of their development in a form somewhat different perhaps from that subsequently and very tardily manifested at the ileo-cæcal valve. I can have no doubt that the disease by which it was invested was essentially malignant, and it corroborates the view of the surgeon who excised the breast. One can scarcely arrive at any other conclusion, when we consider the history, the progress, and the termination of the case; added to which, the abnormal growth, as revealed by the autopsy, was hard and fibrous in its texture.

Could surgery have given that relief in the secondary disease which was denied to medicine? I think not: because the site of the obstruction was not clearly defined during life, and the impediment itself not so complete as to justify the operation for artificial anus; to say nothing of the advanced age of the subject, which would have been most unfavourable to its success.

The case is interesting in a threefold aspect. It tends to the belief that cancerous or scirrroid disease sometimes exists at an early age; the issue as regards the breast encourages timely surgical aid, for the affection of that organ might have advanced more quickly than that of the intestinal canal; and, lastly, it forcibly shows the tenacity of life under the cumulative sufferings of nearly seventy years. At whatever portion of that period the successive deposition may have invaded the intestinal valve, it is not possible to determine with precision from the abdominal symptoms the time at which functional disturbance of the canal was either followed or caused by the malignant obstruction; although, from the tardy character of malignancy attending the growth of that part, there is reason to believe it occurred comparatively early, a view which is corroborated by the testimony of the patient's daughter, who states that her mother's sufferings were of the same character even when she was bearing children. By careful attention to appropriate food, and to the relief of the canal, life was maintained so long; and it was not until the association of bronchial inflammation ensued, to which both her great age and the season strongly disposed her, that it was thus rapidly terminated.

Gulstonian Lectures :

ON

DIABETES AND SACCHARINE CONDITIONS OF THE URINE.

DELIVERED AT THE ROYAL COLLEGE OF PHYSICIANS,
FEBRUARY 25TH, 27TH, AND MARCH 4TH, 1857.

By ALFRED B. GARROD, M.D., Fellow of the Royal College of Physicians; Professor of Materia Medica, Therapeutics, and Clinical Medicine, at University College; and Physician to the Hospital.

LECTURE I (concluded).

Much discrepancy of opinion exists as to the amounts of the ordinary or normal constituents of the urine, in cases of diabetes, especially with reference to the *urea*. Certain observations, as those of Bostock and Cruickshank, appearing to show that this principle is very deficient in quantity, if not altogether absent; by other observers it has been thought to be in excess. I have endeavoured to put this subject to the test of experiment, and believe that the conflicting statements may be easily reconciled. Assuming that the amount of urea eliminated in the twenty-four hours be normal, say 350 grains, and the quantity of urine about 50 fluid ounces, each ounce would contain seven grains, very readily ascertained and estimated; but when this 350 grains of urea is diffused through 400 fluid ounces, as often happens in diabetes, and, at the same time, becomes mixed with a very large quantity of sugar, perhaps forty or fifty times its own weight, some difficulty might have been experienced in detecting even a much larger quantity, by the process employed, at the time when doubt was cast upon its presence. I believe that the daily amount of urea thrown out by diabetic patients is at least as much as, and for the most part greater than, in health; but that, in cases of the disease where the diuresis is excessive, the relative quantity is much diminished. In a well marked case, under my care about eighteen months since, the following determinations were made. The patient was a man, J. S., aged 28, weight 8 stone 4 lbs., living on a diet, consisting of meat 1½ lb., milk 2 pints, beef tea 1 pint, captains' biscuits 4 ounces, and greens 4 ounces.

Date.	Quantity of urine.	Sp. gr.	Urea.	Sugar.
Nov. 22	117 fl. oz.	1046	999 grs.	2923 grs.
— 23	123 —	1046	1085 —	3500 —
— 24	129 —	1046	856 —	2533 —
— 25	131 —	1045	879 —	3718 —
— 26	124 —	1045	769 —	2860 —
— 27	134 —	1045	755 —	2488 —
— 29	124 —	1040	843 —	2313 —

The same patient, in the following January, was much improved in health, and passed—

Jan. 20	76 fl. oz.	1044	601 grs.	..
— 22	89 —	1048	650 —	1893 —

The urea determinations were made with Liebig's test, by a gentleman (Mr. Footman), who had previously had much experience in such analyses, and on whose accuracy I can fully rely. In other cases, of patients passing daily about 70 or 80 ounces of urine, I also found the amount of urea considerably above the healthy standard, although by no means so high as in the case just alluded to.

