tant practical points in phthisis by those who see much of the disease would surely tend to clear up some doubts, and give us truer notions of the malady; and I can only express my regret that the time allotted does not permit me to refer to other points which have occupied my own attention.

A Course of Lectures ON URINE, URINARY DEPOSITS, AND CALCULI.

DELIVERED AT THE PATHOLOGICAL LABORATORY,
DURING THE SESSION 1857-58.

BY

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LECTURE VIII.

URINE IN DISEASE. 1. SUBSTANCES FLOATING ON THE SURFACE OF THE URINE, OR DIFFUSED THROUGH IT, BUT NOT FORMING A VISIBLE DEPOSIT. *Thin Pellicle formed upon the Surface of Urine. Opalescent Urine. Opalescence produced by Vibriones. Milk in Urine. Chylous Urine. Mr. Cubitt's Case. Analyses of the Urine. Microscopical Characters of the Deposit. Dr. Bence Jones's Case. Dr. Priestley's Case. Of the Treatment of Cases of Chylous Urine. FATTY MATTER IN URINE. Different States in which Fatty Matter occurs in Urine. Cholesteroline in Urine. Composition of Fatty Matter passed in Cases of Fatty Degeneration of the Kidney. Kiestein. OTHER FORMS IN WHICH FATTY MATTER OCCURS IN URINE. Urostealith. Fluid Yellow Fat. Fatty Matter in Rabbits' Urine. Erroneous Observations connected with the Presence of Fatty Matter in Urine.*

Thin Pellicle formed upon the Surface of Urine. Several different substances are found from time to time floating on the surface of urine; but, for the most part, these are merely buoyed up by a thin pellicle, which is probably formed by the action of the air on the urine leading to the decomposition of some of its constituents, which causes the precipitation of the phosphates mixed with organic matter in the form of a thin pellicle. Triple phosphate is also deposited in the pellicle, in a crystalline form, some of the crystals being exceedingly minute, but still exhibiting their well known characters. A similar pellicle may always be formed, if urine be somewhat concentrated by evaporation; but in this case a large quantity of urate of soda is entangled in the pellicle. It crystallises in the form of small spherical masses, from all sides of which little spicula project.

Fatty matter is often found floating upon the surface of urine, especially when it has fallen in accidentally. One form of fatty matter has been described under the name of kiestein, which was said to be constantly present in the urine of pregnant women.

Urates occasionally accumulate upon the surface of urine, but present nothing peculiar for remark.

Opalescent Urine. The turbidity or opalescence of urine is most frequently due to the presence of urates in an exceedingly minute state of division. The precipitate may be so fine and so light that it will not sink to the bottom and leave a clear supernatant fluid. The urine is perfectly clear when passed, but becomes turbid afterwards. Upon the application of a gentle heat, the turbidity is instantly removed. In urine of high specific gravity, many substances are held in suspension which would form a deposit in fluids of ordinary density. It is not uncommon to meet with pus or blood thus diffused through the urine. If mucus be present too in large proportion, many substances which usually form deposits will be buoyed up as it were, and evenly diffused through the fluid, although generally these substances subside more or less.

Opalescence produced by Vibriones. Some specimens of urine become decomposed very soon after they have been passed; others are voided in a state of incipient decomposition. Such specimens are found turbid, and look as if they had been mixed with a very small quantity of milk. Upon microscopical examination, it will be found that this turbidity

depends entirely upon multitudes of some of the lowest organisms, consisting of different forms of fungi and other little elongated bodies termed vibriones, which are considered by some authorities to be animals, while others class them with vegetables. My own observations have led me to entertain the latter opinion with regard to their nature.

Milk is often added to urine, for the purpose of deceiving us, and is of course diffused through the fluid, the degree of opalescence varying according to the quantity of milk added. Milk can always be detected upon microscopical examination by the presence of the numerous oil-globules, and by the circumstance of the milky fluid becoming quite clear after agitation with a little ether and a few drops of acetic acid or carbonate of potash, which will dissolve the envelopes of casein around the globules, and thus the oily matter becomes exposed to the solvent action of the ether. By the addition of a little acetic acid, the casein of the milk is precipitated.

