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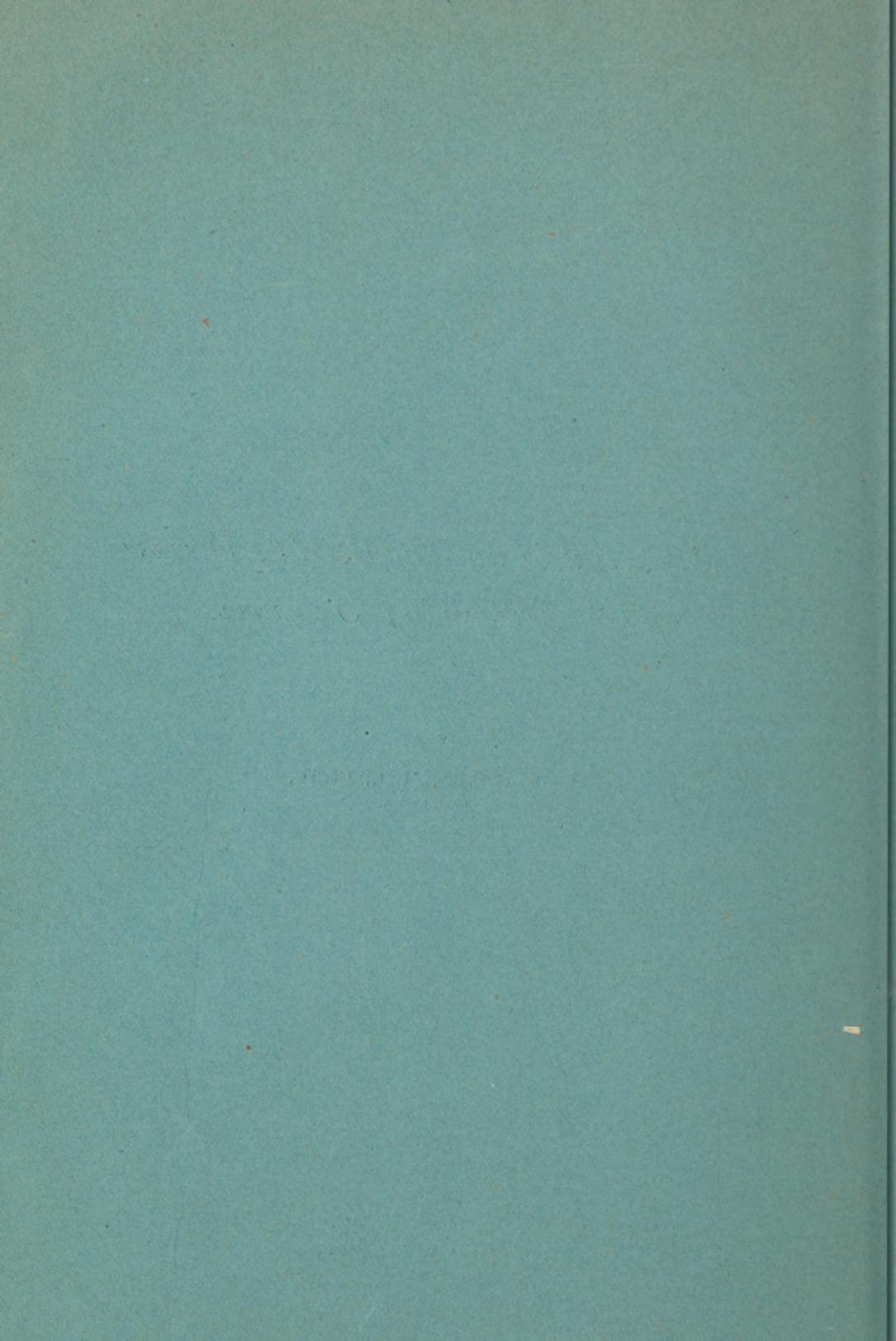
*The Albuminuria and the Bright's Disease
of Uric Acid and of Oxaluria.*

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THE ALBUMINURIA AND THE BRIGHT'S DISEASE OF URIC ACID AND OF OXALURIA.¹

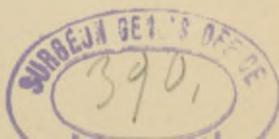
BY J. M. DA COSTA, M.D., LL.D.,
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THE more we study albuminuria and Bright's disease the more we are struck with variations from the ordinary type, and the more evident it becomes that advancing knowledge will separate still other groups than those with which we are at present acquainted. By their study we may learn that they not only have distinctive origins, but lead to significant pathological changes, and manifest themselves, even early, by recognizable clinical features. One of these groups that has attracted my attention for some years, and that is very inadequately known, is the one originating in excessive uric acid formation or in oxaluria, and it is to this group that I here desire to call particular attention, and to examine, in the light of experience with a number of cases watched for long periods, the beginning of the malady, the pathological conditions produced, the special signs which distinguish it, and the treatment that is most helpful.