This view of the existence of an excessive elimination of urea in diabetes, accords with the results obtained by Mr. McGregor and Dr. Christison; the former finding 512, 810, 945, and 1013 grains; the latter, 630 and 884 grains, as the daily amount of this principle voided by certain patients suffering from this disease. Part of the large excess found in some cases, must be attributed to the quantity and character of the food. The nitrogenised matters in the form of meat and eggs, in the hospital case I have alluded to, were very large indeed; and it was found that a non-diabetic patient, who for a few days was induced to take the same diet, also voided a very large amount of urea. When from any cause the appetite fails, I have reason to believe that urea becomes considerably lessened.

The influence of diet upon the daily formation of urea is well shewn in the following table, the result of a series of examinations of Dr. Frank of Wurzburg:—

	Grammes.
Twenty-four examinations on a mixed diet gave ..	37.98
Five " " animal diet	62.63
Ten " " vegetable diet	28.80
Two " " non-azotised	16.66

And during forty hours of complete abstinence, the quantity of urea, etc., was only 19.35 grammes.

The increased excretion of urea, which is certainly often present in diabetes, I should consider to arise from two causes; partly from the large amount of azotised food, partly from the increased consumption of nitrogenised tissues.

With regard to the *uric acid* in the urine in diabetes, there has also been much discrepancy of opinion; by most observers, it has been supposed to be deficient, and the reason is obvious. Dr. Prout has observed, and every one who had studied this disease must have also noticed, that on the occurrence of diabetic symptoms, the urine, before probably turbid, becomes suddenly clear and transparent; not unfrequently it has been remarked to me, on asking about the state of the secretion, that nothing could be wrong in this respect, as the water had lately assumed a much more healthy appearance. This apparent deficiency, however, need not indicate that the total elimination of the uric acid is lessened; for the large increase of the watery secretion, from its power of holding the urates in solution, would at once prevent the cloudy state of this fluid. Without being able to bring forward figures derived from quantitative analyses, I may state that, in almost all cases of diabetes, where the urinary secretion is excessive, the *relative* amount of uric acid is diminished, as likewise the urea, colouring matters, etc., but that the total quantity is not decreased; that, when from treatment or other causes the secretion becomes much diminished in quantity, the uric acid is often deposited, either in the cloudy state of urate of ammonia and soda, or in the crystalline form of uric acid. In the latter condition, it is not unfrequently seen, even when the secretion is rather abundant, caused by this insoluble acid being reduced to a free state by the over-acidity of the urine. If we take eight grains to represent the average daily amount of uric acid thrown out in health, and supposed it diffused over 400 fluid ounces of urine, even on the addition of some foreign acid, it would not be deposited, as this quantity of fluid is then more than sufficient to hold it in solution.

Dr. Prout has observed, that "the appearance of lithic (uric) acid, either in its amorphous or crystallised form", is among the favourable symptoms of this disease; and, from what I have just stated, the reason will be obvious. I hope soon to be able to lay before the profession some more positive and accurate

knowledge on this point; but at present I question whether the appearance of this acid in diabetic urine implies any more than that a diminution of the renal secretion has occurred, of itself of considerable importance. Some observers, as Lehmann, have noticed an increase of *hippuric acid* in diabetic urine. This augmentation does not appear to be at all constant; I have not found it, in cases in which I have sought for this body.

As to the amounts of the other normal ingredients of the urine, little that can be relied upon is known. The earthy phosphates are often found in large quantities, especially when the patients are partaking plentifully of a meat diet.

Albumen has been asserted by some to occur frequently in diabetic urine; but, from my own observation, I cannot think that it is at all a common occurrence, and, when present, I imagine depends on the coexistence of some independent disease of the kidneys. I have not found it in more than 10 per cent. of my hospital cases, and in private practice have seldom met with it. Considering the great frequency of albuminuria, unattended with saccharine impregnation, it can scarcely be considered as being necessarily connected with this affection. By some it has been thought that albuminuria occasionally passes into diabetes; no proof, however, in support of this opinion can be brought forward. Others have supposed that the secretion of a large excess of *urea* often precedes saccharine diabetes. I believe this assertion to be equally destitute of proof. If any tendency to granular or other form of kidney disease preexist, the increased work which these organs are called upon to perform would tend to bring it forward; as would likewise the impaired general health which diabetes engenders.

