This theory, that of modification of intraocular pressure, by the influence of division of the ciliary nerves upon nutrition, through the medium of the ciliary ganglia, deserves investigation, and, indeed, appears to me as plausible, and even more so, than any other theory with which I am acquainted, which attempts to account for the curative influence of iridectomy.

You will reasonably inquire what is my own opinion of iridectomy. Is it to be classed, as some sensible men class it, in the category of medical myths; or is it to be regarded as an operation based upon strictly scientific principles? I confess that my little experience in the matter does not warrant me to attempt a solution of the question. My first thoughts on the operation were inimical to it. It appeared to me that its theory was unsound; that the pathological conditions which it sought to cure were vague and indefinite; and, theoretically, that the operation was incapable of producing the results proposed by, and said to be arrived at by, its originator.

I believe that Dr. Mackenzie, Mr. Walton, Mr. Wilde, and other good surgeons, entertained somewhat similar views; and I have strong reason to think that some, if not all of these gentlemen, still adhere to the same opinion. On the other hand, Professor Von Gräfe, Mr. Bowman, Mr. Critchett, and other able operators, have repeatedly performed iridectomy, and have published their experience, which, in the main, is highly favourable to it.

Under these circumstances, it seems to me but fair to believe the statements of Professor Gräfe and his followers to be correct, until clear and decisive evidence can be adduced to prove that they all have been deceived in their estimate of the value of the operation.*

MYOPIA. Very recently, Mr. Vose Solomon has devised a new operation for the relief of myopia. He designates it "intraocular myotomy". It consists in a transverse division of some of the fibres of the muscle of the lens—the ciliary muscle. Mr. Solomon does not consider it material which part of the muscle is selected for division, but generally prefers either the upper or lower segment of the circle. Supposing the latter situation selected, and the patient to be seated in a chair, the operator stands behind, and fixes the globe with his left fingers as in extraction, holding a cataract-knife in his right hand. With the flat of the blade directed upwards, he pushes the point in succession through the corneo-sclerotic union, the pillars of the iris, and the ciliary muscle. The direction given to the instrument is obliquely downwards and outwards. Care is taken that the incision in the muscle is of the same length as the puncture of entrance; viz., about two lines, or two lines and a half, in diameter.†

Mr. Solomon has tested the operation upon individuals from the age of twelve to forty-five years. A man of the latter age, who had worn double concave glasses of immense depth (No. 16) for a great number of years, and, unaided by lenses, could see with clearness the features of a person, to know them, at a distance of nine feet only, obtained at once by the operation an increase of seven feet in his focal range. In a child of twelve years of age, the operation increased the reading distance from four to eight inches, and the power of identifying persons' features from twenty to forty yards; and in one of sixteen years, the effect was still more remarkable.

Mr. Solomon states that, in myopic cases, the improvement is progressive. He urges me to test the operation by experience. It appears to me that it should be cautiously adopted; that, to test its value, it should be performed in exaggerated cases, in which much harm could not be done, should the proceeding prove ineffectual. Under such circumstances, I should be disposed to perform it, but should not certainly recommend it to ordinary myopic persons—at least, until it is found to produce certain results.

When I commenced this address, I sketched its programme, and comprised within its limits another important subject—the ophthalmoscope. To the best of my ability, I have epitomised the materials which lay at my disposal, and, indeed, have omitted some subjects which ought to have been touched upon: still my paper is too lengthy. I have therefore determined to leave the consideration of the ophthalmoscope to other and more practised observers, and hope that, at our next anniversary, this interesting and important mode of examining

the deep textures of the eye will be brought before the Association, and form the subject of a distinct address.

If I have afforded information to a few here present, stimulated others to investigate, or refreshed the memory of any daily practising ophthalmic surgery, I am amply repaid for the time expended on my subject.

I cannot sit down without expressions of thankfulness that God has endowed our noble profession with the ability, as well as the inclination, to confer vast benefits upon suffering humanity. Time was, when many an intelligent practitioner of medicine gloried in scepticism and infidelity; time is, when his successor, elevated by a better teaching, reverently ascribes to God the glory due unto his name, and humbly adores Him who has bestowed such gifts upon men.

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

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

BY
LIONEL BEALE, M.B., F.R.C.P., F.R.S.,
PHYSICIAN TO KING'S COLLEGE HOSPITAL; PROFESSOR OF PHYSIOLOGY
AND OF GENERAL AND MORBID ANATOMY IN KING'S
COLLEGE, LONDON; ETC.

LECTURE VII.