It may best illustrate my meaning if I first describe a few cases that taught me the value of this kind of research, and that familiarized me with the differences which these particular forms of albuminuria and Bright's disease possess. One of the most striking of these cases may be briefly told:

CASE I.—A well-known professional man consulted me about four years ago, suffering from indigestion, marked flatulence, and constipation. He was very nervous, much alarmed about himself, and greatly annoyed by an irritability of the bladder. Albumin was found in small quantities in the urine, as were tube-casts of hyaline character. The albumin was most marked in the afternoon urine. Repeated examinations showed much the same thing, except that on one occasion hyaline and a few epithelial casts were seen without albumin being detected. The acid urine, the specific gravity of which was never below 1022, and frequently upward, often deposited quantities of brickdust. Extremely heavy sediments were noticed after drinking a glass of beer in the evening. The patient was very nervous about himself and despondent, and all work became irksome. A European trip and a carefully

¹ The groundwork of an address delivered before the Pathological Society of Philadelphia, October 27, 1892.



regulated diet, largely lessening the nitrogenized substances, did him great good. For two years there has been no trace of albumin in the urine. Previous to its disappearance, it was only detected by the turbidity with acetic acid and boiling, and was not found by nitric acid. In an examination made fourteen months ago by a professional chemist who had previously repeatedly found albumin, the urine is spoken of as intensely acid, as containing excessive amounts of uric acid, but without a trace of albumin or of sugar.

The patient consulted me recently again, being much annoyed by irritability of the heart and pulsation of the abdominal aorta. I found no organic disease of either. The second sound of the heart was sharply defined, the temporal arteries were full and prominent, suggesting atheroma; indeed, I had so noticed them before, but the pulse did not indicate this, being small and of doubtfully increased tension. His nervous system was again disordered; he had many of the nervous symptoms of lithæmia. He dreaded going into crowds and coming into contact with people, and was much disturbed about his own condition. The urine was intensely acid, depositing urates, but it did not contain a trace of albumin, not even when boiled with acetic acid. The irritability of the bladder had passed away. Strict diet, chiefly of vegetables and milk, is again doing good. He is keeping the urine free by the use of Poland water or of Londonderry Lithia, and is taking systematic exercise in the open air. The circulation is being controlled by aconite, and his improvement is very marked.

In the case to follow, the symptoms were so much like those of ordinary Bright's disease, from which the patient supposed himself to be suffering, and the albuminuria was at first so decided and so persistent that it was only by a close study of the symptoms for some time that their true meaning was discerned.

CASE II.—J. H. M., about forty-five years of age, suffered at one time from irritability of the bladder, due to a stricture which Dr. Keen cured by dilating. When first seen by Dr. Keen, who subsequently referred the case to me, the urine was found to be normal. Mr. M. was a very nervous man, greatly troubled with flatulent dyspepsia; indeed, his chief annoyance was the constant belching and the intestinal rumbling. He was also a most pronounced neurasthenic, easily depressed, and dreading greatly enlargement of the prostate gland, which, however, was not found to exist. Early in December, 1890, albumin was detected in the urine, of which an accurate examination was made, at Dr. Keen's request, by Dr. Coplin, with the result of finding marked amounts of albumin with hyaline and epithelial casts in an acid urine of higher specific gravity than normal, and exhibiting abundant evidence of crystalline excretion. I placed him on a strictly regulated diet, largely of milk and such green vegetables as he could digest, gave him occasional laxatives, directed the use of Poland water, and, off and on, he also took Basham's mixture. He slowly improved, the amount of albumin lessening and the specific gravity decreasing. A useful prescription proved to be papoid and soda, under which the intestinal indigestion and flatulency were greatly improved, so much so that he himself became encouraged. Further improvement took place by a visit to Capon Springs in the summer,

during which he passed large quantities of reddish sand, as he called it. He never had dropsy.

About a year after I first saw him there was no albumin to be found in the urine on several tests. In truth, he felt himself so much better that he stopped his visits during the winter, keeping up in the main, however, his diet. He was never entirely free from his dyspeptic symptoms.

In April, 1892, he saw me again, having been subjected to very confining work, and being much annoyed by the belching and the other gastro-intestinal symptoms. His tongue was coated; he was constipated, and was once more very nervous. But an examination of the urine showed that his kidneys were not much deranged. There was, it is true, some deposit of urates, yet only the faintest trace of albumin, none at all with nitric acid, the slightest turbidity on boiling with acetic acid, and a very faint cloudiness when tested with picric acid. I put him again on a stricter diet than he had been lately following, and more like that which had been originally directed; ordered him phosphate of sodium and light diuretic waters, and insisted on systematic exercise. He again decidedly improved, and when I saw him in October not the slightest trace of albumin could be found in the urine either with nitric acid or with picric acid, or boiled with acetic acid. The urine was acid, its specific gravity 1020. He was still troubled with flatulency, but not nearly so much, and he made the remark that when he was so disturbed his head felt free and he was able to work better.