Chylous Urine.

The most important substance which gives to urine an opalescent appearance, and at the same time causes it to resemble milk, is fatty matter in a very minute state of division—in a *molecular state*, as it is termed. Such urine, under the microscope, is seen to contain a considerable quantity of the most minute particles, which exhibit molecular movements. These are not altered by a moderate heat, but are dissolved in great measure, though often not entirely, if the urine be agitated with ether. Urine possessing these characters is termed chylous urine. The cases in which it occurs are very interesting, and I propose to call your attention to some points connected with this condition. Cases of chylous urine are very seldom met with in this country, but I have been told by many friends that they are comparatively common in warm climates.

The following interesting case occurred in the practice of my friend Mr. Cubitt of Stroud, to whom I am indebted for the notes, and also for the specimens of urine which I analysed.

Mr. Cubitt's Case. "Mrs. S., aged 50, native of Norfolk, in which county she has always resided, has been married twenty-nine years, and has had five children, the last of whom died in its second year. The youngest now living is 20. The catamenia ceased at 43.

"Till within the last four years, she has usually enjoyed good health, but at that time had a severe attack of influenza. She continued more or less out of health during the six or nine following months, and soon after this period her urine assumed a milky appearance, which character it has retained up to the present time (November 1849), except at intervals of unfrequent occurrence and of short duration. The disorder would seem to have been gradually progressive, as the urine, which was at first only turbid and opalescent, has become by degrees more and more opaque, so that when I saw it, the unassisted eye could not distinguish between it and milk; moreover, after the lapse of a few days, a rich kind of cream rises to the surface. It is almost entirely free from any urinous odour, and has a faint, sweetish smell, something resembling that of ripe apples. In the mean time, the general health has been more and more failing, and the digestive functions imperfectly performed; the patient has complained of loss of appetite, pain at the epigastrium after eating, slight headache with nausea, palpitations, and other dyspeptic symptoms. She has been losing flesh, suffers from pain in the back and loins without tenderness, from aching of the limbs, incapability of exertion, and other evidences of general debility; but still when the duration of the disease is taken into account, the general health may, upon the whole, be said to have suffered little. She states that throughout the affection, fatigue, whether of mind or body, unusual exertion, excitement, late hours, distress, anxiety, immediately renders the milky character of the urine more marked. She has been under the care of several medical men, as well as of some professed quacks (none of whom have ever examined the urine), without benefit; nevertheless, she has found that for the time, brandy and isinglass, or compound spirits of lavender, have never failed to clear the urine, but without at all improving the general health. She seems to derive temporary relief from all kind of stimulants. Occasionally, and without any apparent cause, the urine reassumes its ordinary appearance, but this is of rare occurrence, and its duration never exceeds two or three days. At no one time has she passed milky urine during the day. It is only the urine passed in the morning, after the night's sleep, which has ever presented a milky character. Occasionally, this urine settles down into a tremulous jelly, which takes the

shape of the containing vessel, and more than once this spontaneous coagulation has taken place within the bladder itself; and in consequence of the impaction of small masses in the urethra, the patient has suffered from temporary retention of urine. She has tried various kinds of diet, but without any visible effect upon the urine. The quantity secreted appears normal, and there is no unusual frequency of micturition. The appetite has never been inordinate, or the thirst unnatural; the bowels are inclined to be constive. There is nothing remarkable about the state of the skin. She has suffered a good deal from pain in the back and loins, but there is no tenderness in this locality, and the uneasiness seems to depend upon exertion, and appears to be connected with general debility. There has never been any dropsy, and she has suffered from no cardiac or pulmonary symptoms, but such as may be accounted for by the dyspepsia; but I have not had an opportunity of examining the chest. She has never had severe headache, vertigo, vomiting, or other cerebral symptoms. Has never had rheumatism, fever, or any inflammatory attack, has not been salivated, and has no reason to suppose she has suffered from exposure to cold. At the time when I saw her, the tongue was slightly furred, pulse 70, small and soft, respiration 20, and the skin cool; but there was a haggard appearance about the countenance, and a dark circle around the eyes, with slight bagging of the skin in this situation."

