follows indulgence; the struggle to resist temptation; the awful craving for the stimulus to which the stomach has been accustomed. Nor must we forget the pain with which the sufferer discovers his altered position in society, the disorder in his affairs, the sorrow of those nearest and dearest; nor his prostrate dread of apoplexy, epilepsy, paralysis, or delirium, to which he knows that his evil habits will in time subject him.

In the attacks of delirium to which such patients are subject, we have convincing proof of the extent to which the nervous power has been lowered. Exhaustion is very readily induced; and the patient may even die suddenly, under the influence of any cause of a debilitating nature. Such an event happened under my own notice, in a patient whose case had been misunderstood, and to whose temples leeches had been applied.

Now, in cases of nervous disorder from intemperance, opium holds a prominent place among remedies; with the restrictions, however, which I shall lay down in connexion with delirium tremens; and, if we be called upon to administer to the patient before his habits have become confirmed or have been indulged in for a long time, opium will not only relieve his immediate sufferings, but, what is of even greater importance, will reinforce his mind to struggle against his dangerous tendency.

On the other hand, at a late period, opium can but palliate; the effect of the prolonged operation upon the nervous centres of the influence of alcohol, is to induce a state of wasting and degeneration, as evidenced by the increased quantity of sub-arachnoid fluid found in the cranium after death, by the shrunken and separated convolutions, the thickened and opaque membranes; and such wasting it is out of our power to repair. You may recollect a man who was in attendance for a considerable time, who exhibited a fair specimen of the effects of "soaking". He was anæmic, and had lost flesh considerably; and his expression indicated much nervous worry, and a tendency to insanity. He suffered from disturbed sleep; and from depression and irritability, with fits of excitement, by day. He derived a certain amount of benefit from opiates and tonics; but his improvement was not sustained, and he has now ceased to attend at the hospital. It may be that he suffered from the teetotal discipline, which it was necessary to enforce as the only means of averting a greater evil.

[To be continued.]

THE MASSACRE OF THE INNOCENTS. Five ships of the most approved transport quality, and the property of the most favoured Government contractors, started from the English shores, full laden with helpless women and children, anxiously looking forward to a joyous meeting with their natural protectors at the end of a prosperous voyage. They were going at the public expense, and it was the wish of the public that every care should be taken both of their comfort and safety. Important officials, high, responsible, and well-paid, were to select the ships, to see that the stores were of the best quality, and the berths and bedding comfortable and well ventilated; and so well did they perform their duty, that, we learn, out of these five human cargoes, no less than two hundred and seventy children have perished on the voyage, and been thrown overboard. Probably, since the days of King Herod, so extensive a "Massacre of the Innocents" has never been heard of in history. Now, this is a matter which must at once be taken in hand, and in earnest, by those military members of the House of Commons who have any pretensions to the proud title of the "soldier's friend". It will not do to have it left to a mere inquiry by a civilian member, to be evasively answered in the usual heartless, unintelligible official manner. The service is, no doubt, indebted to Mr. Alderman Salomons for doing, in the case of the *Accrington*, what no military member of the House of Commons thought himself called upon to do; but, still, the further ventilation of the matter must not be thrown upon the shoulders of the worthy alderman. This is a military question, and we call upon some military member—we care not whether on the ministerial or opposition side of the House—to take up the case of these poor slaughtered children with a will. The revised military estimates will give the opportunity, and it must not be exhausted in a mere question which can lead to no practical results. Means must in some way be found for safely and comfortably transmitting our soldiers and their wives and children to the various stations all over the world; and it must not be said that what is done in the case of emigrant ships daily by private merchants is to remain a problem impossible of solution to the officials of Her Majesty's Department of War. (*United Service Gazette.*)

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.S.,

PHYSICIAN TO KING'S COLLEGE HOSPITAL; PROFESSOR OF PHYSIOLOGY
AND GENERAL AND MORBID ANATOMY IN KING'S
COLLEGE, LONDON; ETC.

LECTURE V.