As the urine is so much altered, both in quantity and character, we might anticipate finding many symptoms in connexion with the urinary organs; yet these are by no means frequently or strongly marked.

Many diabetic patients have occasion to pass water at short intervals, but this simply arises from the large quantity secreted, and the necessity of relieving the bladder; sometimes, indeed, there is a frequent desire to micturate, when the amount of urine is not great. In two cases which have fallen under my observation, the symptom has been well marked; in one, the total quantity passed was not much more than in health, but the specific gravity was very high, above 1040. In the second case, the daily average was under five pints, specific gravity 1035. At times the end of the urethra of a diabetic patient becomes red and swollen, arising apparently from the altered and irritating quality of the secretion; in the female, this often proves a very distressing symptom.

There are many important and characteristic symptoms presented by the confirmed diabetic subject, besides those referable to the urinary organs, which have been already enumerated. Some of these appear to be directly dependent upon the great loss of fluid from the kidneys; others, probably, on the altered condition of the blood which will be shewn to be constantly present. As a rule, diabetic patients, at least those who have been long suffering from the disease, are thin, often emaciated. Instances are, however, related by Dr. Prout, of their being unusually fat. One of his patients weighed twenty-three stone when labouring under well marked symptoms; before that time, he weighed twenty-seven stone. The second individual weighed seventeen stone. During the progress of the affection, emaciation generally takes place, accompanied by increasing debility, and great irritability of the muscles. The increase in weight of a diabetic patient may, I believe, be taken as good evidence of the amelioration of the disease. It has been remarked, that diabetes usually runs a more lengthened course in fat people than in those originally of a spare habit of body. My own experience fully accords with this.

Excessive thirst is another prominent symptom in diabetes; and it is not uncommon to hear of patients drinking many gallons of liquids during the day, when no restraint is put upon them. That this depends upon the loss of fluid from the system, and has little or no relation to the saccharine condition of the blood, is made evident by the fact, that the thirst is usually in proportion to the quantity of urine voided; and, likewise, that it exists to an equal degree in other cases of excessive diuresis, where there is no sugary impregnation of the renal secretion.

An excessive, often inordinate appetite, is another of the symptoms common to diabetic patients, depending in some measure on the great drain of solids from the system, and the consequent exhaustion; but partly, I should suspect, upon an irritated condition of the mucous membrane of the stomach, induced by the altered secretion constantly poured into it. That

such is the true explanation, is made probable by the presence of pain and tenderness of the epigastrium, of which these patients often complain. Notwithstanding that large quantities of food are taken, the bowels are usually constipated, the faeces hardened, devoid of biliary matter, and scybalous; characters due to the deficient secretion or excretion of bile, and the excessive liquid drain from the kidneys. The tongue of the diabetic subject is often very characteristic, for the most part unusually red, beefy looking, at times much fissured, sometimes partially covered with a whitish fur, and almost constantly with a very glutinous or tenacious mucus, which is adhesive, and forms bands when the mouth is opened.

The gums are usually inclined to be spongy in character, red in appearance, and apt to bleed from slight causes. The skin is commonly dry and harsh, especially when the urinary secretion is large; in some patients, however, this symptom is not observed. I have records of cases of well marked diabetes, in which, throughout the whole course of the disease, it has been absent, and visible perspiration could readily be induced by exercise or diaphoretics; Dr. Prout, also, has noticed this fact. Even when the skin has been dry during the progress of the disease, I have known the occurrence of night sweats, induced by the phthisis, under which the patients were labouring, becoming active in character. A dry and harsh skin may, however, be regarded as a symptom generally present in confirmed diabetes. I believe it is but little connected with the saccharine condition of the blood, and not commonly present in cases of glycosuria unless diuresis is well developed.

Nothing very remarkable is exhibited by diabetic patients in regard to the vascular system, the heart's action is generally weak, and rather hurried, and the pulse consequently small and quick. I believe that in almost all cases the pulse is *above* the average of health. The presence of diabetes, especially when accompanied by great diuresis produces a distinct alteration of the condition of the mind, and induces great irritability, peevishness, want of energy and power of application. In many of my hospital patients, a disposition to deceive, especially with regard to the subject of food, has displayed itself. I believe this has been observed by others.

Other functions have often been stated as peculiarly affected during the progress of this disease, especially those of the eye and of the generative organs.