URINE IN DISEASE. *Insoluble Substances in Urine.* 1. *Floating on the Surface, or suspended through the Fluid.* **URINARY DEPOSITS.** 2. *Light and Flocculent Deposits.* 3. *Dense and Opaque Deposits.* 4. *Granular and Crystalline Deposits.* **EXAMINATION AND PRESERVATION OF URINARY DEPOSITS.** *Collecting Urine for Microscopical Examination.* *Period when the Urine should be examined.* *Removal of the Deposit from the Vessel containing it.* *Of Collecting a very small quantity of a Deposit from a Fluid.* *Magnifying Powers required in the Examination of Urine.* *Of the Chemical Examination of Urinary Deposits.* *Examination of the Deposit in the Microscope.* *Of Placing the Deposit in the Preservative Fluid.* *Refractive Power of the Medium in which Deposits are mounted.* *Media in which Urinary Deposits may be preserved.* *Of Keeping the Deposit for subsequent Inquiries.* *Of Preserving Deposits permanently.* *Mucus, Epithelium, Fungi, and Vegetable Growths.* *Spermatozoa.* *Casts.* *Pus.* *Phosphates, Urates, Blood-Corpuscles, Uric Acid, Cystine, Oxalate of Lime.* *On Preserving Crystalline Substances which are more or less Soluble in Water.* **OF EXTRANEEOUS MATTERS OF ACCIDENTAL PRESENCE.** *Larvæ of the Blow-fly.* *Hair.* *Cotton and Flax Fibres.* *Portions of Feathers.* *Silk.* *Fibres of Deal from the Floor.* *Starch-Granules.* *Portions of Tea-Leaves.* *Milk.* *Sputum.* *Epithelium from the Mouth.* *Vomit.*

[Concluded from page 738.]

OF EXTRANEEOUS MATTERS.

In the microscopical examination of urinary deposits, the observer often meets with substances the nature and origin of which he cannot readily determine. This is due in many instances to the presence of bodies which have fallen in accidentally, or which have been placed in the urine for the express purpose of deceiving the practitioner. The importance of recognising matters of an extraneous origin can scarcely be sufficiently dwelt upon, for until the eye becomes familiar with the characters of these substances, it will be obviously quite impossible to derive such information from a microscopical examination of the urine as will enable the observer to distinguish between those bodies whose presence denotes the existence of certain morbid conditions, and certain matters which have accidentally found access, and, clinically speaking, may therefore be entirely disregarded. Practitioners who use the microscope for investigating the nature of urinary deposits, will derive advantage from subjecting many of the substances referred to separately to microscopical examination, so that when met with in the urine, their nature may be at once recognised. As most of the undermentioned substances are readily obtained and easily subjected to examination, a brief notice of their

* Since this address was delivered before the British Medical Association, Sir D. Brodie has submitted to iridectomy for glaucoma. Although it appears that the operation has been unsuccessful, still the fact that a man so gifted, and so mature in experience, has allowed its performance upon himself, speaks volumes of his estimate of its expediency and propriety.

† This operation of intraocular myotomy appears to me to differ very little from that which Mr. Hancock practises and recommends for glaucoma.

character will be sufficient. Your attention should be especially directed to the fact of the frequent occurrence of many of these extraneous substances in urine, and you should particularly notice those characters in which they resemble any insoluble substance derived from the bladder or kidney, or deposited from the urine after it has been standing for some time.

The following are some of the most important of these extraneous matters which have fallen under my own notice:—

Human hair.	Milk.
Cats' hair.	Oily matter.
Blanket hair.	Potato starch.
Worsted.	Wheat starch.
Wool.	Rice starch.
Cotton and flax fibres.	Tea leaves.
Splinters of wood.	Bread crumbs.
Portions of feathers.	Chalk.
Fibres of silk.	Sand.

The microscopical appearances of these substances are given in Plates I, II, and III, figures 1 to 16, of the "*Illustrations of Urine, Urinary Deposits and Calculi*." You would hardly believe what curious and unexpected substances are sometimes found in the urinary secretion. Some time since, a specimen of urine was sent for examination, which contained several white bodies, about half-an-inch in length, like maggots. Upon microscopical examination, I found that these contained trachee, and they ultimately proved to be *larvæ of the blowfly*, although it had been stoutly affirmed that they had been passed by the patient.