URINE IN DISEASE. SOLUBLE SUBSTANCES PRESENT IN URINE IN DISEASE WHICH DO NOT EXIST IN THE HEALTHY SECRETION. ALBUMEN. *Of Detecting the Presence of Albumen; Tests; Nitric Acid; Heat; Anomalous Results in Employing these Tests; Apparent Presence of Albumen in Urine which contains none; Phosphate resembling Albumen; Uric Acid resembling Albumen; Cases. Apparent Absence of Albumen in Urine which contains a large Quantity; Cases. Cause of the Precipitation of Albumen by Heat being prevented by a Trace of Nitric Acid. Other Tests for Albumen. On Estimating the Quantity of Albumen. Peculiar Substance in Urine allied to Albumen. Of the Importance of Albumen in Urine in a Clinical point of view. Dropsy in Disease of the Kidney. BILE.* *Tests. Nitric Acid. Heller's Test. Pettenkofer's Test. Yellow Colour of the Cells, etc., in the Urinary Deposit. On Estimating the Quantity of the Biliary Acids in Urine. SUGAR. General Characters of the Urine in Diabetes. Diabetic Sugar. Tests for Diabetic Sugar; Moore's Test; Trommer's Test; Barreswill's and other Solutions. On Testing for Sugar when only Traces are present. Circumstances interfering with the Action of Trommer's Test. Of the Yeast Test. Maumené's or the Perchloride of Tin Test. Bismuth Test. Of Estimating the Quantity of Sugar; volumetrically; by Fermentation; by Dr. Garrod's Method; by the Polarising Saccharimeter. Circumstances under which Sugar is excreted in the Urine. Analyses of Urine in Diabetes. OTHER SOLUBLE SUBSTANCES WHICH ARE NOT PRESENT IN HEALTH. LEUCINE. TYROSINE. INOSITE. ACETONE. CYSTINE.*

[Continued from page 299.]

Of the importance of Albumen in the Urine in a clinical point of view. In the majority of cases, in which the urine contains a very large quantity of albumen, and especially if the urine be of specific gravity of 1020 or higher, the inference will be that the case is an acute one, and that this large quantity of albumen has not been passing from the kidney for any length of time. By far the majority of these acute cases recover if the patients are placed under favourable circumstances. In some instances, however, the circulation through the kidney becomes more and more obstructed; the urinary constituents accumulate in the blood and seriously impair the various actions going on in the body, and especially affect the nervous system; and death results, probably preceded by coma and sometimes by convulsions. Occasionally pus is found in considerable quantity in the uriniferous tubes. Sometimes the acute stage passes off, and the albumen, although it diminishes in quantity, does not entirely disappear from the urine, and the acute attack afterwards proves to have been the commencement of chronic kidney-disease.

If the quantity of albumen be small, amounting merely to milkiness or opalescence when heat is applied, or nitric acid added to the urine, and especially if the urine be pale and of specific gravity 1012 or lower, we should suspect that the lesion giving rise to the escape of the albumen was chronic, and would ultimately destroy life. If the proportion of urea to the other constituents of the solid matter were large, we should form a more favourable opinion than if the percentage in the solid matter were very much less than in health. In the latter case, a great part of the renal structure would probably be involved; but, in the former, there would be reason to think the disease had only affected a certain number of the secreting tubules. There are, however, some exceptions to these general statements. Patients have passed small quantities of albumen in the urine for many months, and it has afterwards disappeared.

In other patients the progress of the disease is exceedingly slow. I have known a man pass urine of the character above mentioned for upwards of twelve years; and I believe that this might go on for twenty years, or even longer, the patient perhaps dying at last of some other malady. Under favourable circumstances, the life of patients suffering from certain forms of chronic kidney-disease may undoubtedly be prolonged for years; but it must always be borne in mind that such persons are more likely to suffer from exhausting influences, cold, fatigue, etc., than others; and an attack which would cause no alarm for the safety of a man previously in good health, might be rapidly fatal to them.

It is very important that the medical officers of Life Insurances should be aware that there are many instances of persons having chronic disease of the kidney, who are not themselves aware of it. Neither is there in many of these cases anything in the appearance or history of the person that would cause the physician to suspect the true nature of the case. The discovery of albumen in the urine, or of casts in the deposit, is sometimes the only point which leads the practitioner to a correct knowledge of the doubtful nature of the life. Now, if one of these persons experienced a severe attack of catarrh, his life might be endangered; and any exposure to cold would be very likely to set up acute inflammation of the kidneys, already impaired by disease, and thus prove fatal. The only way to discover such a condition, is to institute a careful examination of the urine in every case; but, to carry this out practically, it must be confessed there are many difficulties and objections. A microscopic examination of the deposit in the urine will probably throw much light upon the case, and enable us to diagnose the condition with much greater precision than is possible from a mere chemical examination. We cannot be too cautious in arriving at a prognosis in these cases. Every circumstance connected with the individual case must be carefully considered, and the state of nutrition, the progress the disease has made in a given time, the state of other organs, the constitution of the patient, his circumstances, temperament, etc., must be passed in review. Even with the greatest care, we shall seldom feel justified in expressing any but a very guarded opinion as to the probable duration of life.