We see, then, in these cases the symptoms of a malady in which digestive disorder occurs, and in which the disturbed nutrition manifests itself in the urine chiefly by the high specific gravity, the urates, and the presence of albumin and casts that are commonly thought to indicate Bright's disease. We frequently also have some body waste, indisposition to physical and mental exertion, fatigue easily induced, an intermittent pulse, cold extremities; and, from the side of the nervous system, the gloom, the despondency, the irritability of temper met with in lithemics. Headache, too, and vertigo, may be encountered, though they are far from constant.

I shall now group a set of cases alongside of those just described, in which it is not so much uric acid and urates that we find, as oxalates. The symptoms are in the main the same. But we often have more intestinal indigestion, with very marked flatulency, and there is apt to be even a greater amount of nervous depression. We have, in truth, all the well-known symptoms of oxaluria that betray themselves not only in the digestion, but in the nervous system. Otherwise we find the same high specific gravity of the urine, with the deposit of oxalates in place of urates, although occasionally they are intermixed, and we obtain the same results from sustained treatment, though more slowly. As I have given some illustrations of uric acid disorder leading to kidney complaint simulating Bright's disease, I shall add a few cases as illustrations of the oxaluria that leads to kindred affection. Case III.

is a striking instance in a scholarly gentleman from Boston, and valuable because many of the analyses were made with great minuteness by the distinguished professor of medical chemistry at Harvard.

CASE III.—Mr. W., thirty-five years of age, has not been in good health since a college student in 1883. He has had frequent attacks of nausea and dizziness, and, at times, staggering gait; the latter symptom, however, did not appear markedly until June, 1888. He also complained of numbness in the fingers on the right side, and of headache. His eyes were closely examined, but no sufficient cause was found for the attacks, nor for the headaches. He had occasionally distinct seizures of vertigo, and a pain at the base of the brain. The digestive symptoms were very marked, with loss of flesh, flatulency, and, at times, great mental depression. The urine analyzed in 1889 by Professor Wood, of Harvard, showed a great excess of uric acid and of urea, also oxalates and small quantities of albumin, but no sugar.

The urinary condition was much improved by living strictly on milk and Vals water. He took on an average three quarts of milk daily, and for a time the albumin disappeared. Indeed, a report in July, 1889, speaks of its absence as well as of the absence of casts, and only of its increased acidity and of the large proportion of urates. But the absence of albumin in the urine, even at this period, was not constant, for five reports of urinary analysis from the Harvard laboratory, made between March 12, 1889, and October 5, 1889, record albumin. They show acid reaction, increased urea and uric acid, albumin very slight, sugar and bile pigment absent, specific gravity 1027 to 1015 (1015 last examination), chlorides normal, earthy phosphates variable, alkaline phosphates normal or increased; considerable sediment exhibiting at different times excess of mucus, spermatozoa, calcic oxalate crystals, microscopic concretions, acid urate of sodium crystals, urethral epithelium, cells from prostatic region, an occasional blood globule, and renal casts with renal cells adherent, leucocytes, small round fatty cells; in night urine in some specimens casts from the straight tubules with renal cells adherent.

Further symptoms of the case noted were a feeling of constant chilliness, attacks of vomiting lasting sometimes ten days, occasional but not frequent headache, and good knee-jerks. The first sound of the heart was weak, but there was no organic disease. The bowels as a rule were constipated. Under strict diet, laxatives, and exercise in the open air, his whole condition improved very much.

Early in 1891 the symptoms became again more severe, the indigestion was once more marked, and the attacks of vertigo and the periodic attacks of vomiting returned, especially if his uncertain appetite had tempted him to eat freely for some days. There was extreme sensitiveness to cold water, and a feeling of hunger causing faintness. Insomnia and a sensation of cold, particularly at night, were very distressing. A urinary examination in February, 1891, records the urine as slightly acid, the specific gravity 1025, no sugar, small amounts of albumin, normal phosphates, normal urates, many large and small crystals of oxalate of calcium, and several epithelial and granular casts with some hyaline casts. He was directed to drink Poland and Saratoga Vichy freely, to take as a laxative Carlsbad salts, and to avoid sugars in his

diet, and for a time also meats. He took chloride of ammonium, ten grains, three times a day.

Gradually, but particularly after a strict diet, largely of vegetables and milk—to meat he himself had taken a distaste—living in the open air, and keeping up a course of laxatives, his digestive symptoms greatly improved, and all the oxalates disappeared from the urine, and with them the albumin, so that, while he remained a nervous man and often hypochondriacal, he regained his health, certainly as regards the kidney affection. For over a year there have been no tube-casts and no trace of albumin. The specific gravity in an examination of the urine, made in January, 1892, was recorded as 1015, the chlorides were normal, phosphates normal, urates normal; some epithelium from the kidneys and bladder, and amorphous urates were found, but no albumin and no sugar, no casts or blood corpuscles.

