with the pus in these cases were casts, epithelial cells and bacteria.

In three out of the ten cases casts were never noted in the urine, and in four others, though noted, they were only temporarily present, and were not associated with the pus, the latter appearing from four to twenty days after the disappearance of the casts.

In the three cases in which casts were associated with pus, one was a fatal case of the renal type in which the pus only appeared on the day of death; in the other two cases the casts were only noticed when a small amount of pus was present, and were absent when the amount of pus was at its height.

Epithelial cells were associated with the pus in 50 per cent. of the cases, but their presence was inconstant, and they were only noted when the amount of pus was small.

Bacteria were noted in the clinical examinations in three cases, in all of which they were present in very large quantities.

Mucus, blood and amorphous phosphates or urates were very occasionally found with the pus, and always when the quantity was small.

There appeared to be no relation between the appearance of pus, and the appearance of the rose-spots, as a rule, though in the one non-fatal case in which the typhoid bacillus was isolated the pus appeared about eight days after the last rose-spots were noted. This fact is mentioned because of Konjajeff's theory that the typhoid bacilli in urine are signs that lymphomata are present in the kidneys, these lymphomata appearing, according to this author, about the same time that the rose-spots appear on the skin.

There appeared to be no relation between the temperature, and the amount, or appearance of the pyuria; in two cases the pus was present from the beginning and persisted throughout the disease; in four it appeared when the fever was at its height, and in the remaining four either after it had disappeared or just as it was disappearing.

Albumin was present in the urine in all the cases, but never in more than traces, except in the fatal case; at times it was entirely absent in filtered urine, whilst the pus was present, and it usually disappeared coincident with the disappearance of the pus, though in two or three cases the albumin persisted a day or two after the pus had disappeared.

Sugar was never present in any case, nor was bile, except in the one fatal case.

The amount of urine was decreased, as is usual in typhoid, but there was no suppression of urine, except in the fatal case, and no definite relation between the amount of urine and the amount of pus.

*The Bacteriology.*—It is necessary to state, in regard to the technique, that none of the patients had been catheterized previously, so that cystitis from this source could be excluded.

The urine in each case was drawn per catheter with proper precautions, and plate cultures were made. The latest methods of differentiating typhoid from colon were used.

Bacteria were present in the urine in varying numbers: in some cases 1 cc. of urine would give only 10–30 colonies in a plate; in other cases one drop of the urine had to be diluted to obtain the colonies at a sufficient distance from one another for working purposes.

The following bacteria were isolated from the 10 cases, usually in pure culture:—

1. *The colon bacillus.*
2. *The typhoid bacillus.*
3. *The staphylococcus albus.*
4. *An unidentified coccus.*

The colon bacillus was present in seven cases—once in association with the typhoid, and six times in pure culture.

The typhoid bacillus was found twice—once with colon, and once alone.

The staphylococcus albus was found once in pure culture.

In one case an organism was found which was not identified. It was a medium-sized coccus, but did not give the reactions of the pus cocci. The organisms were small and oval, occurred in groups and stained well; they grew readily on the ordinary media, except potato, where an invisible growth occurred; did not liquefy gelatin, did not coagulate milk, produced acid, but no indol. The organism was non-motile.

The form of organism present in the urine did not, as a rule, influence the date of appearance, the amount or the duration of the pus.

It is noticeable, however, that the three cases in which bacteria were present in such large numbers as to be observed in a microscopical examination were all colon bacillus cases. In the case in which the unknown coccus was found pus was only present in the urine for seven days, all of the other cases running over twenty days.

Regarding the cases in which the typhoid bacillus was present in the urine, one was a fatal case of the renal type, the other an ordinary uncomplicated case, and it is interesting to note that in this case the pus did not appear in the urine until the 42nd day of the disease.

In looking over the literature of typhoid fever, we have been unable to find any work bearing directly on the subject of pyuria as a complication, though it is barely recognized as such in some of the larger text-books.

A review of the work which has been done on bacteruria in typhoid and on the urinary complications is desirable that we may, if possible, gain some idea of the origin and significance of the pyuria.

