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STATED MEETING, NOV. 5, 1862. DR. JAMES ANDERSON, PRESIDENT, IN THE CHAIR.

DR. JOS. M. SMITH, by appointment, then presented the following remarks on

THE THERAPEUTICS OF ALBUMINURIA.

MR. PRESIDENT—As the Academy is aware that I have accepted the invitation to open the discussion of one of the topics into which the general subject of Albuminuria has been divided, viz. its therapeutics, I will now endeavor, with your permission, to discharge the duty I have assumed. And here I would remark, that I shall be unable to enter upon the discussion with any hope of interesting the Academy, or with satisfaction to myself, without, in the first place, submitting a few remarks on the pathological history and present state of our knowledge of the disease in question. Such a preface I deem necessary, in order to show the grounds upon which, I think, the treatment of albuminuria should be based.

It is justly remarked, in the preface to the New Sydenham Society's edition of Dr. Bright's Clinical Memoirs, that a great advance was made towards the true pathology of dropsy by Dr. John Blackall, Physician of the Devon and Exeter Hospital. The name of this distinguished physician, I believe, has not been mentioned in the course of this discussion. It deserves to be brought prominently before us. The first American edition of his work, bearing the title of "Observations on the Nature and Cure of Dropsies," was published in Philadelphia in 1820. In this work, Dr. Blackall relates numerous cases in which the urine was coagulable by heat and by nitric (or, as he called it, nitrous) acid. Though this fact, as he expressly states, had been occasionally noticed by his predecessors, he remarks, in speaking of the properties of the urine in dropsical affections, that "Writers have spoken of the color of that secretion, its quantity, its sediment; and it is a circumstance hardly credible that, amidst so much minute labor bestowed on these topics, the effect produced on it by the application of heat should have been so greatly overlooked." And he further observes, that "so extraordinary a phenomenon cannot be investigated with too much care, and the distinctions which it seems capable of affording in nosology are undoubtedly not to be neglected." He also states, on high authority, that albuminous urine was found to contain hardly any *urea*. The cases of anasarca, with albuminous urine, he called inflammatory dropsies.

Concurrent with the facts collected by Dr. Blackall were the observations of Dr. Wells, "a name scarcely less illustrious than Bright or Blackall," published in two papers, in the third volume of the Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, in 1812. The first paper relates to dropsy which succeeds scarlet fever, and the second to the presence of red matter (blood?) and serum of the blood (albumen?) in the urine of dropsy which has not originated in scarlet fever. Neither Dr. Blackall nor Dr. Wells had noticed any constant association or connexion of albuminuria with diseases of the kidneys, or with any other internal organ.

Such was the state of our knowledge concerning albuminuria, added to which was the theory that the dropsy attending it was due to an increased exhalation or diminished absorption, or both, when Dr. Bright came forward, about 1824, and directed his sagacious and philosophical mind to the study of the morbid anatomy of different internal organs, and especially of the kidneys; and, in doing so, he carefully noted the semeiotic phenomena which attended the organic lesions he found in his post-mortem examinations. While thus prosecuting his inquiries, with a scrupulous regard to accuracy of observation and correctness of detail in the record of cases, he arrived, by a rigorous induction, at the important conclusion, that in the forms of dropsy in which the urine is albuminous and deficient in urea, there is invariably

organic disease of the kidneys. This great truth being established beyond question, and published by Dr. Bright, in 1827, at once placed him in the foremost rank of renal pathologists, and obtained for him the distinguished honor of having his name associated with the disease he had so successfully and admirably investigated.