Having seen instances like this and bearing them in mind, I have been able of late years to diagnosticate them readily. I have twice within the last year, in cases that happened to be brought to me by the same physician, Dr. MacCuen Smith, recognized this particular form of albuminuria and told the patients that they would recover, as has fortunately proved to be a correct opinion. It may not be without interest to describe these cases, as they are very illustrative:

CASE IV.—M. A. H., forty-two years of age, had influenza in 1889, and has not been in good health since. He has been losing flesh, and has been much troubled with giddy spells. When first examined in November, 1891, the tongue was found to be slightly coated, the breath heavy; the bowels were regular. He had a compressible pulse, a short feeble first sound, no headache, felt very listless and languid, was easily fatigued, and subject to attacks of great mental depression. A dry cough existed. The urine was noted to be of specific gravity 1030, acid, to contain small quantities of albumin, but no bile or sugar. In the sediment granular casts were detected, vesical epithelium and granular débris and oxalates, but no oil, no blood, and no pus. He was placed on Rochelle salts as a morning laxative, directed to take Saratoga Vichy, to abstain from sweets, to use only moderate amounts of meat, and to live on green vegetables, fish, and oysters. He also took from time to time courses of two-drachm doses of Basham's mixture. Exercise was urged upon him. He began to feel so much better by living more in the open air that he gave up his business, and now he is a completely well man. The urine has become normal, has no trace of albumin or oxalates; he is in good spirits and considers himself in excellent health.

CASE V.—The case of B. T. M., seen in May, 1891, presented similar features. The symptoms of indigestion were very marked; the least exertion, mental or physical, produced great exhaustion, and he, too, had periods of great mental depression. The urine was of high specific gravity, and contained oxalates and albumin. Under treatment similar to that in the preceding case, both oxalates and the albumin disappeared. The urine, frequently examined for eleven months, showed neither oxalates nor albumin. In July of 1892, after considerable worry for ten days, both calcium oxalates and a trace of albumin re-

appeared; but a more active return to the treatment, which had been almost suspended, caused these to disappear, and Mr. M. expresses himself now as feeling better than he has done for twenty years.

From the general tenor of the cases the form of albuminuria with its particular features will have become apparent. Nevertheless, it will conduce to accuracy if the most striking of these be fully examined. First, of the dyspeptic symptoms. These are rarely absent, though sometimes they are very slight. The signs of intestinal indigestion with flatulency and stools of changed color are more common than the evidences of gastric disorder. Lack of appetite or capricious appetite is, however, not unusually complained of, as well as a feeling of fulness after taking food. The circulation is prone to be irregular, sometimes rapid, sometimes slow. The pulse is often weak and faltering, or intermittent. Rigidity of arteries, or even increased tension, which is said to belong to the uric acid diathesis as well as to the contracted kidney, I have very rarely noted. The hypertrophies and other cardiac lesions of Bright's disease are conspicuously absent. The same may be said of dropsy and of the eye lesions. Of neither of these have I observed a single instance. A symptom worthy of note is the slight rise of temperature, particularly in the afternoon; and this teaches us to think of what the kidneys are excreting when we try to explain those slight but long-continued elevations of temperature, seemingly causeless, that we sometimes meet with. The prominence of the nervous symptoms is always very evident. Listlessness, fatigue on the least bodily or mental exertion, forgetfulness, headache, melancholy, sleeplessness, giddiness, may be severally, or may be all, encountered.

The characters of the urine are very significant. There is first the high specific gravity in a urine that is about the normal amount or a little scantier than normal. The specific gravity generally ranges between 1022 and 1028, but I have known it persistent at 1036. The urine, on standing, often deposits urates, sometimes even uric acid, very often mucus. In the deposit, in place of urates, or alternating with them, we may find with the microscope very many of the crystals of oxalate of calcium. The uric acid does not necessarily manifest itself by the deposits of urates. It is best to determine it chemically. This is done most readily by Haycraft's process. It is not always in excess in cases which have all the other characteristics of the group under discussion; but these are generally the oxalurics.

The total solids are increased. The salts in the urine other than the urates are in normal proportion, or vary but little; at times the chlorides are increased, and not diminished, as they are persistently in contracting kidney—a point to which Dr. Wolff, who made for me many of the analyses on which these remarks are founded, called my attention. The phosphates are normal or increased; urea is not deficient; it is of normal

amount or increased. The relation of the urea to the uric acid is various. If we take the standard which Haig has established for uric acid, as 1 of the acid to 33 of urea, this proportion may be found to be unaltered, or the uric acid even relatively increased. In the cases with oxalates, the excretion of urea is usually much augmented.

The amount of albumin is generally small, but it varies much with the time of day. I found it mostly in the morning urine, or in the urine after breakfast; and with the ordinary tests it is at times absent, especially in the evening urine. But here, as in other cases of so-called intermittent albuminuria, there is this fallacy: The albumin is not really absent, but only greatly diminished; for it may often still be detected by the finer tests, such as by slightly acidulating the urine with acetic acid and then using picric acid, or by Tanret's test, or by the metaphosphoric acid test. It is not unusual for the albumin to be accidentally discovered, either by examination for life insurance (Case VII.), or by chemists testing their own urine for comparison. I have known such instances; in one, the urine was tested as a control experiment in the use of metaphosphoric acid. There has now been no albumin present for over a year, though there are still oxalates.