A few years ago, Dr. Stewart informed me that a man had brought some urine to him for examination with a thick, brick-red deposit, which was analysed by Mr. Taylor, and proved to consist of sesquioxide of iron. The urine containing this deposit was of specific gravity 1.011; and, upon the addition of ammonia, a brown flocculent precipitate (hydrated sesquioxide of iron) was thrown down. Dr. Stewart tells me, that a considerable quantity of the powder (jeweller's rouge, or sesquioxide of iron) remained suspended in the urine after it had stood for many hours, and that the fluid was still turbid after having been passed through a double filter. The man who brought this urine has been endeavouring for some time to impose upon different hospital physicians.

Hair of various kinds is very frequently found amongst urinary deposits, but, as its microscopical appearance is so well known, it is not necessary to enter into a description of the characters by which it may be distinguished. The varieties of hair most commonly found are human hair, blanket hair, and cat's hair. Not unfrequently portions of coloured worsted will be met with: but the colour alone will often remove any doubts with reference to the nature of the substance. Portions of human hair are sometimes liable to be mistaken for transparent casts of the uriniferous tubes, which are quite destitute of epithelium or granular matter, and which present throughout a homogeneous appearance. The central canal, with the medullary cells within it, in many cases will be sufficient to distinguish the hair from every other substance likely to be mistaken for it; but sometimes this cannot be clearly made out, and the marks on the surface may be indistinct; when attention must be directed to its refracting power, well defined smooth outline, and also to the sharply truncated or fibrous ends, or to its dilated club-shaped extremity in the case of the hair bulb. In the latter points, small portions of hair will be found to differ from the cast, for this latter does not refract so strongly; the lines on each side are delicate but well defined, and the ends are seldom broken so abruptly as in the case of the hair. Cat's hair can scarcely be mistaken for any urinary deposit with which I am acquainted, and its transverse markings will serve at once to distinguish it with certainty. (*Illustrations*, Pl. I, figs. 1, 2, 3.)

Cotton and flax fibres are very often found in urine. When broken off in very short pieces, they may be mistaken for casts; but the flattened bands of the former, and the somewhat striated fibres of the latter, will generally be found sufficiently characteristic. (*Illustrations*, Pl. III, fig. 16; Pl. I, fig. 4.)

Portions of feathers are often detected in urinary deposits upon microscopical examination, and are derived, no doubt, from the bed or pillow. The branched character of the fragments will always enable the observer to recognise them with certainty. (*Illustrations*, Pl. III, fig. 14.)

Pieces of silk are not unfrequently present, but these can scarcely be mistaken for any substance derived from the kidney. Their smooth glistening appearance and small diameter at once distinguish them from small portions of urinary casts, and their clear outline and regular size from shreds of mucus, etc.

Fibres of Deal from the Floor. Of all the extraneous matters likely to be met with in urine most calculated to deceive the eye of the observer, none are more puzzling than the short pieces of single fibres of deal. In hospitals, where the floor is uncovered, and frequently swept, portions of the fibres of the wood are detached, and being light, very readily find their way into any vessel which may be near. In fact, these fibres enter largely into the composition of the dust which is swept up. I was familiar with the appearance of these bodies for a long time before I ascertained their nature; for, although the peculiar character of coniferous wood is sufficiently well marked, when only very small portions are present, and in a situation in which they would scarcely be expected to be met with, their nature may not be so easily made out. Often only two or three pores may be seen, and not unfrequently these are less regular than usual, in which case they may be easily mistaken for a small portion of a cast with two or three cells of epithelium contained within it. I have very frequently met with these fibres amongst the deposit of various specimens of urine which have been obtained from private as well as from hospital patients. (*Illustrations*, Pl. III, fig. 15.)

Starch-granules are very commonly found in urinary deposits, and indeed in all matters subjected to microscopical examination; usually their presence is accidental, but large quantities of starch have often been added for purposes of deception. Their true nature may be discovered, either by their becoming converted into a jelly-like mass on being boiled with a little water in a test-tube, by their behaviour upon the addition of free iodine, or by their well defined microscopical characters. The three kinds of starch most likely to be met with in urine are potatoe starch, wheat starch, or rice starch. They are readily distinguished by microscopical examination. Small portions of potatoe, or pieces of the cellular network in which the starch globules are contained, have been occasionally met with. Under the head of starch may also be included bread-crumbs, which are very commonly present in urine, and have a very peculiar appearance, which may be so easily observed that a description would appear superfluous. Many of the starch-globules will be found cracked in places, but their general characters are not otherwise much altered. (*Illustrations*, Pl. II, figs. 6, 7, 8, 9, 10, 11.)

