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A PAPER
ON
RENAL DROPSY,

Illustrated by Cases and a Dissection,

READ BEFORE THE
MEDICAL & SCIENCE
SENIOR PHYSICAL SOCIETY,

Guy's Hospital,

(T. GREENWOOD, Esq. PRESIDENT)

SATURDAY, FEBRUARY 7th, 1835,

BY JOHN ANDERSON,

(LATE CLINICAL CLERK, GUY'S.)

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A PAPER

RENAL DROPSY

PRESENTED BY GEORGE AND A. DUNN

READ BEFORE THE

SENIOR PHYSICAL SOCIETY

GROUP'S HOSPITAL

(T. GREENWOOD, F.R.S. PRESIDENT)

LONDON: FEBRUARY 1884

BY JOHN ANDERSON

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TO
DR. BRIGHT,
(OF GUY'S HOSPITAL)
IN ADMIRATION OF WHOSE UNWEARIED ZEAL AND SUCCESS IN
PROMOTING THE ADVANCEMENT
OF
MEDICAL SCIENCE
AND THE
PROFESSIONAL KNOWLEDGE OF THE STUDENT,
THIS PAPER ON RENAL DROPSY
IS,
WITH THE MOST PROFOUND RESPECT AND GRATITUDE,
DEDICATED,
BY HIS VERY OBLIGED
AND VERY OBEDIENT
HUMBLE SERVANT,
THE AUTHOR.

TO

DR. BRIGHT,

(OF BRISTOL HOSPITAL)

IN RECOGNITION OF HIS DEEPLY INTERESTED RESEARCH AND SUGGESTIONS IN

PROMOTING THE ADVANCEMENT

MEDICAL SCIENCE

AND THE

PROFESSIONAL KNOWLEDGE OF THE STUDENT

THIS PAPER ON RENAL DROPSY

WITH THE MOST TENDER REGARD AND GRATITUDE

DEDICATED

BY HIS VERY OBLIGED

AND VERY GRATEFUL

WILLIAM WATSON,

THE AUTHOR.

Mr. President and Gentlemen,

THE subject of dropsy is one of considerable interest and importance. It is the consequence of disturbed balance between exhalation and absorption, and arises from so many and various causes, and is accompanied by, or dependent on, such extensive functional and organic derangement, as to render its presence an object of great anxiety to the physician, and its pathology, origin, and treatment, matter of considerable importance to which to direct his attention. In its different forms of acute and chronic, idiopathic and secondary, it is of frequent occurrence, and is generally attended with danger; though this will, of course, vary with the extent, situation, and perhaps more particularly the cause of the effusion and its combination with organic disease. The acute and idiopathic forms are the most under our control, though, in the former, connecting circumstances will materially influence our judgment. Thus, then, the prognosis is for the most part unfavourable, and more especially as there exists, in many persons, a true hydropic diathesis, and this occurring generally in those whose constitution is weakened by disease, or debilitated and broken down by intemperate habits.

It is scarcely necessary to observe, that dropsy takes place in two very opposite states of the circulatory system and constitution generally, and in each state depends on various causes. We find it occurring as the result of debility simply, or of mechanical pressure, or of some thoracic or abdominal disease; and accompanied by relaxation of the whole system, and a want of power in the exhalant vessels. Very frequently, however, it occurs in a totally opposite state, and, instead of debility and relaxation, we have increased vascular action going on, and an active inflammatory condition of the system, attended, though not necessarily, by fever: this form has been called acute inflammatory or arterial dropsy. Thus, then, we arrive at two grand divisions of dropsy, according to the sthenic or asthenic state of the system in which it occurs:

this will be found nearly analogous to Dr. Blackall's two divisions of dropsies according as the urine is or is not coagulable. The state of the urine in dropsy generally should always be regarded; in the latter form, though depositing nothing by heat, it presents certain appearances to which it is important and necessary to attend. In some cases it will be found clear, of a light colour, and copious in quantity; in others, diminished in quantity, but healthy in appearance; in others again (especially, I have observed, where there has been more or less disease of the heart), it is natural in quantity, but grows turbid on cooling, and deposits a copious light-coloured sediment, which is dissolved by heat. Lastly, the urine will be found scanty, and depositing a copious sediment more or less lateritious: this I have generally observed when diseased liver has been the cause of the effusion.