Casts are scanty or altogether absent. In character they are hyaline, or epithelial, rarely markedly granular, never fatty. In a few instances (as in Cases III. and VII.) fatty cells have been reported as occasionally existing. Casts and albumin mostly go together. Yet I watched a case for ten years in which for a long period hyaline and epithelial casts were very often found in the urine of a gentleman suffering much from oxaluria, without any of the tests by heat or by nitric acid finding a trace of albumin. This case came under my observation before I had learned to employ any of the finer tests for albumin. Complete recovery took place, and ultimately death occurred from an affection of the liver.

When now we come to the question of diagnosis, we find the main difficulty is undoubtedly that there are cases of contracted kidney with most obscure beginnings, cases in which the amount of albumin is extremely small and at first intermittent, and so often absent that, as in one instance that was finally brought to the post-mortem table and found to have contracted kidneys, albumin was only noticed once in eight examinations.¹ But even in such cases we have the low specific gravity of the urine of the contracting kidney to guide us, and we do not observe the crippled organ passing off abundantly urea, urates, or oxalates; indeed, the urea is often much diminished. In advanced cases there is no difficulty in the differentiation. The retinal changes, the heart symptoms, with the low specific gravity of the urine in con-

¹ Brennan: New York Medical Journal, July 4, 1891.

tracted kidney, are strikingly different. On this I cannot dwell too much. I have yet to see the first instance of the kind of albuminuria to which I am calling attention, in which the specific gravity was persistently low. To high arterial tension we must not attach too much importance as a means of distinction; for it also occurs from uric acid in the blood.

Another form of albuminuria that it may be difficult to distinguish from this albuminuria of mal-assimilation, is the dietetic albuminuria. Now, in point of fact, a number of the reported instances of the latter are really not instances of dietetic albuminuria at all, but belong to the group under discussion, although they are not so recognized. In true dietetic albuminuria the albumin is only found in the urine when certain articles of food are taken, generally in immoderate amounts, such as cheese, eggs, or pastry. This albuminuria, too, has its special periods; it is particularly common after breakfast or a mid-day meal. It only occurs after the ingestion of food, and then very quickly, and, as the cases of Grainger Stewart¹ prove, it is worse after mental excitement and exercise, and is unattended by tube-casts. Very significant is it that the albumin is never found in the urine before breakfast, and that the albuminuria lacks the signs of disorder of the nervous system; significant, too, is the high specific gravity of the urine with the attending persistency of urates or oxalates.

The albuminuria of severe exercise, with which we have become familiar through the observations of Grainger Stewart² on football-players and on soldiers, and through the critical analysis of Senator,³ is discriminated from the albuminuria of perverted nutrition we are endeavoring to elucidate by its occurring only after strenuous exertion, and by the absence of all other symptoms as regards the digestive state and the nervous system. Undoubtedly, violent exercise will also in the albuminuria under discussion increase the amount of albumin temporarily. But it does not do so in a distinctive or peculiarly striking manner; and, the strain over, the abnormal ingredient shows itself in its usual way.

One more point let me mention in the diagnosis of the albuminuria of uric acid and of oxaluria. We must be careful, when we obtain reactions showing but traces of albumin, to be sure that it is really albumin and not mucin we are encountering; for the amount of mucus in the heavily loaded urine is often very great. With reference to the kind of albumin that is discharged, it is, I believe, serum albumin. But whether it may not be mixed with globulin, or this preponderate, is a matter for future chemical research, as well as in how far peptones also occur and become a source of error.

¹ Lectures on Albuminuria, 1888.

² Ibid.

³ Die Albuminurie, 1890.

The form of albuminuria under consideration may be met with at any age. It is rare among children or old persons. It is common in growing boys. It affects the sexes in an extraordinary disproportion. Bright's disease, as is well known, is much more usual in men than in women. But in the albuminuria and the Bright's disease of uric acid or of oxaluria the difference is still more striking. In the many instances I have met with there is but one woman, now a young married woman, who had had the disorder for some years and was cured by going to Carlsbad. Even her case was not entirely free from uncertainty, as there had been a severe attack of scarlet fever a few years before the albuminuria was discovered. Still, irrespective of this case, I cannot doubt that the disease may occur in women; for some of the reported cases of intermittent albuminuria in women, as, for instance, the cases spoken of by Dubreuilh,¹ admit best of this interpretation.

I have just mentioned the frequent occurrence of the disorder in boys. Indeed, since I have been studying the subject, I have become convinced that the albuminuria of adolescence, the form so common at or for some years after the age of puberty, is in the majority of instances the albuminuria of uric acid and of oxaluria. Long before I understood this disease I was struck with the fact that the albuminuria of adolescence showed marked debility, digestive disorder, albumin in varying amounts, mostly small, urine of high specific gravity abounding in urates or in oxalates, or in both. The intermittent character of the albuminuria and the sparse tube-casts are also very suggestive. Let me add that I believe most of the so-called intermittent albuminurias, or functional or cyclic albuminurias—for such are the many names given to the same disorder in which albumin unconnected with a real disease of the kidney appears at certain periods in the urine—whether they occur in adults or in young persons, to be also instances of this kind of albuminuria, and that it is the tissue-waste, with its uric acid or oxalates, which causes in its excretion temporary disturbance of the kidneys. Is not also the so-called physiological albuminuria of similar origin? And does not the irritation of the kidney from the excretion of the tissue-waste have as much to do even with the albuminuria after forced exercise, seen in the contests of pedestrians or in soldiers, as the altered blood-pressure and active congestion the exercise produces? It may be, then, that, studied in the light of attending tissue-waste and disordered nutrition, more or less permanent, all these forms of albuminuria will receive a new meaning.