Wissicowich is the first one accredited with finding the typhoid bacillus in the urine in typhoid, and since his contribution Neumann and Konjajeff have done the most important work.

The frequency with which the bacilli were found in unselected cases varied considerably with various authors—Karlinski of Krakow claiming to have found it in 50 per cent. of the cases examined, whilst Hueppe only found it once in sixteen cases. Between these two sets of observations come other authors with percentages varying from 15 to 28. In the majority of these cases the typhoid bacillus was in pure culture.

Unfortunately all of these observations were made before the more exact methods of differentiating the typhoid from the colon bacilli were in vogue, and are therefore open to doubt. Judging from the results of the bacteriological examination of the ten cases just reported, it would seem probable that a large number of the bacilli designated as typhoid in these papers were really colon.

Besides these reports on the typhoid bacilli in urine we find other reports on the nephritic form of typhoid in which bacilluria was present; in these cases the typhoid bacillus is not always present, and when present is quite commonly associated with the pus organisms.

For the origin of the bacilli which cause the pyuria we must look to the pathological changes which have been found in the urinary organs.

The presence of the typhoid bacillus in the kidney is of common occurrence, either in connection with the so-called lymphomata, with distinct nephritis, abscess formation, or with no appreciable lesion other than the usual parenchymatous changes found in prolonged fevers.

Konjajeff, who has made a special study of the bacteriology of the typhoid lymphomata, always isolated the typhoid bacillus in pure culture from them.

Bouchard, in nine autopsies on patients who died with bacteruria during typhoid, demonstrated bacteria in the kidney substance in all cases and also lesions of the cells, such as are found with transient nephritides. His work, however, must not be regarded as conclusive, as he made no bacteriological study either of the urine or the kidneys,

and the bacteria in both might just as well have been the colon as the typhoid bacillus.

Besides the typhoid bacillus other bacilli have been noted in the urine in typhoid fever, and in the kidneys after death.

Neumann isolated the streptococcus in two of his cases of bacteruria, and in the nephritic form of typhoid the pus organisms have been frequently obtained.

In typhoid nephritis and in abscess of the kidney following typhoid the colon bacillus and the pus cocci have both been found at times. We have been unable to find any case in which the colon bacillus was present in typhoid lymphomata, and in all the post-mortems here in which the lymphomata have been specially examined, the typhoid bacillus alone has been found. No cases of pure pyelitis, due to the typhoid bacillus, are reported.

The bladder has been found to show pathological changes in a fair number of cases, though in most of these the changes consist of submucous ecchymoses, which could be accounted for without assuming a bacterial origin, and which could hardly produce a pyuria.

In a few cases graver vesical alterations have been found, as patches of gangrene in the mucous membrane, or even gangrene of the entire mucosa, the most extensive observations on this subject having been made in 1843 by Cossy, a pupil of Louis.

Guinon has reported one case of cystitis following typhoid in which, in addition to pus, a pure culture of the colon bacillus was found in the urine; this case is, however, hardly comparable to ours as the cystitis followed directly on catheterization.

It would seem then from post-mortem evidence that the sources of the bacilli in the urine could be either the kidney or the bladder, and presumably the pus is from the same source as the bacteria.

This latter fact is, however, not by any means proven, as unfortunately the most of the articles on typhoid bacteruria fail to mention the state of the urine, other than that it contained albumin; only an occasional reference to a microscopical examination being found.

In the kidney the two sources of the bacteria are the lymphomata on the one hand and a definite nephritis on the other.

According to Konjajeff typhoid bacilli in the urine are definite proof of the presence of lymphomata, though the occurrence of lymphomata does not necessarily lead to bacilluria.

In the case of a nephritis Bouchard seems to think that the bacilli gain entrance to the urine by direct trauma of the kidney cells.

Whilst we have no direct evidence to prove that the pyuria in typhoid is ever due to bladder implication, we must admit that the cases of actual gangrene of the vesical mucous membrane were in all probability of bacterial origin, but further observation is necessary on this point. One other origin of the pyuria should be considered, and that is the intestinal origin.