The discovery that urea was deficient in the urine in Bright's disease, suggested the inquiry whether that effete substance was retained in the blood. This question was satisfactorily answered by Drs. Bostock and Babington, who, after a satisfactory analysis, announced, that in albuminuria there is an accumulation of urea in the blood. "It was this," to use the language of another, "that perhaps constituted the most important part of the discovery, and which produced so great a change in the whole science of pathology. For it was argued, and with reason, by Dr. Bright, and still more earnestly by his disciples, that this inquinition of the blood was the cause of many of the morbid phenomena, such as cerebral disturbance and inflammations of the serous membranes; and thus was introduced a modified and rational humoral pathology." A more stunning blow could not have fallen on the doctrine of *solidism*, then almost exclusively received by medical men, than the one inflicted by the discovery in question.

It is noticeable in the history of albuminuria that Dr. Bright drew the picture of the disease which bears his name from phenomena presented by one hundred cases; a number no doubt sufficient to afford opportunities to contemplate, not merely the more common manifestations of the disease, but most of those which are of rare occurrence. In following up the labors of Dr. Bright, thousands of microscopes and test tubes, in the hands of experts, have been employed in exploring the more recondite metamorphoses which take place in the organism of the kidneys and in the blood and renal secretion. The symptomatology, too, of the disease has been studied by innumerable observers with a minuteness which, it would seem, has, for the most part, exhausted that branch of the subject. Among those who have recently contributed to this result, we may be proud to mention the gentlemen who have preceded me in this discussion. Their labors, directed to the end of elucidating the subject, are creditable to American medicine.

In studying the therapeutics of albuminuria, I am ambitious of avoiding, as far as possible, the empiricism into which we are apt to be led in managing diseases the nature of which is obscure or unknown. It will, therefore, I trust, be excusable, if I look into the pathology of albuminuria, so far as will enable us to ascertain what are the rational indications which should govern us in the treatment of the disease.

It has already been remarked that albuminuria is but a symptom of disease. It occurs in maladies which are not Brightian in their nature. It occurs temporarily in febrile attacks, in scarlet fever, in pregnant, parturient and puerperal women, and in various *acute* inflammatory affections, especially of the serous membranes.

I use the word *acute*, for the reason that the diseases referred to are usually suddenly developed, and are comparatively violent and transitory. In such cases, the organism of the kidney is in no respect permanently changed. Abeille has published an article "On Temporary Albuminuria without Lesion of the Kidneys, occurring in a number of Morbid States."

Now in all such instances I am not disposed to regard the symptom of albuminuria as an indication of Bright's disease. Setting aside, therefore, for the present, the acute affections in which that symptom occasionally appears, we come to consider the examples in which albuminous urine is a persistent symptom, showing itself in connexion with certain local and constitutional phenomena of a chronic character. Such phenomena occur in the great majority of cases which are universally recognised as Bright's disease. But albuminuria is not a constant symptom, even in this disease. It is sometimes absent in cases in which there are symptoms unmistakably diagnostic of the malady. It is, therefore, clearly improper to call Bright's disease albuminuria.

The symptom of albuminuria, however, has a value, especially appreciable in connexion with other morbid changes in the urine. In the changes referred to, we find appearances which, with rare exceptions, are reliable diagnostics of Bright's disease. Among the more remarkable of these, are a smoky color, and diminished specific gravity of the urine, cylindrical casts, variously denominated according to their physical characters—transparent or hyaline, waxy, bloody, granular, &c. When these, or the greater part of them, are concurrent with an impairment or loss of vision and certain constitutional symptoms, among which dropsical intumescence of the face and limbs is the most remarkable, we cannot err in recognising the disease as a chronic structural lesion of the kidney.

In regard to the changes which the kidneys and the urine undergo in Bright's disease, I have only to remark, that though they have of late been so minutely investigated I have been unable to deduce from them any principle which is important in a therapeutic point of view, or, in other words, which enables me to judge whether there is any peculiarity or modification of treatment required in the large white kidney, or the small contracted kidney, or where the casts are of this kind or of that kind, or where there is an excess of fibrous tissue, or fatty degeneration. Nor do they appear to me to settle the question whether the morbid conditions usually embraced in the term Bright's disease are different disorders or modifications or stages of one and the same disorder. But, however these things may be, we are not without sufficient data from which to deduce certain general rules of treatment, though in following them it will be found that the pathology of the disease is in advance of its therapeutics.