The acute or inflammatory dropsy is frequently attended by the presence of albumen in the urine; a circumstance first noticed, and commented on nearly twenty years ago, by Dr. Blackall, and still more recently by our talented physician, Dr. Bright, who has made this a subject of deep investigation, and whose labours and conclusions have rendered it an object of the greatest interest and importance to the inquiring physician. This latter gentleman has collected together an immense number of cases, and has detailed their history, symptoms, and morbid appearances, with extreme minuteness, and to him belongs the merit of having first pointed out organic structural changes in the kidney, as referable to the existence of anasarca; and then again connecting this with the presence of albumen in the urine. No argument or theory is adduced but what is substantiated by what must be considered as facts in medicine—viz. reports of cases*; and no plan of treatment is followed, or proposed, but what patho-

* Vide Reports of Medical Cases, by Dr. Bright, vol. i.; also a critique on the third volume, in the Med. Gazette for May 19, 1832, p. 229, col. 1.

logy would justly indicate; and before these theories can be overturned, or these connexions and relations disproved, an equal mass of evidence must be brought into the scale, and pathology must be as intimately connected with an opposite train of reasoning, as in the cases just alluded to. I am quite certain, that if this subject were not treated so superficially by many, its importance would be more evident; and from experiments, I am sure that the continued appearance of albumen in the urine, unconnected with dropsical effusion, is by no means so constant an occurrence as is usually supposed, but that connected with anasarca it very frequently takes place, and that when present it should always be an object of great anxiety, as indicative of extreme mischief and danger. It is this form of dropsy (to which Dr. Bright has suggested the name of renal) that I have ventured to select for the present discussion, illustrating it as far as possible by cases that have recently occurred in this hospital, and more particularly by one that proved fatal, and which we had an opportunity of investigating after death.

Dropsical effusion, connected with albuminous urine, is induced by several causes, which predispose the kidney to suffer.

1st. Scarlatina.—In this case, the skin, from the previous eruption, is rendered very susceptible of cold, and its secreting function very much impaired; the kidneys sympathize, become functionally deranged, and serous effusion is the consequence. The urine will, in most cases, be found to be coagulable. Dr. Blackall relates about ten cases, illustrative of this, in five of which there was a bloody sediment in the urine. Dr. Hughes has found the urine albuminous in about twelve cases. Dr. Addison has frequently found it so, and further observes, that whenever this is the case, we may prognosticate anasarca*. This anasarca is truly of an inflammatory nature, generally coming on suddenly, and when early and properly treated does well. Antiphlogistic remedies are to be employed, and great reliance (according to Dr. Blackall) is to be placed on digitalis, the efficacy of which is fully shewn in the treatment of the above-mentioned cases; these are related at full length in his valuable

treatise*. Dr. Wells also has given much valuable information on the nature and cure of this form of dropsical effusion†. Dr. Bright also observes, that "it is almost always accompanied by an obvious derangement of the kidneys, that the urine is frequently coagulable, and that there is more or less tendency to hæmaturia‡."

2dly. Abuse of mercury.—As to whether mercury has the power of producing a coagulum in the urine, and the propriety of its employment in renal cases,—on this I will observe hereafter, and shall merely now state that the anasarca arising from this cause is of a true inflammatory nature, and may come on either suddenly or gradually; the former being the most favourable. Antiphlogistic remedies are here requisite, and an immediate discontinuance of the mercury, supposing the patient to be undergoing a course of it. In furtherance of this I may notice the case of a man now in Lazarus Ward, who had always enjoyed good health until attacked with syphilis some months ago, and took a considerable quantity of mercury: before this time he never observed any swelling, but, shortly afterwards, his legs became anasarcous, and his urine very decidedly coagulable. Dr. Blackall also relates nine cases illustrative of this form of inflammatory anasarca, treated principally by antiphlogistic means.

3dly. Several other remote causes are given by Dr. Blackall, as gout, the improper exhibition of bark and steel, topical injuries and inflammations (a rare cause), unsoundness of the digestive organs, which impairs the nourishment of the body and vitiates the blood; drinking too freely of cold liquors when heated (two cases illustrative of which are recorded by Dr. Blackall, which recovered under the use of bleeding and antiphlogistic remedies). The last causes to which I shall advert are those of most frequent occurrence; they were those, I may mention, that prevailed in the case to which I wish more particularly to call the attention of the Society;—I mean the exposure to cold and wet, and the free use of spirituous

* Vide Dr. Blackall's work on the Nature and Cure of Dropsies.