It has been shown by experimentation, that by irritating the rectal wall in animals, and then introducing cultures of certain bacteria into the rectum, a cystitis is almost invariably set up, the organism having passed through the tissue between the rectum and bladder.

Whilst we do not ordinarily have implication of the intestinal tract as low down as the rectum in typhoid, yet a certain number of such cases do occur.

In one of our cases, in which the rectum was extensively involved in the pathological process, and in which, during life, both the colon and typhoid bacilli were isolated from the urine, only the typhoid bacillus was obtained from the kidneys at the post-mortem cultures; it is presumable, therefore, that the colon bacillus had some other place of origin than the kidneys in this case.

We must not forget, also, that cases of what were formerly believed to be post-mortem migrations of the colon bacillus into the organs are now pretty definitely proved to be ante-mortem, and occur often with the very slightest lesions of the intestinal wall.

It is easy to understand, then, how in a disease with as extensive intestinal lesions as typhoid fever the colon bacillus could pursue a similar course and thus gain entrance to the urine.

In the cases reported it would seem impossible to definitely state the origin of the pus and bacteria in the urine. The clinical picture was that of an ordinary typhoid fever, the pyuria giving rise to no special symptoms.

Nor does the state of the urine aid us: casts were often absent, and when present were not usually in intimate association with the pus; epithelial cells were present in some instances, but most authorities are agreed that the origin of epithelial cells in the urine cannot be definitely made out. The reaction of the urine will not help

us, as we can have an acid urine in a cystitis as well as in a pyelitis or nephritis.

It would seem, then, that pyuria, whilst present fairly frequently in typhoid fever, is a complication of no gravity, and is only important from its association at times with the typhoid bacillus, prophylaxis demanding that in these cases the patient should be retained in the Hospital till the pus has disappeared.

The following is a resumé of the cases in which the pyuria occurred:

*Case I.*—L. H. J., aged 13, colored, school-boy, admitted to the Hospital complaining of cough and headache.

The family history is negative; the past history is negative.

The present illness began three weeks ago with weakness, not much headache, loss of appetite. The bowels were regular; no pain in the chest or abdomen. He has had cough, with white, frothy expectoration. The nose bled three or four days ago several times; no chills. The blood was negative for malarial organisms.

The patient was well formed, well nourished; the tongue was slightly coated. The lungs were negative, except for numerous coarse, moist and sibilant râles. The heart was negative; spleen was not palpable on admission.

The temperature, which was 103° on admission, ranged between this point and 104.6° for the first week, except when influenced by baths. It dropped slowly during the second and third weeks, and at the beginning of the fourth week had reached normal. It then, however, went up again, patient having a relapse, which lasted about three weeks.

The urine showed pus from the third day after admission. The pus decreased in amount as the fever went down, but never disappeared, the cells appearing again in great numbers when the relapse came on. At the time of discharge—forty days after the termination of the relapse—the urine had not contained any pus for a week.

Cultures in this case showed the bacillus coli communis only.

*Case II.*—G. E., aged 10, colored, school-girl, admitted to the Hospital complaining of headache.

The family history is negative.

She gives a history of having had, soon after birth, a purulent discharge from both eyes, and later a general eruption. The past history is otherwise negative.

The present illness began five days ago. The onset was gradual, with headache, listlessness and loss of appetite. On the second day of the disease the patient had a shaking chill, followed by fever and profuse sweating. She has had no chills since, but has constant headache and feels tired and sleepy. She has no cough; the appetite is gone; the bowels are constipated. She has had no nose bleed. The blood was negative for malarial organisms.

On admission the note states that she is a sparely nourished child; tongue thickly coated; pulse regular, good volume. The lungs are perfectly clear. The heart is apparently not enlarged, and the sounds are clear, except at the base, where a soft systolic murmur is heard; also present in both subclavians.

The abdomen was rather full, nowhere tender; splenic flatness extended from the eighth rib nearly to the costal margin, but the border was not palpable. The spleen was never palpable through the entire course of the disease.

The case was complicated about the middle of the third week by a double parotitis.