In respect to the etiology of Bright's disease, we know of no determinate point of inquiry from which to proceed with a ra-

tional expectation of reaching its *fons et origo*. Are the theoretical suggestions of Prof. Clark worthy of consideration? viz. that the disorder may have its beginning in a lesion of the ganglionic nerves which go to the kidneys; or travelling further back, is its source to be found in a morbid condition of the blood? These questions have a bearing on the treatment of the disease.

In reviewing the whole subject, as it now stands summarily unfolded before us, we are brought to contemplate the prominent facts, in the history of the disease, facts which were clearly disclosed by Blackall, Wells, Bright, Bostock, and Babington, viz. albuminous urine, diminution of urea in the renal secretion, accumulation of urea in the blood, and chronic disease of the kidneys. In this group of phenomena we find the substratum of the various symptomatic or secondary phenomena which are observed in individual cases. As to the diversified changes in the qualities of the urine and in the organism of the kidneys which recent observers have detected by chemical and microscopic means, it appears to me that it must at present be predicated of them that their relations to one another and to their antecedents are yet involved in obscurity. Nor will they, I am persuaded, be available for practical purposes, if ever they can be made so, until some master mind shall generalize them, or rather say, unravel their complexity, show the order of their development, and interpret their significance.

It is, then, in the kidneys that the first *apparent* morbid movement in Bright's disease occurs; and all that follows arises from these organs losing the power of eliminating the effete azotised principle, urea, from the blood. This peculiar substance, when accumulated in the blood, is generally believed to act as a poison, its deleterious effects being co-extensive with the circulation. In its chemical constitution it is closely allied to the cyanogen compounds, a class of bodies many of which are remarkable for their toxical properties. Though it may be prepared artificially, it is in the body a natural or physiological product, formed either from the debris of the decomposing tissues, or from certain principles existing in the blood. "Dumas has announced with much enthusiasm the confirmation of his views, already old, respecting the origin of urea in the animal economy, viz. that the urea proceeds from the albuminoid substances destroyed in the blood by an oxidating process. This is now established by M. Bechamp, Professor at the School of Pharmacy at Strasbourg."

But is uræmia, in truth, capable of producing the morbid phenomena attributed to it? Prof. Frerichs asserts that it is not the intoxicating agent in Bright's disease. He says that when it is accumulated in the blood it "is transformed into carbonate of ammonia under the influence of some peculiar ferment," and that the salt, thus produced, is the *materies morbi* in the circulating mass. It is true, the elements of urea exist in it in proportions, viz. $C\ H_4\ O_2\ N_2$ which, with two atoms of water, form the carbonate in question. But whether such a transformation is

common in Bright's disease, is, I think, a question by no means settled. And yet, that both urea and carbonate of ammonia may occasionally occur in the blood, the latter substance being derived mainly from the former, seems to be established by the facts collected by Dr. Braun, in his work on the "Uræmic Convulsions of Pregnancy, Parturition, and Childbed." It is, however, upon the whole, a question of no practical importance, whether the *materies morbi* be urea or carbonate of ammonia—or a mixture of both.

But, Mr. President, I must withhold any further observations concerning the nature and phenomena of albuminuria, and turn to the topic on which I am expected to remark at this time. And here I feel bound to say that, I think the therapia of albuminuria has made no great advance since the days of Dr. Blackall. And, indeed, there is so little that I can offer with confidence to the consideration of the Academy, which has not already been submitted by Prof. Clark, that I trust I shall be excused, if, in the course of my remarks, I may repeat in substance some of his views relating to the topic before us.

In looking at the subject of albuminuria, as I have endeavored to survey it, it seems to me that we must regard the disease as occurring in two forms, viz. Acute and Chronic; and, accordingly, that in the treatment the following are the leading indications:

1. In the acute form, to remove the morbid conditions on which it depends.

2. In the chronic form, first, to remove the disease of the kidneys; second, to eliminate the urea from the blood; and third, to remove or prevent complications.