Albumen is always found in small quantity in urine containing pus. We shall therefore meet with it in cases of inflammation of the pelvis of the kidney (pyelitis), and in cases of inflammation of the bladder and of the mucous membrane of the urinary organs generally. Whenever blood is present in the urine albumen is detected; for, if blood-corpuscles escape from ruptured capillaries, a certain quantity of serum must at the same time pass through the same apertures. The colouring matter of the blood is sometime passed in urine in a state of solution; but in this case, also, a certain quantity of albumen is present.

Dr. Bence Jones detected albumen in the urine of a patient who passed spermatozoa. The urine passed in the morning contained spermatozoa and albumen. The evening specimen contained neither. On a subsequent examination, no albumen could be detected.

I have detected albumen in many cases of pneumonia during the period of hepatisation of the lungs. It is present, also, in the specimens of urine first passed after the period of suppression in cholera. In some cases of acute rheumatism with pericarditis it is observed; and it has been occasionally detected in continued fever. In puerperal fever it is often met with, and in puerperal convulsions it is almost constantly present. Dr. Lever found that it was absent in only one case out of fifty. The pressure of the gravid uterus is probably a cause of the albuminous urine met with in some cases of pregnancy, but it cannot always be referred to the same cause, for it occurs at an early period of pregnancy, when the uterus is too small to exert much pressure. Dr. Tyler Smith considers that it is to be accounted for by an influence exerted upon the nerves, in those cases in which it is not connected with organic disease. After intermittent fevers albumen frequently escapes in the urine. In cases in which any physical impediment to the return of blood in the emulgent veins or inferior cava exists, and in some cases of obstructed portal circulation, as in cirrhosis of the liver, traces of albumen may be detected in the urine. In anæmia, and in cases of dropsy depending upon an impoverished state of the blood, albumen is often passed. Sometimes a large quantity of blood extractive matter is also present. After long continued hæmorrhages, when dropsy occurs, we not unfrequently find albumen in the urine. In these cases it does not depend upon kidney-disease, but upon the state of the blood. Just as serum escapes from the capil-

laries of various tissues of the body, it is prone to transude through the renal vessels. Lastly, in persons who have suffered for many years from affections which produce alterations in the capillary walls, albumen may pass off in the urine; and towards the termination of exhausting diseases it is frequently present.

In those cases in which its presence depends upon obstruction to the circulation in the kidney, the impediment may be *functional or temporary*, or it may be *organic and permanent*. As examples of the presence of albumen depending upon temporary congestion, may be adduced certain cases of pneumonia and cholera, cases of acute dropsy, and of dropsy consequent upon scarlatina, with many others. Fatty degeneration and chronic nephritis may be brought forward as instances of structural disease, giving rise to such impediment to the circulation of the blood as to cause albumen to transude through the capillary vessels.

In the majority of cases, the vessels of the Malpighian tuft doubtless form the precise seat of the escape of albumen; but there are reasons for believing that albumen sometimes passes from the capillaries surrounding the convoluted portion of the uriniferous tubes, and in some instances from those in contact with the straight portion. (*Archives of Medicine*, vol. i, p. 300.)

In most cases in which albumen occurs in the urine, casts of the uriniferous tubes are also found; for with the serum a certain quantity of coagulable material transudes, and this becomes solid while it lies in the tube, of which it thus takes a mould, and entangles in its meshes any loose bodies, as particles of epithelium, etc., which may happen to be in the tube at the time. In the first series of cases alluded to, casts are often absent, or, if formed, they are perfectly transparent. On the other hand, where the structure of the kidney is altered, the casts often afford evidence of the nature of the lesion. We shall consider this part of the subject in the next lecture. Albumen is, however, often present without any deposit, so that for its detection we must rely solely on chemical tests.