Mr. Cubitt inquired as to this patient's state in April 1857, and informed me that occasionally she passes chylous urine, but only for a short time. The symptoms seem to have become less marked. She has been taking no medicine, and latterly has been in better general health than for several years past.

Analyses of the Urine. The first specimen of urine was passed in the morning. It was perfectly fluid, and had all the appearance of fresh milk. It had neither a urinous smell nor taste. Upon the addition of an equal volume of ether it became perfectly clear; but when the ether was allowed to evaporate by the application of a gentle heat, the fatty matter could be again diffused, by agitation, through the urine, which regained its milky appearance, although it appeared rather more transparent than before the addition of the ether. Upon examination, however, by the microscope, instead of the minute granules visible in the first instance, numerous large and well defined oil-globules were observed.

Specific gravity, 1013. *Reaction*, neutral.

A little of the urine was evaporated to dryness. The dry residue was very greasy to the touch. It was treated with ether, and upon evaporating the ethereal solution, a considerable quantity of hard and colourless fat was obtained.

Analysis 55.

The urine was found to contain in 1000 parts—

Water	947.4
Solid matter	52.6
Urea	7.73
Albumen	13.00
Extractive matter with uric acid	11.66
Fat insoluble in hot and cold alcohol, but soluble in ether	9.20
Fat insoluble in cold alcohol	2.70
Fat soluble in cold alcohol	2.00
Alkaline sulphates and chlorides	1.65
Phosphates	4.66

The second specimen was passed during the same day. It was slightly turbid, but contained a mere trace of deposit, consisting of a little epithelium, with a few cells larger than lymph corpuscles, and a few small cells, probably minute fungi. Not the slightest precipitate was produced by the application of heat, or by the addition of nitric acid.

Specific gravity, 1010. *Reaction*, very slightly acid.

Analysis 56.

In 1000 parts it contained—

Water	978.8
Solid matter	21.2
Urea	6.95
Uric acid	15
Extractive matter	7.31
Fatty matter	0
Alkaline sulphates and chlorides	5.34
Alkaline phosphates	1.45
Earthy phosphates	15

The presence of so large a proportion of fatty matter, perhaps combined with the albumen (13.9 grains), in the first specimen, and its complete absence in the second, which was passed only a few hours afterwards, is very interesting, and bears upon the pathology of this strange condition.

The proportion of the constituents in 100 grains of the solid matter of these two specimens of urine, is given in the following table. 55, is the chylous; 56, the clear specimen:—

	55.	56.
Solid matter	100.00	100.00
Urea	14.69	32.78
Albumen	24.71	—
Extractive matter, uric acid	22.17	35.18
Fatty matter	26.43	—
Alkaline sulphates and chlorides	3.14	25.18
Phosphates	8.86	7.54

Microscopical Characters of the Deposit. The slight deposit which formed after the chylous urine had been allowed to stand for some time in a conical glass vessel, consisted of a small quantity of vesical epithelium, and some small slightly granular circular cells about the size of a blood-corpuscle.

No oil-globules could be detected upon the surface of the urine or amongst the deposit, and the fatty matter, which was equally diffused throughout, was in a molecular or granular

Fig. 23.—Deposit from chylous urine, showing fatty matter in a molecular state. 215 diameters.

form. By examining the urine with the highest powers, only very minute granules could be detected. These exhibited molecular movements. Indeed, it may be said, that the microscopical characters of this urine closely resembled those of chyle.

Only a few of the granular cells could be discovered in the clear specimen, in which there was scarcely any visible deposit.

In a case which occurred in the practice of Mr. Gossett, and which is related by Dr. Golding Bird, an alternation in the character of the urine similar to that noticed in the present case occurred. The urine which was passed in the morning was chylous, while that secreted some hours afterwards was clear, pale, and transparent. The clear specimens, however, contained albumen. The chylous specimen which I examined did not coagulate spontaneously, as often occurs in these cases. In the case reported by Dr. Bence Jones, specimens of urine were frequently passed which were perfectly clear.