For the first eight days after admission the temperature ranged between 101° and 103.8°, except when influenced by baths. After this it fell steadily but slowly, and on the twenty-third day had reached 99.5°. It, however, rose again, patient having a relapse, which lasted about three weeks. The temperature never fell to normal, but remained between 99° and 100° for eight days following the first relapse, when a second relapse of lesser severity, and lasting nine days, occurred. The temperature then fell, and remained normal until discharge—two months after admission.

The urine contained a few pus cells from the beginning. They were, however, very scanty at first. They were most numerous during the height of the first relapse, and were still present in small numbers when the patient was discharged.

Cultures in this case showed the bacillus coli communis only.

*Case III.*—H. T., aged 31, male, native of Germany, baker, admitted to the Hospital complaining of having caught cold.

The family history was negative. Personal history was negative.

The present illness began about twelve days before admission with deafness. He had some abdominal pain, but none anywhere else,

constant headache, and nose-bleed three or four times in the week before admission. The appetite has been poor; bowels have been a little loose. He gave up work about a week after the onset of the disease; has been in bed since. No cough. The history is unsatisfactory, as the patient is extremely deaf.

Note on admission says: Patient is a man of large frame, well nourished; tongue slightly coated; pulse full, soft, regular, dicrotic; lungs clear throughout. The heart is negative, except for a slightly accentuated second aortic. Splenic border palpable about 3 cm. below the costal margin. A number of suggestive spots on lower thorax and abdomen; one or two on the back. The next day the patient developed an extensive rose-rash.

The temperature ranged between 103° and 104° for the first five days, excepting when influenced by baths. After this it fell gradually with occasional slight rises, and reached normal thirty days after admission.

The urine contained pus from the seventh day after admission; at first in small quantities, but about the end of the third week enormous numbers of pus cells were present in the urine. The pus continued, but gradually decreased from about the fortieth day, and on discharge there was none present.

Cultures in this case showed the bacillus coli communis only.

*Case IV.*—E. E., aged 21, male, native of the United States, laborer, admitted to the Hospital complaining of abdominal pain.

Family history negative.

Past history.—Had malaria of the tertian type two years ago. Denies venereal history.

The present illness has lasted for about ten days, but he has been able to work up to within six days ago. The illness began with headache, pain across the back, and general aching. He has had no chills, no nose-bleed, no cough. Appetite very poor; bowels loose, two to four movements daily; no blood in the passages; pain in the abdomen, not very severe. Blood examination negative for malarial organisms.

The note on admission stated.—Patient is a man of small frame, sparely nourished; tongue is coated; pulse full, regular, dicrotic; lungs clear throughout; heart negative, except for an accentuation

of the second aortic; border of spleen just palpable. There are several suggestive spots on the lower thorax.

Temperature for first twelve days ranged very irregularly between 97° and 103°, being very markedly influenced by baths. After this it fell gradually and reached normal twenty-three days after admission.

The urine contained pus from the twenty-third day after admission. It continued up to within eight days of discharge, at which time the microscopical examination of the urine was negative.

Cultures in this case showed the bacillus coli communis only.

*Case V.*—S. O., male, aged 20, native of the United States, farmer, admitted complaining of a heavy feeling in the chest.

Family history.—Comes from a house in which eight of the thirteen inmates have either had or are now suffering with typhoid fever. One sister and one brother have lately died from the disease.

Past history.—He has had the usual diseases of childhood; denies venereal disease.

The present illness began about five days ago; onset gradual; felt tired and giddy; no chill; slight headache and nose bleed. Appetite absent; bowels loose—two or three movements in the twenty-four hours; no blood in the stools; no cough. Examination of the blood for malarial organisms negative.

On admission the note is: Patient well developed, well nourished; tongue slightly coated; lungs clear throughout; heart not enlarged; at the apex a harsh systolic murmur, transmitted to the axilla, and heard also over the body of the heart. The second aortic sound is accentuated. Spleen is just palpable; no rose-spots.

Patient had a slight attack of hæmorrhage from the bowels; the disease otherwise ran its usual course.

Temperature ranged between 101° and 104°, except when influenced by baths, for the first week, after which it gradually dropped, and reached normal by the eleventh day after admission. It remained at normal, with the exception of a sudden rise, lasting over a part of the twenty-four hours, on the twenty-second day.