Dimness of vision appears to be laid great stress on by certain French physicians, and supposed to be due to some opacity of the humours of this organ. I cannot say that my own experience would lead me to rely much upon the symptom, as scarcely any of my patients have complained of it; and, on inquiry, I have seldom been able to discover more than the usual imperfection of vision which so frequently accompanies impaired nutrition of the body.

With regard to the loss of virile power, I am inclined to regard it as more connected with the excessive diuresis and general debility, than with the altered state of the blood. In some of my cases, the loss was stated to be complete; others had not noticed much diminution.

The symptoms just enumerated are particularly characteristic of those forms of the disease where diuresis is very prominent, and in which many of the phenomena are secondary to the great loss of fluid from the urinary organs; but, as I have before observed, there are forms of saccharine disease either unaccompanied by an increased secretion of urine, or at least in which the diuresis is not well marked—nay, even unnoticed by the patient. Such cases, I believe, are very numerous: at the same time, most important to diagnose correctly. From my own observation, it appears that these instances more frequently occur in private practice than in the wards of the hospital; and hence perhaps the cause of their having been less perfectly understood, and less accurately examined.

Are there any symptoms, saving the saccharine state of the urine, which can be regarded as pathognomonic? I know of none upon which I should venture to rely. Certain phenomena, however, very generally exist; and these I will now briefly notice.

Perhaps one of the most constant is a certain amount of oedema of the legs, which, in some instances, may be so slight as readily to escape detection, unless specially sought for. Since my attention was first directed to its frequent occurrence, I believe I have seen no patient, in whom the urine has been distinctly saccharine, where it was absent: in some cases, the amount is so slight that it appears to be little more than a loss of elasticity of the integuments over the tibia, but still it has been distinctly marked. In real diabetes, it often becomes very decided, and in the later stages considerable oedema

and swelling of the legs not uncommonly ensue. The occurrence of slight oedema in cases where the renal secretion is augmented, is somewhat peculiar, and shows that it depends upon the morbid condition of the blood, and has no reference to the renal function.

Another very common phenomenon is the appearance of some cutaneous eruption, or some affection of the subcutaneous cellular tissue. I have been consulted by several patients with such, and have discovered a saccharine condition of urine, evidently most closely connected with the skin-disease, in the relation of cause and effect. In the majority of cases, the eruption has been herpetic in character; now and then scaly; in some, pruriginous; in others, it has assumed the form of boils and carbuncles. From what I have hitherto observed, I am much inclined to think that these cutaneous affections are more marked in cases of saccharine urine unattended with diuresis, than where the urinary secretion is greatly augmented; as if, in these latter cases, there was less accumulation of sugar in the blood, on account of the establishment of free outlet by the kidneys. Dr. Prout had noticed this, for he makes the following remark: "Were I permitted to draw a general inference from my experience, I should say, that diabetes usually follows cutaneous affections, and accompanies (perhaps precedes) the affections of the cellular tissue. Thus I have several times heard patients observe that they were formerly subject to eruptions in various parts of the body, but that such eruptions disappeared after the diabetic complaint became established; nor do I remember more than one instance in which diabetes actually accompanied a severe cutaneous affection." Within the last few weeks, I had a patient under my care, suffering from diabetes, who exhibited from time to time a large ring of herpes circinatus upon the right cheek; and I am of opinion that there was some distinct connexion between the intensity of the skin affection and the amount of the renal secretion, one being in an inverse ratio to the other. Not many months since, I correctly diagnosed the presence of saccharine urine in a gentleman, mainly from finding that, without any very evident cause, he had been suffering for several years from a succession of herpetic eruptions in different parts of the body.

Pruritus not unfrequently accompanies a saccharine condition of the blood; and several instances illustrating this fact have occurred in my own practice. There also very commonly exists in these patients a tendency to low forms of inflammation, a difficulty of healing parts when injured, and a liability to furuncular and carbuncular affections. In many of these cases, the tongue exhibits in some degree the characters we have before described. There is often increased thirst and dryness of the skin; and, although the patient may be quite unconscious of it, some augmentation of the urinary secretion; but this latter may be insufficient to cause any increased frequency of micturition, and hence pass unnoticed.

As a good example illustrative of this form of disease, I may relate the following case.