In regard to the indication in the acute form, it is observable, that when it occurs in connexion with ordinary phlegmasial affections, it may be fulfilled by the remedies usually employed in their treatment. When it occurs as a sequel of scarlet fever, it will commonly disappear after a limited, though a somewhat indefinite period, under the use of remedies proper for vascular excitement, and congestion of the kidneys. So also in acute dropsy, resulting from the application of cold to the surface of the body, or a sudden suppression of perspiration, a cure may generally be effected in a few days or weeks, by moderate evacuations, and especially by diaphoretics. In all such cases the kidneys suffer no violence beyond a temporary disturbance of their functions. A case of so called renal dropsy, in a highly acute form, and suddenly developed, occurred in 1849 in the practice of Dr. Bulkley, and which I had an opportunity of seeing with him. It was treated by cups and poultices to the loins, and the internal use of the corrosive chloride of mercury. The patient, a young man, perfectly recovered, is still in good health, and is now serving in the Union army. Six years after his recovery the doctor examined his urine and found it natural.

As to the treatment of convulsions occurring with albuminuria or uræmia in parturient and puerperal women no treatment, directed

immediately to the kidneys, can be of any special advantage. The uræmia, in such cases, has its origin in the adventitious condition of the patient; and though it may for a time exert a poisonous influence on the system, thus contributing to the production of eclampsia, still when under a proper treatment the convulsions cease, and the parturient and puerperal states are safely passed, the affection of the kidneys, and, of course, the uræmia, will gradually terminate. It will be recollected that parturient convulsions are generally reflex phenomena, and that uræmia is but their predisponent cause; hence delivery is of primary importance in their treatment. That Bright's disease, in its chronic form, may originate from utero-gestation is not deniable; but such occurrences, if they happen, are extremely rare.

In respect to the treatment of the chronic form of albuminuria, or, as we may now more properly say, Bright's disease, or uræmia, in which general dropsy is the most common and remarkable symptom; I say symptom, for it is nothing more, the first part of the threefold indication, I have mentioned to be considered, is that which points to the removal of the disease of the kidneys, or, in other words, to restore these organs to the condition in which they may be able to resume their proper function, viz. to eliminate the urea and other effete matter from the blood. It is in attempting to fulfil this indication that we discover the intractable nature of the disease.

I look upon Bright's disease, therefore, when it is insidiously developed, and not discovered to exist until the general health has been for some time seriously impaired, as, in the great majority of cases, incurable.

It is then only in the early stage of the disease that we may hope to arrest its progress, and afford permanent relief to the patient. But how to effect this is a question which I am not prepared to satisfactorily answer. There being in no period of the disease any very marked evidence of nephritic congestion or inflammation, the more active depletory measures are not, or but rarely, called for, and yet that a hyperæmial condition of the kidneys does probably exist in most cases, in the first stage of the disease, may be reasonably assumed: and, accordingly, antiphlogistic and revulsive remedies, as cupping of the loins, purgation, poultices to the back, and sudorifics, are clearly indicated, these last remedies being among the most efficient at our command. The earlier these therapeutical measures can be brought into use the greater will be the chances of recovery.

But in contemplating the disease of the kidneys as a single object of treatment, we take but a partial view of the morbid conditions which exist at the same time and which endanger life. Were the system to suffer only from the nervous irritation transmitted to it from chronic disease of the kidneys, apart from uremia, life might be greatly protracted, as it frequently is in cases of various chronic local affections, by appropriate medical and

regiminal treatment; but in Bright's disease, when the renal disorganization has made considerable progress, it not only disturbs sympathetically the whole economy, but interposes an impediment to the elimination of the effete nitrogenous principles in the blood, and thus adventitiously adds to the disease an element formidable and dangerous.