† Vide a paper by Dr. Wells, in the third volume of the Medical and Chirurgical Transactions.

‡ Vide Gulstonian Lectures, 1833, delivered by Dr. Bright; published in Med. Gazette, June 22, 1833.

* Dr. Addison's Lectures on Practice of Physic.

liquors, which some physicians have considered as capable of exciting a true dropsy; and certain it is that most of the renal cases which have occurred at this hospital lately are referable to these two causes, either separately or in combination: out of seventeen cases, sixteen were evidently thus produced. The sedative effects of cold and consequent deranged function of the skin, and the debility of constitution and irritation, induced by spirit-drinking, through the medium of the stomach, are well known. These causes predispose the kidney to suffer: this irritable organ sympathizing with the skin, a change in the renal secretion takes place, and, owing to checked perspiration, a vicarious discharge in the kidneys is produced: they become functionally deranged, and albumen appears in the urine; deranged function leads to disorganization; serum is effused first in the cellular membrane of the face, feet, and ankles; then gradually extending upwards to the thighs and abdomen; and the aching pain in the loins, the severe throbbing and lancinating pain in the head, and apoplectic tendency; the hard pulse, dry unspirable skin, and albuminous, dingy, and sometimes bloody urine, fully characterize and establish a true and exquisite case of renal anasarca.

I shall now proceed to detail the case just alluded to; it will be found to bear upon the description and symptoms just enumerated, and its sudden and fatal termination will shew how formidable a disease we have to combat with, and how, as yet, ineffectual are our remedies.

Frederick Crown, ætatis 47, a stout well-formed man, of leucophlegmatic appearance, was admitted into Luke's ward, December 3, 1834, under the care of Dr. Bright. He stated that he had been ill six months, and had been subject for several years to rheumatism, to an attack of which he dated the present illness. For the last four months he had suffered from anasarca, which first appearing in the face and ankles, gradually extended itself over various parts of the body. He was a man of very dissolute and intemperate habits, drinking freely of spirits, and exposing himself to many and varied changes of temperature. At the time of his admission the most prominent symptoms and appearances were as follows:—Countenance pale and sallow; eyes of a dull

pearly lustre, and eye-lids bloated and œdematous; lower extremities anasarcaous, and pitting on pressure; thighs œdematous, and hard on the inner side; cellular membrane of the scrotum and abdomen infiltrated and distended with serum; percussion gives no sense of fluctuation. Lancinating pain in the head, increased at night; oppression at the epigastrium, and pain in the region of the kidney, palpitation and dyspnœa following the least exertion. The action of the heart is labouring, and somewhat indistinct; rhythm tolerably healthy, and its beat diffused; pulse 104, with considerable jerk, regular; tongue dry, and skin unspirable; bowels freely open; urine of a pale straw colour, acid, coagulable by heat and nitric acid, specific gravity 1.015; gouty and rheumatic pains (principally in the hands and wrists) very much complained of.

R Vin. Ant. ℥xx. ex Jul. Ammoniacæ Acetatis, ℥j. sextâ quâque horâ.

R Pil. Scillæ c. Hyd. gr. x. omni nocte.

December 4th.—Pains very much increased; pulse 100, with some jerk.

Mittatur sanguis e brachio ad ℥xij. Applicetur Cataplasma lini lumbis bis in die. Omittantur Pilulæ. Pergat Mistura.

5th.—Blood drawn slightly buffed; pain in the loins relieved; that in the head increased; bowels rather confined.

C. C. nuchæ ad ℥x. R Ol. Ricini, 3vj. statim.

6th.—Going on more favourably; symptomatic pains better; gout and rheumatism troublesome; urine rendered only opalescent by heat; very coagulable, however, by nitric acid.

Pergat.

11th.—Pains in head and loins much increased: dyspnœa very severe; skin dry; pulse quick and hard, with some jerk; urine about natural in quantity, acid, and very coagulable before boiling. Mr. Stocker saw him, and ordered the following:—

R Pil. Camb. Comp. c. Cal. aa. gr. iiij. statim. C. C. lateri dextro ad ℥xii.