Bile. When much bile is present in urine, it gives to the secretion a very dark yellow colour, which is even more distinct when thin layers are placed upon a perfectly white surface, as on a plate, than where a considerable bulk of urine is examined. This arises from the presence of the colouring matter, which has received the name of *biliverdin*. It may be completely removed from any solution containing bile by causing it to filter through a layer of charcoal. The presence of bile in urine is commonly observed in cases of jaundice. From some cause or other, as from pressure upon, or obstruction of, the common duct, bile is partly or entirely prevented from escaping into the intestine. The gall-bladder and duct soon become distended by the accumulation of the secreted bile, which, finding no escape, is reabsorbed, no doubt, partly by the veins and partly by the lymphatics. It thus passes into the blood, and is partly deposited in the tissues and partly carried off in the urine. That scarcely any bile passes into the intestine, is proved by the pale colour, offensive odour, and clay-like consistence of the fæces. Cases of jaundice caused by a temporary obstruction in the common duct are very common. The urine is often of a very dark yellow colour, and remains so for two or three weeks or a month, when the bile generally passes into the intestine by its normal channel, and the patient soon recovers. Small and occasional doses of mercury, with dilute acids, expedite the recovery of these cases of simple jaundice. In cases depending upon permanent closure of the duct, as from the pressure of a tumour, impaction of a gall-stone, etc., the jaundice continues, and bile passes off in the urine as long as the liver retains the power of secreting bile. The presence of bile in the urine is due to the kidneys taking upon themselves to a certain extent the office of the liver when the healthy secreting functions of this gland are interfered with.

Several tests have been proposed for the detection of bile in urine. The efficacy of some of these tests depends upon a change being produced in the colouring matter; that of others upon alterations of the resinous acids.

For Detecting the Colouring Matter of the Bile.

1. **The Nitric Acid Test.** This may be applied in two ways.

(a.) A few drops of the biliary urine are to be poured upon a white plate, and a drop of nitric acid allowed to fall upon it. As the acid gradually mixes with the surrounding fluid, a play of colours, commencing in green, passing through various shades, and terminating in red, will be observed.

(b.) A portion of the urine is to be placed in a test tube, and treated as before. If much bile be present, a bluish-green colour at first appears. This is succeeded by various shades, until the play of colours terminates in red.

2. *Heller's test* consists in adding to the suspected urine a few drops of a solution of albumen, and, after agitation, a little nitric acid is added. If the colouring matter of bile is present, the flocculi of albumen which are precipitated will possess a dull green or bluish colour.

Not unfrequently, the albuminous flocculi, when thrown down by nitric acid, are more or less coloured in consequence of the action of the nitric acid on the colouring matter of the urine (uroxanthine). The colour is sometimes reddish, sometimes of a bluish colour. This change is not unfrequently observed in albuminous urine; and Dr. Basham considers it a condition of very unfavourable significance, and states that he has met with it most frequently in the acute forms of renal disease (*On Dropsy Connected with Disease of the Kidneys*, p. 48). This reaction must not be mistaken for that dependent upon biliary colouring matter.

3. After exposing urine to the air for a day or two, crystals of triple phosphate are formed, as is well known. If bile pigment be present, these crystals have a yellow tinge (Hassall, *The Urine*, page 27).

The three tests just described enable us to detect only the colouring matter of the bile.

4. In urine containing bile, the precipitate produced by the addition of acetate of lead has a yellowish colour.

For Detecting the Biliary Acids.

5. *Pettenkofer's Test.* If albumen be present, this must be coagulated, and separated by filtration. The urine is to be treated with about two-thirds of its bulk of strong sulphuric acid, which is free from sulphurous acid, adding the acid drop by drop, to prevent the temperature rising much above 100°; a little sugar or a drop or two of syrup may now be added to the mixture, and in the course of a minute or two a violet tinge will occur if bile be present. This test is not perfectly satisfactory, since it is very easy to obtain a reddish colour by the action of the acid upon the sugar if albumen and no bile is present; moreover, oil of turpentine, oil of lemons, and of cloves, with other substances, yield similar results. In all these cases, however, the colour is not bright like that produced when bile is present. The action of the sulphuric acid on the sugar alone produces a brownish-red, but this cannot be mistaken, as the colour is very different from that developed by bile. I recommend everyone to become familiar with these colours, by going through the experiments for himself by daylight with a diluted solution of bile.

The method of applying this test has been modified by Dr. Felix Hoppe, whose plan answers exceedingly well, and is so delicate that the smallest quantity of biliary acid can be detected with the greatest certainty. The urine suspected to contain bile is to be treated with excess of milk of lime, and boiled for half an hour. The clear fluid obtained by filtration is evaporated nearly to dryness, and then decomposed with excess of strong hydrochloric acid. The mixture is to be kept boiling for half an hour, and the acid is to be removed from time to time, to prevent the spurting which would occur if the mixture became too concentrated. When completely cold, the mixture is to be diluted with from six to eight times its volume of water. The turbid solution is to be thrown on a filter, and the resinous mass washed until the water runs through quite colourless. The insoluble mass is next to be dissolved in spirit containing 90 per cent. of real alcohol, decolorised with animal charcoal, again filtered, and evaporated to dryness over a water-bath. The yellowish resinous residue is pure *choloïdic acid*. By warming it, it emits the peculiar musk-like odour. It is to be dissolved in a little caustic soda and warm water, a little sugar added, and three drops of concentrated sulphuric acid are allowed to fall slowly into the mixture. The resinous acid is at first precipitated; but afterwards the flakes adhering to the glass are slowly dissolved by the addition of more sulphuric acid, and a perfectly clear fluid, of a beautiful dark violet colour, is produced. (*Virchow's Archiv.*, vol. xiii; *Archives of Medicine*, vol. i, p. 346; Abstract of Kühne's Paper on *Icterus*, by Dr. G. Scott.)