Now, as there is no way known to us of neutralizing the urea in the blood, we are led to consider the means suited to fulfil the second leading indication in the treatment, viz. to eliminate the urea from the circulating fluid. In endeavoring to accomplish this object, we are not to lose sight of the remedies which tend to remove the congestion of the kidneys, but to continue them, if they be still indicated; and, while doing so, to administer such means as will increase the quantity of urine, or, in other words, favor the elimination of urea, and at the same time effect another object of great moment, namely, the removal of the dropsy. We know of no other way of depurating the blood of urea than through the kidneys, the other emunctories affording no adequate vicarious outlet to that substance. As to the quantity of urea exhaled with the serum, so frequently infiltrated into the areolar tissue and occasionally collected in the closed cavities, it is probably too small to have any decided effect in relieving the system from its intoxicating influence.

As is well known, diuretics and alteratives are specially indicated in general dropsies. Among these calomel or blue pill, combined with squill and digitalis, has long been employed, especially in cases of cardiac dropsy. But in renal dropsy calomel and blue pill are liable to salivate, owing to there being in this disease a morbid susceptibility to their specific effects on the mouth. But while such is the fact in regard to these mercurials, it is not so in respect to the bichloride of mercury. This energetic preparation has been used with great success in the treatment of the dropsy connected with Bright's disease. Its employment in this disorder was, I believe, first suggested by myself, in the wards of the New York Hospital; and the earliest trials of it were made in that institution about twenty years ago, under the careful observation of the late Dr. Wotherspoon, then the resident physician of the house, and afterwards a surgeon in the United States army. It is, as I have just hinted, much less likely to produce salivation than the other common mercurials. Its alterative power is exerted upon every tissue and fibre of the body, and its therapeutical influence being diffused through the system, it resolves certain morbid conditions, local and constitutional, with great promptness. Besides acting favorably towards removing the lesion of the kidneys, it generally induces a copious diuresis; and, in this way, rapidly diminishes hydropic swellings. Two cases of renal dropsy, treated by it with favorable results, are recorded by Dr. Swett in his valuable paper on renal diseases in the *New York Journal of Medicine, for July*, 1844. In the first case calomel

gr. ss. and squill grs. ij. were given three times a day, but it produced tenderness of the gums, and was discontinued, having afforded no relief. About ten days afterwards the bichloride of mercury was administered in doses of one-eighth of a grain with a drachm of tincture of cinchona, three times a day. This remedy acted decidedly as a diuretic, and almost entirely removed the dropsical effusion. Its use was continued for a considerable time without affecting the gums. The patient was discharged free from the dropsical symptoms and much improved in appearance; but the urine continued unchanged; it retained its smoky appearance and low specific gravity, and freely deposited albumen. In the second case, Dr. Swett prescribed the bichloride of mercury in the same manner, but with less benefit than in the first case, though it acted favorably in reducing the œdema of the legs and improving the countenance and complexion. The urine, however, afforded a large deposit of albumen. The result of the treatment is not stated, the record of the case being incomplete, the last report being the continuance of the corrosive sublimate and the tincture of cinchona.

Dr. Griscom has recorded, in the *New York Journal of Medicine, for November*, 1847, two cases of albuminuria with dropsy, in which the corrosive sublimate was exhibited. He tells us that "the treatment in these successful cases consisted in the administration of hydragogues for the direct removal of the fluid, and of bichloride of mercury for the original disease. The latter was given in doses from one-sixteenth to one-fourth grain, ter in die, in solution in tincture of bark one drachm. Under a steady exhibition of this, the albuminous deposit of the urine disappeared entirely in one case, and was considerably diminished in the other." In respect to the value of the corrosive sublimate as a remedy in renal dropsy, my own observations in hospital and private practice entirely accord with the favorable reports of its use I have cited.

Next to corrosive sublimate, in point of value, ranks, perhaps, the iodide of potassium. This salt has been used with marked success in some cases, but it is more active as a diuretic in renal dropsy, than as an alterative. But so far as I have had opportunities to observe its action, it seems to have no solid claim to distinction as a remedy or palliative in this disease.