It is not my purpose to examine here into these different types of functional albuminuria further than is necessary to connect them with the object of this paper. But there is one point that experience has

¹ *Revue de Médecine*, 1887, vii.

taught me which it may not be without value to mention. The cases of intermittent albuminuria in adolescents have been supposed to be due to a weak circulation which attends the languor and listlessness in some of the boys it affects. I cannot think that any disordered flow of blood in the renal vessels from weakness is the true cause. Indeed, one of the most typical illustrations of the malady I have known was in a college student with hypertrophy of the heart and slight mitral disease, with whose case I have been familiar since his childhood. The circulation has been always over-active.

CASE VI.—B. W., aged nineteen, a student at Yale, has had, for years, hypertrophy of the heart with mitral regurgitation, which followed rheumatic fever in 1883. Examinations of the urine had shown nothing abnormal to exist until January, 1892, when he saw me on account of frequent nose-bleeding. His tongue was somewhat coated; he did not complain of headache; the heart's action was about the same as usual, though the pulse was not quite so strong; he expressed himself as not feeling vigorous. The heart's impulse was still forcible, and indicative of the hypertrophied condition. I found albumin in his urine, and a subsequent examination of the evening and morning urine, made by Dr. Wolff, gave these results:

	Morning.	Night.
Appearance	Clear	Clear
Color	Yellow	Yellow
Reaction	Acid	Acid
Specific gravity	1030	1032
Total solids	6 per cent.	6.3 per cent.
Urea	2.8 per cent.	2.6 per cent.
Chlorides	1.7 per cent.	1.6 per cent.
Albumin	Faint traces.	Traces.
Sugar	None	None
Sediment by microscopical examination	Calcium oxalate copious.	Calcium oxalate copious.

In a number of specimens examined no casts could be detected. The enormous amount of crystals of oxalate of calcium pointed to the incomplete suboxidation that was going on. The urea, it is seen, was below the proportion of total solids, and below the proportion of the chlorides. The patient was placed upon muriatic acid, laxatives, and diuretic waters, at first Buffalo Lithia, and subsequently Poland water. He was restricted in sugars and meats, and was allowed to take moderate exercise. On the 15th of January no albumin could be detected in the morning urine. On the 19th of February the specific gravity of the evening urine was 1038, and there were heavy deposits of urates and small quantities of albumin. In the morning urine of February 20th, the specific gravity was 1030, the urine was acid, and no traces of albumin could be found by boiling with acetic acid, or by the nitric acid contact test, or by picric acid dropped into urine acidulated with acetic acid and boiled. From this time on, a number of examinations of the urine showed no albumin. The treatment was, in the main, kept up, occasional short courses of Basham's mixture substituting the muriatic acid. The diet was adhered to, and he was allowed moderate amounts of milk. A gradual improvement took place; the specific gravity

decreased, though in several specimens it was still 1026; and since March 23d, while oxalates and urates have been found at times, there has been no albumin, and he has felt well. The last examination of September 26th proved him to be in good health, and he shortly after resumed his work at college.

The prognosis is favorable, though the cases may be of long duration, lasting several years, with occasional reappearance of the albumin in the urine. When recovery takes place, which I think is almost invariable under proper treatment, and albumin and casts have long ceased, it is not unusual for small cells still to be found with the microscope in the urinary sediment, very likely incompletely formed cells from the tubules of the kidney. Yet I believe that occasionally, from very long continuance of the disorder, fibroid changes may take place and interstitial nephritis result. Notwithstanding some doubts that suggest themselves, owing to the history, I think this to be a case in point.

CASE VII.—Mr. C. L., fifty-three years of age, a manufacturer, became aware of having a renal disease on applying to a life insurance company in June, 1882. His application was refused on account of albuminuria. Except that he was tired from strenuous attention to business, and was a dyspeptic, he regarded himself as in perfect health. The discovery of albumin in his urine led him to put himself under treatment, and to retire from business. He was actuated partly in this by the fact that he had lost two brothers by Bright's disease. In March, 1883, as the records of a very accomplished physician in Richmond, who examined him, show, he was suffering a great deal with lassitude and general depression, and complained of pain in the back and head, indistinctness of vision, and was rheumatic. The urine at that time had a specific gravity of 1020, the amount voided in the twenty-four hours being forty ounces, and contained 6 per cent. of albumin by measure; no sugar, but granular casts, torulæ, and fat-cells. It was acid, and showed 320 grains of phosphates in the forty ounces; the urates were not determined. By June 11, 1883, the patient being under treatment, the albumin as well as torulæ had entirely disappeared; so had the casts, and the phosphates were normal; the specific gravity was 1014.