Pus was observed in the urine in slight amount on the seventh day after admission, it remained only for a few days and then disappeared. On discharge microscopical examination of the urine was negative.

Cultures in this case showed an unidentified coccus, more fully described in another portion of the article.

*Case VI.*—C. W., male, aged 47, Irish, laborer, admitted to the Hospital complaining of headache and pains in the legs.

The family history was negative.

Past history.—Has used alcohol and tobacco excessively; denies venereal disease.

The present illness began about five days ago with tired feeling and a severe headache, which have continued ever since; no nose-bleed; no chill; pain in the epigastrium, dull and constant; no cough; has general pains. Appetite is absent; bowels constipated. Examination of the blood on admission for malarial organisms was negative.

Note on admission states.—Patient was a small framed, fairly nourished man; tongue slightly coated; pulse small, low tension, regular, not dicrotic. Percussion over the lungs is clear. On auscultation the expiration was prolonged, and everywhere accompanied by occasional wheezing or piping râles. Heart negative. The spleen was just palpable. There were one or two suspicious spots on the abdomen and lower thorax. The disease ran its usual course.

The temperature for the first sixteen days ranged between the normal and 104°, except when influenced by baths. After this it gradually dropped and reached normal by the eighteenth day, but rose again the same day, reaching 102.6° four days later; then falling again and reaching normal seven days from the beginning of the second rise.

The urine showed a few pus cells from the fifth day after admission. These gradually became more numerous until the thirty-fifth day after admission, when they began to decrease, and at the time of discharge, on the 29th day of January, 140 days after admission, pus had been absent for nearly sixty days.

Cultures in this case showed the colon bacillus only.

*Case VII.*—C. R., male, aged 33, Pole, laborer in Iron foundery, admitted to the Hospital complaining of fever.

Family and personal history both negative.

Patient has been ill four weeks, with headache and fever; has not been able to work for three weeks; no chills; no nose-bleed;

some cough, but no expectoration. Appetite good; state of bowels not ascertained. Patient does not speak good English. Blood on examination was negative for malarial organisms.

Note on admission states.—Patient looks ill; expression is dull and heavy; moderately well-nourished; tongue is moist, slightly furred; pulse is regular, not dicrotic. Heart and lungs are both negative. The spleen is not palpable. There are several rose-spots present on the abdomen.

The temperature, which reached 103° shortly after admission, fell gradually and had reached normal by the end of the fifth day.

The urine began to show small amounts of pus on the tenth day after admission. The amount gradually increased, but never became very great. Pus was still present at the time of discharge, three weeks after admission.

Cultures in this case showed the typhoid bacillus in pure culture.

*Case VIII.*—J. S., male, aged 24, Hungarian, laborer, admitted to Hospital complaining of fever.

The history was very difficult to obtain, as the patient spoke neither English nor German. He has been ill about two weeks with headache; no nose bleed; no chills; slight cough, but no expectoration; has loss of appetite and pain in the abdomen; bowels are loose.

On admission the blood was negative for malarial organisms.

Note on admission states: Patient is a healthy-looking, well-built, muscular man; tongue has a white fur. Pulse is quiet, not dicrotic; lungs clear, except for a few bronchial râles at the bases. The heart sounds are clear. There is a very extensive rose rash over the lateral region of the chest and abdomen; also a few on the arms. The spleen is readily palpable.

The temperature for the first seven days ranged between 100.5° and 104°, except when influenced by baths. After this it fell gradually, and reached normal about fourteen days after admission.

The urine contained a few pus cells on the ninth day after admission. On the eleventh day more pus cells were noted, and it was also observed that the urine was swarming with bacteria. The pus continued until within four days of discharge, but on the day before patient was discharged microscopical examination of the urine was negative.

Cultures from this case showed the colon bacillus only.

*Case IX.*—J. R. A., male, aged 20, German, sailor, admitted to the Hospital complaining of pain in the abdomen.

Family history is negative.

Past history.—Has had malaria two years ago; no details; had urethritis a year ago.