In regard to some diuretics they are objectionable on account of their over stimulating the kidneys and thus tending to increase their hyperæmial condition. Among the diuretics which are believed to be most useful are the acetate of potassa with the infusion of buchu or the liquor ammoniæ acetatis. The apocynum cannabinum is an active diuretic, and but for its nauseating and depressing and cathartic effect would often be preferred to any agent of its class.

As to squill, digitalis, and juniper, there is a question as to their suitableness to the treatment of uræmia. The question is suggested by the interesting investigations of Dr. Hammond, the present

Surgeon-General of the United States army, into the action of these well known diuretics. This gentleman thinks that it is deducible from his experiments "that neither digitalis, juniper, nor squill, increases the total amount of solid matter eliminated by the kidneys, and that the organic matter is considerably reduced through their influence. Although they do increase the amount of inorganic matter removed through the urine, yet as it is the organic matter which is generally considered as contaminating the blood in disease, it is evident they exert no effect whatever in depurating this fluid, but, on the contrary, are positively injurious." Now, if this be so, seeing that urea is organic matter and accumulated in the blood in Bright's disease, are not digitalis, squill, and juniper improper diuretics in that disorder?

It is curious to notice, in connexion with these statements of Dr. Hammond, the opinion of Dr. Blackall in regard to the use of squill in renal dropsy. He says he has "sometimes seen it render service where the urine is partially coagulable. But in proportion as that symptom becomes more marked by its extreme constitutional characters, inflammations and a weakness of the digestive organs, it fails in its effect, or is even injurious. I have seldom had so much reason to regret the use of medicine as of squill in these circumstances."

As respects digitalis, if its action, like that alleged of squill, is to reduce the elimination of *organic* matter from the blood, though it increases the *inorganic*, it must be, at least in the advanced, if not in the earlier stages of uræmia, a dangerous diuretic, seeing that besides causing an accumulation of urea in the blood, it adds to this fluid its own peculiar proximate principle, *digitalia*, one of the most poisonous arterial sedatives. These two poisons, mingled and accumulated in the blood, and having no neutralizing action on each other, produce what may be called a double toxæmia, and thus not only aggravate the disease, but cause great exhaustion and sometimes sudden death.

If this view of the action of digitalis be correct, it seems proper to regard this agent as a simple hydragogue-diuretic, and to confine its use to cases of dropsy in which there is no uræmia, as in cardiac dropsy, in which, combined with squill and calomel or blue pill, it has long been distinguished as a most effective means of removing serous effusion. Moreover, its use in dropsy depending on organic lesion of the heart should not generally be prescribed, until we are assured that the disease is not seriously complicated with uræmia.

These remarks concerning the action of digitalis naturally lead to the inquiry whether there are other poisonous vegetable principles, which, if used too freely in renal dropsy, may be injurious? Is it so with the organic alkalies of opium? There are occasional conditions in Bright's disease in which opium is indicated, and in which it may be advantageously administered. Its diaphoretic action, promoted by combining it with ipecac, as in Dover's pow-

der, may in some cases give it a preference over other narcotics. But as opium manifestly diminishes the secretion of urine, and consequently causes an accumulation of urea in the blood, and as it has probably no power to neutralize urea, such as it has to neutralize atropia and other mydriatics, there is danger of its poisonous influence interfering with the elimination of urea, and, in this way, of destroying life. Such an incident happened in a case in which I had an opportunity of observing the phenomena a short time before death, and of noting the post-mortem appearances. Of similar cases there are authentic accounts.

There is another class of remedies which we must refer to, viz. purgatives. It is well known that the hydragogue cathartics are used with great benefit in general dropsy. They are advantageous in causing the absorption and discharge of the serum accumulated in the areolar tissue, and in the various closed cavities of the body. In this particular they are perhaps to be preferred in many cases to diuretics. Are they not, also, to some extent, useful as eliminatives of urea from the blood? Of this class of remedies the pulvis purgans, elaterium, senna, and the salines are the most favorable in their action. Care should be taken that they do not induce excessive irritation of the intestines.