6. *Evidence of Bile Obtained by Microscopical Examination.* If the urine contain any epithelial cells from the kidney, as is usually the case, microscopical examination of the deposit will at once show the presence of bile, as the cells have a bright yellow tinge. The existence of this tinge proves conclusively the presence of bile colouring matter; but its absence cannot be

regarded as satisfactory proof of the urine being free from bile. In cases of kidney disease, when bile is present in the urine, the casts, when examined in the microscope, are seen to have a deep-yellow tinge.

[To be continued.]

Original Communications.

ON THE PREVALENCE AND SEVERITY OF SYPHILIS IN THE BRITISH ARMY; AND ITS PREVENTION.

By GEORGE R. DARTNELL, Esq., Inspector-General of Hospitals, H.P.

THE perusal, in the BRITISH MEDICAL JOURNAL of 25th February last, of a report of an interesting paper by Mr. William Acton, on the "Rarity and Mildness of Syphilis amongst the Belgian Troops quartered at Brussels, as compared with its Prevalence and Severity amongst the Foot Guards in London", induces me to offer a few observations on the prevalence of syphilis in the British army, and its possible prevention or mitigation.

From the opportunities afforded me by a service of upwards of thirty years as a medical officer in the army, I am enabled to endorse the statements of Mr. Acton as to the frightful extent to which not only the Foot Guards, but the whole military force of the empire, is paralysed by this foul disease; and to express a decided belief that it is, to a certain extent, preventable, or at least capable of considerable mitigation.

I am not in a position now to refer to documentary or statistical evidence to prove the truth of this assertion, or to shew the actual extent to which syphilis prevails in the army generally, or its comparative prevalence in the several commands at home and abroad, and in the different arms of the service; nor is this necessary to my present purpose, for the fact is well known. It is sufficient to state that a very large proportion of our best and most efficient soldiers are constantly confined to hospital, at heavy pecuniary loss to the state, and loss of efficiency to the army; while considerable numbers are annually lost to the service altogether, by deaths and invaliding, from this loathsome disease. In the large garrisons of the United Kingdom, this is especially the case; and the great depôts for recruits, such as Chatham, are the fertile hotbeds where syphilitic disease is sown broadcast amongst the young soldiers. Many of these poor fellows carry abroad with them the seeds of the disease, either undeveloped, or but partially eradicated by a short treatment in hospital, to be germinated under the debilitating heats of a tropical sun, unfolding, at the same time, the hereditary and previously hidden horrors of scrofula and phthisis. Numbers of such unfortunates perish annually in our colonies and India; while I have seen many, in the General Hospital at Chatham, brought back as invalids, wasted to skeletons by the frightful complications of these terrible maladies—the most wretched, miserable, and loathsome objects that imagination can depict.

As a means of checking the spread of venereal disease in the army, Mr. Acton suggests that "all parties concerned should offer an asylum and cure for the women who disease the soldiers", and states that the Admiralty had very wisely voted £1800 for building wards at Portsmouth for the treatment of prostitutes, and £500 a year for "the present maintenance of the system". This is certainly a step in the right direction. The only wonder is why the experiment was never tried before; and I cannot conceive an objection to the plan being extended to all the large garrisons and camps in the kingdom. The expense of such small hospitals would be more than met, I am confident, by a saving in the two great sinews of war—money and muscle—from resulting health and efficiency to the army. There are persons, no doubt, who would raise objections to this system, as tending to the encouragement of vice, and a premium on prostitution. Such persons, however, might be reminded that these hospitals would open a new field of labour to the pious and philanthropic, who would here meet many of the unfortunate fallen only too happy, on the bed of sickness and suffering, to listen to the soothing words of advice and consolation, and to be led, by an awakened sense of their sin and degradation, to return from the paths of vice to a life of repentant innocence, renewed in soul as well as in body.

At the period of my service in India, a lock hospital existed in most, if not all the large European garrisons; and possibly