12th.—Pains rather relieved; skin dry; pulse incompressible; rheumatic pains more severe. Dr. Bright ordered the following:—

R Tr. Camp. Comp. 3ss. c. Vin. Colchici, ℥xx. et Liq. Ammon. Acet. 3ss ex Mist. Camph. ℥j. ter die.

R Hyd. Submur. gr. j. sextâ quâque horâ. Admov. Emp. Cantharidis sterno.

15th.—Pain in loins increased; dyspnoea great; tongue dry; skin hot; pulse strong; urine very coagulable, but rather diminished in quantity; bowels rather confined; feels nauseated from the medicine.

R Mist. Magn. c. Mag. Sulph. ℥iss. pro re nata sum.

R Sp. Æth. Nit. 3ss. c. Liq. Ammon. Acet. ℥ss. ex Mist. Camph. ℥j. ter die.

To this latter Mr. Stocker added on the following day—

Acet. Scillæ et Tr. Hyoseyami, aa. 3ss.

22d.—Has been a little improving up to the present time; but to-day the symptoms have recurred with their usual violence; great soreness of the loins complained of, and pain extending down the groin to the scrotum, with slight retraction of the testicle; also, a soreness and dryness in the throat, affecting deglutition, and causing a cough: these feelings probably owing to œdema of the glottis. Right hand puffy and œdematous; great thirst and heat of skin; tongue dry; pulse quick and incompressible; bowels regular; urine of the same appearance, acid, and coagulable.

Pergat.

27th.—œdema of upper extremities, and particularly of the right hand, very much increased; pain in the throat, and difficulty of deglutition, very severe.

Admov. Emp. Cantharidis gutturi.

R Pil. Scillæ Comp. gr. v. ter die.

R Liq. Ammon. Acet. ℥ss. ex Mist. Camph. ℥j. ter die.

30th.—Cough very troublesome; expectorates some viscid mucus stained with blood; throat very sore; œdema of right hand increased; urine in good quantity, and very coagulable.

Pergat.

Jan. 5th, 1835.—Pain in the head has continued very severe; breathing rather easier; skin dry; tongue coated; pulse quick; slight difficulty in passing his urine, which is of the same character and appearance.

R Mag. Sulph. 3ss. c. Vin. Ipecac. ℥v. ex Inf. Gent. Co. et Inf. Rosæ Co. aa. 3vj. sextâ quâque horâ. Omittantur alia medicamenta.

He continued during the next week rather to improve, though the throat was

very sore, and the urine very coagulable. A few days afterwards (the day preceding his death) he was observed by Dr. Bright to be better in his general health; but towards evening his manner of speaking seemed rather singular and unusual; his breathing became more oppressed during the night, and he would not answer when spoken to. These symptoms and appearances continued to increase during the next morning, when, about half-past 11 A.M., he suddenly went off into a kind of apoplectic fit; his breathing became stertorous, eyes protruded, and pupils contracted; he foamed at the mouth, had convulsive startings, and the face was of a yellowish tinge.

He was ordered to be cupped behind the ears, a blister to be applied to the shaved scalp, and one grain of calomel to be taken every four hours.

He rallied, but had four more attacks of the same character, and a last one at 3 o'clock, when I was with him. The pupils were then dilated; the breathing was stertorous, and at long intervals; the face and hands were bedewed with a cold, clammy perspiration; and in a quarter of an hour he died.

An inspection took place twenty-two hours after death. For the following minute and interesting account of the post-mortem appearances I am indebted to Mr. Sibson:—

There was a general state of anasarca present all over the body, penis, scrotum, upper and lower extremities. On cutting into the cavity of the abdomen, which was exceedingly tumid and tense, upwards of a gallon of clear slightly yellow fluid escaped. Liver appeared to be remarkably healthy; gall-bladder nearly filled with dark greenish bile. Spleen small; numerous white opaque spots on its surface; substance healthy; Pancreas rather small; healthy. The small intestines were rather blanched on their surface; their appearance gave rise to the idea of their being invested with a false membrane, from which, however, they were quite free. The stomach: towards the cardiac extremity, and along the greater and lesser curvature, the mucous membrane was soft, and easily separated from the middle coat. The mucous membrane of the pyloric extremity, for two or three inches from the orifice, was hard and granular; the pylorus itself was nearly half an inch in thickness, dense and white in its