In regard to diaphoretics, Prof. Clark has so well treated the subject that I may be excused from going over the ground a second time. I may merely mention, in passing, a remedy in which I have great confidence, and which has always, in my hands, been attended with pretty uniform results. I refer to a combination of the liquor ammoniæ acetatis and ipecacuanha. The former of these acts both upon the skin and kidneys, and tends to reduce the accumulation of fluid very rapidly. It is used most advantageously with the great diaphoretic, so favorably noticed by Prof. Clark, viz. the hot-air or vapor bath. Most physicians are acquainted with the mode of applying this remedy. In the great majority of cases in which it is used, it proves serviceable. Its efficacy, however, is limited to the cases in which the cutaneous transpiration is readily increased. If, after a few trials, it fails to act as a sudorific, its continued use may be injurious. There is a collection of twenty-five cases of renal dropsy, published by Dr. Oscar G. Smith, in the *New York Journal of Medicine, for January*, 1857, which occurred during the three years, ending November 1, 1856, in the New York hospital, and which were mostly treated by the hot vapor bath, and the spiritus mindereri and ipecac, under the direction of Drs. Metcalfe, Griscom, Swett, Bulkley, T. F. Cock, and myself. Of these twenty-five cases, it is said seven recovered, twelve were relieved, one improved, and five died. Though so many are reported as leaving recovered or been entirely relieved, it is not probable that all of them were, strictly speaking, *cured*. It is rare to see a case of chronic Bright's disease so perfectly recovered as to show no evidence of its existence in the renal secretion.

We now come to consider the third indication of treatment in the chronic form of albuminuria, viz. to prevent or remove complications. Besides the dropsical effusions, which so constantly attend the disease, there are various other affections of a general or local character, which occasionally occur, and which increase the gravity and fatal tendency of the malady. The more common of these complications are convulsions, coma, amaurosis, or fatty degeneration of the retina, vomiting and inflammations of the brain, pericardium, endocardium, pleura, and peritoneum. To prevent these occurrences, nothing more can be done than to carefully avoid their exciting causes. Warm clothing and warm apartments will be found conducive to the comfort and safety of the patient; and if he be anæmic and feeble, the tincture of the sesquichloride of iron or some other ferruginous preparation will be an appropriate prescription. As to the remedies to be employed, in the event of any of the complications occurring, to which I have referred, I need not enumerate them. They are sufficiently well understood by every general practitioner. It must be observed, however, that in using them, caution is necessary on account of the peculiar condition of the patient.

Now, in respect to one other point, and I will close. It is said by my distinguished colleague, Prof. Dalton, in his Treatise on Human Physiology, that "the quantity of urea varies with the nature of the food. Lehmann, by experiments on his own person, found that the quantity was larger while living exclusively on *animal* food, than with a mixed or vegetable diet; and that it generally was smallest when confined to a diet of purely non-nitrogenous substances, as starch, sugar, and oil." The daily quantity of urea in the urine when animal food was exclusively taken was 798 grains; when non-nitrogenous food was taken, such as those just mentioned, the quantity was only 231 grains, a difference of 567 grains. This is a very remarkable fact; and, if it be true, as Dumas asserts, respecting the origin of urea in the animal economy, that this substance proceeds from the albuminoid substances destroyed in the blood by an oxidating process, would not great advantage result to albuminurial patients, at least such of them as are plethoric and eat much animal food, if they would avoid such diet, and thus diminish the amount of urea generated in the blood? These considerations appear to me to deserve the special attention of gentlemen who have the direction of the regimen of women during the period of utero-gestation, and particularly of those primiparæ whose conformation of body and general hyperæmia predispose them to eclampsia.