L'Heritier, and the late Dr. Franz Simon, of Berlin, state that these specimens of milky looking urine contain oil-globules; but the greater number of authors who have met with such cases have failed to detect oil-globules in the urine. In the present instance they were certainly absent, and the fatty matter existed in a molecular form only.

In Dr. Bence Jones's case, oil-globules were found in one or two instances; but in other specimens the fatty matter was present in a molecular state.

In true cases of chylous urine, the fatty matter, in a molecular state, seems to filter through the walls of the vessels, and escapes at once into the urine, while in cases of fatty degeneration of the kidney, in which actual globules are observed, the fatty matter exists in the interior of the cells, where it remains a sufficient time to become converted into distinct oil-globules. Globules thus formed may afterwards become separated from each other, and may appear in the urine as free oil-globules. It is, however, very probable, that after chylous urine has been allowed to stand for some time, the granular fatty matter may become aggregated in masses, so as to form distinct oil-globules.

Dr. Bence Jones's Case. In a case of albuminous and fatty urine, reported by Dr. Bence Jones (*Medico-Chirurgical Transactions*, vol. xxxiii), oil-globules and streaks of oil were detected upon the surface of the urine which was passed in the

morning, by microscopical examination. In two other specimens passed later in the day, fatty matter in a molecular form, but no oil-globules, was discovered. Upon standing, a coagulum formed in the urine. These specimens contained about 50 grains of solid matter in 1000 of urine. The patient was a Scotchman, aged 32. His work was hard, and he was subject to privations. The urine was first observed to be thick and white about Christmas 1848; and at this time, the chief symptom from which he suffered, was acute pain in the loins.

Lehmann is, as far as I know, the only observer who states that chylous urine never owes its opacity to fat (vol. iii, p. 544). I have now seen several cases, and in all the opacity was due to fatty matter. Authorities generally are quite agreed upon this point; but some state that the fat is sometimes in the form of globules. It may be combined with albumen.

Many of the patients whose cases are recorded, have suffered from severe pain in the region of the kidneys; but this may be accounted for by general debility, associated with this condition of urine, as well as on the supposition of the existence of organic disease of the kidneys. Indeed, the pain referred to in this locality, seems to partake more of the character of muscular pain than of pain seated in the kidneys themselves.

The following are two analyses of the urine in Dr. Bence Jones's case. The first was made on October 19th, and the second was passed some time afterwards, on the same day on which the patient was bled.

	Analyses 57	58
Water	955.58	949.13
Solid matter	44.42	50.87
Albumen	14.03	13.95
Urea	13.26	24.06
Fatty matter	8.37	7.46
Saline residue	8.01	10.80
Loss	.75	.60

The chylous urine contained blood-corpuscles. The serum of the blood was not milky, but the blood contained in 1000 parts 240.03 of solid residue, which contained of fatty matter .62; fibrine, 2.63; blood-globules, 159.3; solids of serum, 78.1.

Dr. Bence Jones showed, in some valuable experiments on this case, that during complete rest albumen ceases to be passed. (*Phil. Trans.*, 1850.)

The urine was not chylous from February 14th, 1850, to October 4th, 1851, when it was again slightly chylous. The beneficial change was entirely attributable to gallic acid. At first, twenty grains three times a day were given, but this was afterwards diminished.

Dr. Bence Jones mentions another case of a gentleman, aged 40, who passed the greater part of his life in the West Indies. The chylous condition of the urine was increased both by mental and bodily exertion. The urine was sometimes clear for several days together, sometimes white after dinner, and clear all the rest of the day. It was more frequently chylous after animal than after vegetable food.

Dr. Priestley's Case. This occurred in a boy who was only 11 years of age. (*Medical Times and Gazette*, April 18th, 1857.) He was born at the Cape of Good Hope, and was taken as a child to the Isle of France, and while there had frequent attacks of hæmaturia and chylous urine. The attacks came on at intervals of weeks or months. He was placed in the autumn of 1855 under the care of Dr. Simpson of Edinburgh. Various plans of treatment were tried in vain. He was confined to the house, and passed as much as fifty to fifty-five ounces of chylous urine daily. He gradually became weaker, and died apparently from asthenia. A fortnight before death, the urine lost its milky appearance, and the feet became oedematous. Every tissue appeared bloodless, and there was considerable emaciation. The kidneys were pale, rather larger than natural. Throughout the greater part of both kidneys the epithelium was found to contain numerous oil-globules. Dr. Priestley suggests the possibility that this case of chylous urine may have been associated with Bright's disease.