Portions of tea-leaves are occasionally found in urine. The beautiful structure of the cellular portions, and the presence of minute spiral vessels, distinguish this from every other deposit of extraneous origin. A small piece of a macerated tea-leaf will be found to form a most beautiful microscopic object. (*Illustrations*, Pl. I, fig. 5.)

Milk and certain colouring matters are sometimes purposely added to urine; and it is often difficult to make out whether they have been added with the intention of deceiving us, especially as some colouring matters, such as logwood, Indigo, or Prussian blue (?), when taken into the stomach may be absorbed by the vessels, and eliminated from the system in the urine. A form of Indigo, there can be no doubt, is actually generated in the system. Urine to which milk has been added can be easily distinguished from the so-called chylous or milky urine by its microscopical characters. The presence of small oil-globules, with a well defined dark outline, can always be detected in milk by the aid of the microscope, while in chylous urine nothing but a great number of very minute and scarcely visible granules, composed of fatty matter, can be made out. (*Illustrations*, Pl. III, fig. 13.) The observer should also be familiar with the appearance of oil-globules under the microscope, fig. 12.

Sputum: Epithelium from the Mouth: Vomit. It must be remembered, too, that epithelium from the mouth is often found in urine. All the cells met with in sputum are occasionally found, and a vast number of different substances, which are rejected by vomiting, are from time to time detected. The observer must not be surprised at finding now and then some well defined elementary fibres of striped muscle. It is most difficult to prevent these different substances from being mixed with the urine. They often cause the microscopist great trouble—and especially at first, before the eye has become quite familiar with the appearances, they are likely to give rise to the greatest confusion in descriptions of microscopical appearances. For the microscopical characters of the substances present in sputum and vomit, I must refer you to the wood-cuts in *The Microscope in its application to Practical Medicine*, and the plates in the third part of *Illustrations of the Use of the Microscope in Clinical Medicine*: When we next meet, I propose to commence the description of *urinary deposits*, and shall in the first place allude to the characters of insoluble substances floating upon the surface or diffused through the

urine. I shall have to speak of those interesting cases of chylous urine which occasionally come under our notice, and shall advert to the different conditions under which fatty matter occurs in human urine.

Original Communications.

SCROFULOUS DISEASES OF THE EXTERNAL LYMPHATIC GLANDS:

THEIR NATURE, VARIETY, AND TREATMENT.

By P. C. PRICE, Esq., Surgeon to the Great Northern Hospital; the Metropolitan Infirmary for Scrofulous Children at Margate; etc.

III.—TUBERCULOUS DISEASE OF THE EXTERNAL LYMPHATIC GLANDS.

IN the foregoing chapters have been considered two forms of glandular affections; one, the result of more or less subdued inflammation, termed by the French surgeons, *engorgements*; the other, the effect of a particular chronic increase or hypertrophy of the true parenchymatous glandular tissue. Both these conditions may obtain in all kinds of constitutions; but their occurrence in truly scrofulous individuals is marked by special phenomena indicative of a peculiar diathesis, which generally allow the surgeon to distinguish not only the nature, but oftentimes the cause and results of the diseased action.

So comparatively distinct is the line that can in general be drawn between various glandular affections, that little or no difficulty is encountered in describing under a separate heading a most frequent and destructive form of disease, depending on a true tuberculous manifestation. Hitherto—at least, in England—but slight practical distinction has been drawn between the different forms of glandular affections occurring in scrofulous subjects, so that many really benign conditions of the lymphatic system have oftentimes been indiscriminately, if not ignorantly, spoken of as truly tuberculous. Lebert was the first surgeon of eminence who attempted to define with any precision scrofulous and tuberculous diseases; and so apparent are many of his observations, that I have willingly acceded to some of his views and explanations. I have long ceased to regard every condition of idiopathically enlarged glands in decidedly scrofulous subjects as the result of tuberculous complication; for it will be remembered that in preceding chapters a considerable proportion of glandular swellings, even in highly scrofulous constitutions, were shown to be entirely independent of production by tubercle.

Tuberculous disease of the lymphatic glands may occur at almost any age. I have seen those externally seated involved at a very early period of life; while Oehler, Cruikshank, and others, have recorded instances of morbid states of the mesentery in the fetus greatly resembling ordinary tubercle.