A gentleman 66 years of age, had been somewhat out of health for several years, had felt much weaker than usual, and has also been troubled with an herpetic eruption about the prepuce, which had recurred so frequently as to induce phymoses: he had also formerly suffered from some affection of the scalp. At the time of his visit, he exhibited the following symptoms: some herpetic eruption on the prepuce; considerable redness of eyelids; general feeling of debility; pulse weak, about 80; slight oedema of legs, over the tibia; tongue somewhat red, with a small quantity of a rather glutinous-looking mucus on its surface; frequent desire to make water, from a feeling of irritation, but no large amount passed at the time. On examining the urine voided at the visit, about two hours after breakfast, I found it of the usual yellow appearance, clear, acid in reaction, specific gravity 1035 at 60° Fahr., and yielding, with the potash and copper tests, abundant evidence of sugar. On obtaining an estimate of the daily average, I found it to be about four pints, having a mean specific gravity of nearly 1035. I may state that, on the addition of yeast, it fermented very strongly; and, when allowed to stand, gave rise to a precipitate of uric acid in orange coloured crystals. By appropriate diet and treatment, this gentleman lost all his uncomfortable symptoms, gained flesh and strength, and the urine (which is now about two and a half pints per diem) has a specific gravity of 1020, and gives but a very faint indication of the presence of sugar; still this abnormal principle is detectable. In this case, there was a decided diuresis; yet, on first questioning, the patient had no idea that he passed a larger quantity of water than usual.

As another example, I may mention the case of a lady about

sixty-five, who complained first of great irritability about the neck of the bladder, and afterwards of intense pruritus pudendi: slight pitting over tibia. The urine was, according to the patient's statement, rather scanty than not; but on examination I found it of specific gravity 1045, dark yellow colour, and yielding, by the fermentation and other tests, a large amount of sugar: it was also very rich in urea.

Another gentleman, aged 63, had suffered for some time from an eruption about the lips and chin, with slight pitting over the tibia; otherwise in pretty good health. The urine was found to be distinctly, but not strongly, saccharine. Treatment with a diet deficient in saccharine and amylaceous matters, but not very rigid, appeared to remove the tendency to the herpetic affection, and the urine has recovered its healthy condition.

As a last example, I may mention the case of a gentleman about sixty years of age, who consulted me on account of some affection of the ends of the fingers, which he considered gouty in character. On examination, I found that they were evidently small blebs, which on puncture gave exit to a very tenacious gelatinous-looking substance, semifluid in consistence. These blebs had troubled him for some time, and he had also suffered much from prurigo about the legs and arms. The legs gave slight, but distinct, evidence of pitting over the tibia; the quantity of urine was moderate, not exceeding three pints; specific gravity about 1030, and yielding strong indications of sugar by the various tests.

On a subsequent examination of the urine, after following for a month or two a plan of treatment I had proposed, the urine ceased to exhibit the reactions of sugar; but whether it has remained free from saccharine impregnation, or whether the symptoms have become ameliorated, I am unable to say.

British Medical Journal.

SATURDAY, APRIL 11TH, 1857.

THE SHORTCOMINGS OF OUR HOSPITALS.

THE fact that Miss Nightingale is making a tour of the Metropolitan Hospitals, will be received with an ill suppressed sneer, we know, by many individuals, who fancy that, whatever may be the shortcomings of our military asylums, those dedicated to the civil element of society cannot be bettered. We willingly admit that neither in London nor in the provinces do we find such glaring examples of bad sanitary arrangements in our hospitals, as are to be found either at Fort Pitt, Chatham, or at the Woolwich Military Hospital, or, if report speaks truly, as we are likely to find at the great military hospital now building at Netley. That is to say, they are almost universally dry, and tolerably well lighted and ventilated; the diet in them is liberal; and the attendance, as regard nursing and medical assistance, is excellent. There are many shortcomings, however, in our best metropolitan hospitals, which the eye of an intelligent and sensitive lady, such as Miss Nightingale, will instantly see, but which the boards of governors, under whose direction they are, either never will see, or, if they do see, will never attempt to remedy.

Sidney Smith has wittily said that public boards have neither bodies to be killed, nor souls to be saved. This observation, in a modified degree, holds good with respect to the boards of hospitals; composed as they are of so many heterogeneous elements, they have no mind for the performance of those finer duties and acts, which a single good and cultivated intellect is so capable of performing. The more obvious routine work of an hospital they direct well enough, but here their function ends; if any philanthropic individual suggests some plan for