The urine, in March, 1886, examined by the same physician, is recorded as having one-seventh per cent. of albumin by measure or bulk, and again granular casts; and to be of specific gravity 1014, and acid. The phosphates were half a grain to the drachm.

Mr. L. subsequently went abroad and consulted a very eminent London physician, who looked upon his case as one of albuminuria largely due to nervous injury and indigestion, and to renal gravel. His analysis shows the urine to have been of specific gravity 1016, acid, normal in urohematin, in oxalic acid, in hippuric acid, in hydrochloric acid, in sulphuric acid, but with an excess of uric acid and of phosphoric acid; there were no bile acids. There was a little albumin. There was none in the urine at 8 A.M.; some was found at 11 A.M.; at 10 P.M. it was again absent. Under the microscope torulæ were detected, but no casts. The urine, examined several times after this record, showed no albumin or casts, but always torulæ. The patient's health

had improved very much under diet and treatment for his indigestion. Mr. L. consulted me September 27th, of this year, on account of severe headache coming in spells in the morning, and great annoyance from flatulency. The bowels were slightly costive, the tongue lightly coated; he complained of pain over the left kidney. The pulse was 80, of rather high tension, but the second sound was not accentuated, nor was there cardiac hypertrophy. A urinary examination showed the urine to be of specific gravity 1013, to contain a trace of albumin, a deficiency of urea, no sugar and no casts, though a good many epithelial cells were found. He was placed on a diet chiefly of milk, green vegetables, and fruit. Phosphate of sodium was given to him in the morning, and, subsequently, ten drops of dilute muriatic acid three times a day. His digestion improved decidedly under this treatment, and the headaches lessened greatly, yet an examination of the urine on October 20th still showed albumin, quite well marked with the picric acid test, and the nitric acid ring test. A subsequent and careful analysis by Dr. Wolff gave in the urine of a total quantity of 64 ounces in a day, the following:

Total quantity as given, 64 ounces (normal 48 ounces); appearance, slightly cloudy; color, yellow; odor, normal; reaction, very acid; specific gravity, 1015; total solids, 3 per cent. = 960 grains in twenty-four hours (by Vogel, normal 930 grains); urea, 1.7 per cent. = 518 grains in twenty-four hours (by Vogel, normal 542 grains); uric acid by Haycraft, 0.141 per cent., in twenty-four hours 43.2 grains (normal, 11.7 grains); chlorides (as NaCl) = 0.68 per cent., in twenty-four hours 206.4 grains (normal, 255 grains); albumin (computed dry) in twenty-four hours, 7.6 grains; sugar, none; sediment consisted of epithelial cells (bladder), also a few leukocytes and red corpuscles.

This proves that there is little, if any, diminution of urea, but a marked diminution of the chlorides. The uric acid, as determined by Haycraft's method, is about three times the normal amount, and the ratio of the urea is as 12 to 1, which is a great increase, if we accept the estimate of Haig as to 33 to 1 being the norm. The sediment consists of epithelial cells from the bladder, also of a few leukocytes and red corpuscles, but no casts are detected.

What is the pathological state that gives rise to the albuminuria of uric acid and of oxaluria? I think essentially a congestion of the kidney, with, should the hyperæmia persist, slight local inflammatory changes in the vascular cortex from the irritating effects of excreting increased amounts of ill-formed or broken-down tissue in the shape of urea, urates, or these imperfectly oxidized, as oxalates. In other words, the primary fault is not in the kidneys, though the kidneys suffer because they have to throw off the irritating waste products. Anything that lowers vitality and disturbs the nervous system may increase the faulty assimilation, and, with it, the irritation and congestion which produce the albuminuria. The question whether this kind of albuminuria ever passes into true organic affection of the kidney has been already considered. I believe this to be possible, but of extremely rare occurrence, and, when it happens, to be brought about by the constant irri-

tation leading to slow fibroid changes, and gradually developing interstitial nephritis. It is held by some that all, certainly most, cases of Bright's disease originate in uric acid excess acting locally. This view seems to me too sweeping, for, even for the production of the gouty contracted kidney in which we have uric acid playing so important a part, we have other elements to take into account—the general changes that occur in the body, the state of the abdominal ganglia, and the condition of the arteries, which, in the various relations of Bright's disease, have been so admirably described by Gull and Sutton and by Arthur Meigs.