It is not, however, till after the second year that tuberculous diseases generally manifest themselves, when the mortality arising therefrom is often truly appalling. At the Metropolitan Infirmary for Scrofulous Children at Margate, patients between the ages of three and sixteen years only are admitted, so that beyond the latter age, I am possessed of no very extended means of arriving even at an average appreciation of the number of deaths from tuberculous affections. M. Guersant, formerly of the Hôpital des Enfants Malades in Paris, has stated that in scrofulous children between these two ages tuberculous disease has been found in one or more parts of the body in at least two-thirds of the number of patients who have died in the institution. This proportion is certainly much in advance of any I can offer; for the deaths from various forms of scrofula at Margate among children are comparatively few, when compared with the high rate of mortality occurring in the crowded hospitals and unions of large cities.

Various statistics have been offered as to the frequency of tuberculous disease of the external glands in scrofulous children. Papavoine states that in the bodies of fifty scrofulous children which he examined, tubercle was found on twenty-six occasions invading to a greater or less extent the cervical ganglia. Louis says that in the bodies of scrofulous subjects over the age of fifteen years, the cervical glands were

affected with tubercle in one-tenth of the cases which he examined.

My own conclusions allow me to verify the results of M. Papavoine; for I think it may be asserted, as a rule, that the development of tubercle in the lymphatic glands is a very early and frequent manifestation in the young scrofulous subject, especially when subjected to various depressing influences. Although the appearance of tubercle in the lymphatic system is by no means infrequent after the age of two to eighteen years, still it appears from my own statistics that it most usually occurs between the ages of six or eight years and twelve or fourteen years. It may invade the lymphatic ganglia as a specific and solitary affection, or as a secondary consequential development coexistent with similar manifestations in other parts of the body.

In young children it, perhaps, more often occurs without any previous appreciable association, except a well marked scrofulous constitution. On the other hand, although tubercle may not only be suspected but detected in other localities, yet the destructive form that it assumes when deposited in the glands is oftentimes the most formidable manifestation which has to be encountered. In youth such developments are more frequently associated with similar ones, especially in one or more of the internal organs of the body. Louis mentions that tuberculous disease seldom or never occurs in the external glands after the age of fifteen years without appearing in the lungs. This well known law, as it has been called by many English writers, is, however, I am convinced, one that is untenable without numerous exceptions. I have had considerable opportunities of observing cases which have proved the incorrectness of this deduction, and although I do not mean to avow that the association of glandular and pulmonary tuberculosis never coexists after the age of fifteen, still I cannot admit, so far as my own experience goes, that it is a compulsory and infallible, at least to all physical signs, combination. Cases have lately particularly impressed this fact on my mind, and, I believe, there are many whose opportunities of observation are much greater than my own who have arrived at the same conclusion.

On the other hand, it by no means follows that, because the lungs are seriously involved in tuberculous disease, the same morbid condition should be extended to the lymphatic ganglia. I have made particular inquiries from sources of large experience regarding this point, and I find that it is comparatively rare to see in the adult a tuberculous condition of the external lymphatic glands following the development of phthisis pulmonalis. My friends, Drs. Pollock, Cockle, and Webb, whose testimony is much to be valued, inform me that my deductions are in harmony with their own; while from the very latest work on *Diseases of the Lungs* by a well known and distinguished authority (Dr. Walshe, 3rd ed., 1860), I peruse the following observations, which tend to confirm my own convictions. "The external lymphatic system," writes this physician, "on the whole, rarely undergoes tubercularisation in the phthisical adult. An antagonism, not absolute but tolerably well marked, seems to exist between the external and internal tubercularising processes. In corroboration of this, I have known the cervical and axillary glands greatly enlarged in phthisical people rapidly fall to the natural size without suppuration or symptom of any kind, while pulmonary tubercularisation rapidly advanced."

Although the two forms of tuberculous manifestation—pulmonary and glandular—are not of frequent occurrence, still they do sometimes appear in concert. One of the most distressing cases of this description which has come under my notice is the following.

I was asked lately by my brother, Dr. William Price of Margate, to see a patient, a girl, about nineteen years of age, who for years had been in a delicate state of health, and a sufferer from glandular swellings of the neck. At the time I saw the patient she was in the last stage of consumption, the right lung was filled with purulent matter, which was constantly coughed up. In addition, the cervical glands on both sides were so enlarged as completely to mask the contour of the neck and shoulders. There was no doubt of their tuberculous character, for the pain, acute nature of the suffering, and the contents of some of the glands which had been opened, fully indicated the true type of the affection.

Under the age of fifteen, however, pulmonary phthisis frequently occurs in concert, or soon manifests itself, after recognition of glandular tuberculosis. Indeed, many of the deaths which have occurred at the Children's Hospital at Margate during the past six or eight years, have been mainly