No lesion likely to account for the production of the chylous urine has been met with in the *post mortem* examinations of the cases of this condition which have been made; and most observers consider that the chylous condition of the urine does not depend upon a morbid state of the kidneys. Dr. Elliotson, on the other hand, inclines to the view that the kidneys are to be regarded as the seat of the affection. He gives the history of a very interesting case in the *Medical Times and Gazette* for September 19th, 1857.

[To be continued.]

Original Communications.

TEN YEARS OF OPERATIVE SURGERY IN THE PROVINCES.

By AUGUSTIN PRICHARD, Esq., Surgeon, Clifton, Bristol.

I PROPOSE under the above head to lay before the readers of the *BRITISH MEDICAL JOURNAL* a complete but brief account of ten years of operations. This will include those operations which fell to my share during that period as one of the five surgeons of the Bristol Royal Infirmary, and will therefore represent as nearly as possible one-fifth of the cases occurring there in that time, with the addition of the usual small proportion met with in private practice.

Of the more important operations, every case, whether successful or otherwise, will be noted; but of the minor ones, a few have slipped away for want of accurate notes taken at the time of their occurrence. The whole number of each kind of operation is too small to supply any safe basis for statistical results, supposing that medical and surgical statistics were ever useful; but I think that those of our associates who are employed in a like occupation will feel sufficient interest in this and the following papers, to justify my publishing them; and I am not without hope that they may be even useful; for every surgeon with a moderate amount of practice, whether among the poor or rich, must be the depository of some truths worked out by his own observations, or some curious results of his own experience, which, if they were published, would be new to most of us; and it cannot be doubted that a vast store of valuable medical knowledge lies concealed, especially in the remoter country districts, and that the greater part of it is lost to the world and disappears at the same time as its possessors.

In the Bristol Royal Infirmary, where the great majority of the following cases occurred, there are nine surgical wards, and about fifteen hundred surgical cases are annually admitted as in-patients; and each surgeon has the charge of all the in- and out-patients (including casualties) admitted every fifth week, as long as they continue to be under treatment. The cases of operations on the eyes were at the Bristol Eye Dispensary, as well as at the Infirmary, with perhaps rather a larger proportion in private practice. I am not aware of any particular advantage to be derived by distinguishing in a report of this kind the hospital from private cases, and therefore they will all be classed together, unless it appears that some change in the result of treatment may be traceable to this element in the case.

Upon looking over the respective numbers under the separate heads of the diseases, treated by operative measures, it will appear that some of the less important cases, which are generally considered to be of frequent occurrence, are represented by very small numbers; for instance, I note more amputations of the thigh than operations for hare-lip, and more operations for strangulated hernia than for fistula *in ano*, and thus no criterion is afforded of the comparative frequency of these disorders, because cases involving the slighter operations are treated by the practitioners under whose care they first come, and also of a considerable number no accurate notes or records have been kept.

A retrospect of only these last ten years during which I have been surgeon to the Bristol Royal Infirmary, and the necessary examination of my notes of the operations I have performed there and elsewhere during that period, have shown very clearly not only that the science and art of surgery are progressive, but that they make rapid and important progress, and that even in this time numerous valuable improvements have been introduced, and the public who derive the chief benefit of hospital experience are not sufficiently impressed with this fact, nor is it sufficiently urged upon them as an argument for giving liberal pecuniary aid to these truly English establishments.

In the following report, by far the greater number of the more important operations were performed while the patient was under the influence of chloroform, or chloroform with ether or alcohol, or after the application of the freezing mixture of pounded ice and salt, and unless there is anything particularly noticeable upon the subject of anæsthetics it will not be alluded to in the account of each individual case. I