Present illness began about a week ago, with gradual onset; no chill. There was diarrhœa, six or eight stools in twenty-four hours, loose, watery, never bloody, which ceased after four or five days; no nose-bleed; cough for a week with moderate white, frothy expectoration; headache at times. Appetite poor; feels weak at times. Blood on admission was negative for malarial organisms.

Note on admission.—Patient looks dull and apathetic; tongue dry, coated; sordes on the lips; pulse slow and regular, quite dicrotic. Lungs clear, except for a few moist râles at the bases.

Heart.—Point of maximum impulse apparently in fifth space about in the mammillary line, relative dulness at the third rib, does not pass the left sternal margin. At the apex the first sound is soft, much prolonged, almost like a murmur. As one passes upwards a well marked systolic murmur is heard, more marked over the pulmonic area. This is a little rough and probably organic. The spleen is readily palpable. There is very profuse rose-eruption on the trunk, arms and thighs. Temperature for first three days after admission ranged between F. 99° and F. 103°, except when influenced by baths, it then gradually fell, ranging between F. 99° and F. 101°, until the seventh day after admission, when it reached normal.

The urine showed a large amount of pus four days after admission, and on the fifth day showed rather less pus, but a very large number of bacteria.

Cultures from this case showed the staphylococcus pyogenes albus in pure culture.

*Case X.*—Mrs. R. F., female, aged 20, native of the United States, admitted to Hospital January 2nd, 1895, complaining of typhoid fever.

The family history is negative.

She has had the usual children's diseases; married two years; one child, living and well.

The patient went to bed nine days ago, but had not been feeling well for some months previously; was thought to have had malaria;

had headache, diarrhœa, pain in the back. She has vomited a few times, and had diarrhœa continually after going to bed; she did not have any hæmorrhages previous to admission. She became slightly delirious three days before entrance.

Note on admission: The patient is very dull and apathetic; pulse small, soft and rapid; sordes on lips and teeth. She can be made to answer questions with greatest difficulty, and then answers only in monosyllables. The lungs are clear, except for a few fine râles at the bases. The heart sounds are rapid, but clear. A number of spots on the abdomen suggest faded rose-spots.

Patient had a hæmorrhage from the bowels, gradually sank, and died within forty-eight hours of admission.

Temperature on admission was 105.6°; fell, reaching 102° six hours after admission, and from then until death it ranged between 101° and 103°. It was 103° at the time of death.

The urine was highly albuminous, but no pus was noted until the day of death, when many pus cells were present. It contained a large number of granular, waxy and hyaline casts, all of which were bile-stained.

*Autopsy.—Anatomical Diagnosis.*—Extensive ulceration in small and large intestines; hæmorrhagic infiltration of ulcers.

Beginning 288 cm. above the valve is the first ulcer; the central part is sloughing and hæmorrhagic. From this point downwards the ulcers increase in size and extent; sloughs are still adherent to many of them; in others they have separated, exposing the circular muscular coat. In general, the ulcers show an hæmorrhagic appearance. Just above the valve is a very large, irregular, hæmorrhagic ulcer, partly covered by slough and partly clean. The cæcum presented many small follicular ulcers, and similar ones occurred throughout the ascending and transverse colon. Many of the swollen follicles presented necrotic tops. The edges of the ulcers were usually hæmorrhagic. In the descending colon and rectum the ulceration was more advanced, and the edges of the ulcers very hæmorrhagic. The mesenteric glands were much swollen. The spleen was enlarged —weighed 475 grammes. The kidneys were swollen and pale. The heart was normal; muscle firm.

Cultures from the urine in this case showed both the colon and the typhoid bacillus.

## LITERATURE.

Bouchard: Revue de Médecine, Vol. I, 1881.
Cossy: Archives Générales de Médecine, 1843 (?), 3rd Volume.
Guinon: Revue de Maladies de l'Enfance, 1892.
Karlinski: Cited in Sajou's Annual.
Konjajeff: Centralblatt für Bakteriologie, 1889.
Neumann: Berliner Klinische Wochenschrift, 1890.
Seitz: Inaugural Thesis, München, 1886.
Zègre: Inaugural Thesis, Paris, 1893.