In the treatment of the albuminuria of uric acid and of oxaluria we must bear in mind that we are dealing with a special disease, one in which mal-assimilation is the main element, and the kidney affection only a conspicuous expression. The treatment must not be, therefore, purely that of Bright's disease, as we commonly meet with it, but largely that of the underlying state, a state chiefly one we are familiar with as lithæmia, or as oxaluria. The lines of treatment are, it is true, in the main parallel. Thus it is just as essential in this form of albuminuria as in the ordinary forms of Bright's disease to lessen the work of the kidneys by calling the various emunctories into play. Nay, it is more essential, for the kidneys have not only usual work, but largely more than their share of work thrown on them; and it is this extra work that leads to their damage. Their labor can be much lessened, and the blood condition and the character of the excretions altered, by close attention to diet—which is, in the main, also that of Bright's disease, though it is stricter as regards the ordinary carbohydrates, and, on the other hand, does not insist so much on milk. Vegetables, especially the green vegetables, and fruits are freely allowed; tea, coffee, and cocoa are permitted, if sweetened but slightly; so are limited amounts of oatmeal, of buckwheat and corn cakes, of rice, of bread and butter; and so are oysters and fish. The white meat of poultry and of game may be moderately taken, but the meats containing much nitrogen, such as mutton and beef, ought, as a rule, to be avoided. I find, however, where considerable exercise is indulged in, particularly by growing boys, that meats may be eaten in restricted amounts without disadvantage. Milk I do not find especially useful, and direct only a pint or two daily. It is, indeed, quite unnecessary to confine the patients to a milk diet, as is so often done, and done with advantage, in the usual nephritic kinds of Bright's disease. In fact, I have known an instance where a permanent cure was effected on a vegetable diet, in which an exclusive milk diet had left the urine still albuminous. Eggs need not be forbidden, if they be not taken constantly, and if the yellow rather than the white be eaten. As regards sugars, I am always strict, for I have too often noticed how they aggravate the symptoms in lithæmics.

Beets, for the same reason, are forbidden. Among vegetables, too, I never allow the rhubarb plant, for I have observed, after its use, oxalates, and with them albumin reappear. Salt may be always freely taken.

It is, as in all forms of albuminuria, important to keep the kidneys flushed. The free use of pure water, plain or aerated as fancy dictates, and of the mild diuretic waters, such as Poland water, Saratoga Vichy water, or Vichy water, is always of service. Drinking hot water at bed-time acts in some persons very beneficially as a diuretic, and gives a copious flow of urine in the morning—doubly serviceable then, for Roberts and other observers have shown that uric acid is largely excreted during the morning hours. Drinking fluids before or soon after breakfast is valuable for the same reason. Alcoholic drinks ought, as a rule, to be avoided, or, if used, to be restricted to light wines, not acid. Beer is forbidden.

The use of baths, not too cold, followed by systematic skin friction, is clearly indicated; and of the value of exercise in the open air I have seen many striking examples. As long as it is not excessive and too long continued, it does good service. It helps to oxidize the food-stuffs as well as the waste products, and produces free action of the skin. Far from increasing the albumin, as violent exertion will, it diminishes it. I learned this lesson from experience. I examined the urine of a young man that was albuminous in the morning, and, after his taking a horseback ride in the forenoon, the albumin had disappeared. The good results seen from life in the open air led to the inquiry whether mountain air was beneficial, even in high altitudes. I have found it so, unlike what we so often notice in the ordinary varieties of Bright's disease. The urine improves, and the albumin may, for the time, cease to be voided. Sea air does the general health good, but sea-bathing I have known to increase the albuminuria, as has also been observed for other forms of the disease. Cold douches to the spine I have not systematically tried. Grainger Stewart speaks of their causing the albumin to disappear in dietetic albuminuria. It is, I think, important that the patient should not make much exertion in the early part of the day. In one of Clement Dukes' very instructive papers on "The Albuminuria of Adolescents"¹—a form which I have already cited as belonging, I think, in the main, to the group I am here describing—he mentions as a significant sign that boys affected with it fainted when obliged to stand during morning prayers in chapel. Young people who have the complaint ought not to be pushed in their studies. It is in them an expression of a disturbed development of the growing organism; an expression of weakness of nerve force, and of poor assimilation during growth.

¹ London Lancet, December, 1891.

Among medicines, laxatives are very important—phosphate of sodium, cream of tartar, Rochelle salt. An occasional blue pill, or a grain or two of calomel preceding the saline, is also to be recommended. So is a course of muriate of ammonia, or of iron, from time to time—iron, in the shape preferably of the tartrate of iron and potassium, or of Basham's mixture. In the cases with oxalates, nitro-muriatic acid remains a standard remedy, and Haig,¹ in his recent very interesting work, strongly urges acid as clearing the blood of uric acid. We must not in any case overlook the heart. The heavy work thrown on the kidneys, the general ill-nutrition which comes from the poorly oxidized elements circulating in the blood, and the lowered nerve force, disturb the heart, and the irregularity it exhibits may have to be met by digitalis or strychnine. The inhalation of oxygen has suggested itself, but I have not as yet used it sufficiently to be sure of its distinct therapeutic value.

The treatment has been described in this paper at some length, because we have it in our power to make this treatment effective, and, by applying it to a form of albuminuria that can be clearly recognized, to rescue cases which otherwise might really swell the list of Bright's disease, with the dreaded name of which they are commonly labelled.

¹ Uric Acid as a Factor in the Causation of Disease, 1892.

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