structure. The duodenum, for two or three inches at its commencement, had its mucous membrane hard and minutely granular. The rest of the small and the large intestines appeared perfectly natural. The left kidney was of little more than half the usual size, slightly lobulated on the surface, and of a much firmer texture than natural. The investing cellular membrane adhered pretty firmly to the proper tunic, below which were seen eight or nine cysts about the size of a pea, but varying a little in magnitude, and filled with clear fluid. One cyst of the same size was opaque. The proper tunic was readily separated from the surface of the kidney, which was covered with minute white granulations, of the size of small pins' heads; they were clearly contrasted with the light brown colour of the cortical texture. There were one or two white spots, about half the size of a silver penny, near the entrance of the vessels. On cutting into the kidney, its substance was found to be hard, and similarly granulated to the surface in its cortical part. One or two white spots were seen on the tubular substance; and the cortical part was exceedingly narrow, the tubular structure appearing to be of rather more than its natural dimension. The infundibula and pelvis presented nothing remarkable. The vessels of the right kidney were injected; the veins with blue, the arteries with red size. The veins presented numerous stellæ on the surface. The arterial injection shewed itself in numerous small packets in the cortical substance; but the whole of the tubular, and greater portion of the cortical, part remained uninjected. The right kidney was similar in every respect to the left. The bladder was filled with urine.—Thorax: the cavity of the pericardium contained about half a pint of pretty clear, straw-coloured serum. The pericardium itself presented nothing remarkable. Heart: the cavity of the left ventricle was about four times its usual size; it was firmly contracted, and presented very great hypertrophy, the walls being about three-fourths of an inch in thickness. The mitral valve and semilunar valves of the aorta were quite healthy. The calibre of the aorta was nearly double its usual size. The right ventricle was considerably dilated, and its walls were thinner than natural. The right lung was free of pleuritic ad-

hesions; it was crepitant throughout, and natural. The left lung was considerably congested and œdematous, especially at the posterior part; it was crepitant throughout. The pleura pulmonalis, on the left side, was universally adherent to the pleura costalis. The cavity of the pleuræ contained about a pint of straw-coloured fluid.—Head: There was very considerable sub-arachnoid effusion on the surface of both hemispheres and at the base of the brain. The arachnoid presented small and slight opacities in numerous points. The pia mater was readily separated from the convolutions, and from their surface a thin pellicle of cineritious matter could be easily peeled off. The lateral ventricles were distended with about two ounces and a half of clear fluid. The carotids were at points opaque, and semi-cartilaginous.

On cutting into the knee-joints they were each found to contain about an ounce and a half of semi-opaque synovia, mixed with loose flakes of a white matter, having a gritty feel. The articular surfaces of the cartilages of the femur, tibia, and patella, in both joints, were covered with a white gritty substance, and the synovial membrane had imbedded in it, at various points, masses of a calcareous concretion, the largest of which was about an inch in length, and half an inch in thickness. The cartilages were of nearly double their usual thickness, much less firm in their texture than natural, and of a brownish colour. The elbow-joints contained a similar secretion; but the surface of the shoulder-joints was quite smooth, as also the phalangeal articulation of the right great toe*.

A portion of the effused fluid from the different cavities was analysed by Dr. Barlow, who has been kind enough to favour me with an account of the process:—

“An aqueous extract was obtained from each of the fluids, and from this extract an alcoholic one was procured, absolute alcohol being used for the latter purpose: all the evaporations were conducted at a temperature not exceeding 200° F. Of each extract a syrup was made by the addition of a few drops of distilled water; and to each of these syrups were added a few drops of strong

* Preparations of the injected kidney and diseased joints are carefully put up, and preserved in the museum of the hospital.

nitric acid. The syrup from the effused fluid of the brain, as also that of the abdomen, yielded within two hours a considerable crop of foliaceous pearly crystals, of an arborescent form. That from the pericardium, as also that from the pleuræ, yielded a very small crop of crystals, after a much longer time."

Dr. Barlow has strong reasons for believing that these crystals were nitrate of urea.

The case just related, then, presents many particulars of practical interest and importance.

1st, The remote cause of his complaint—his intemperate habits, and consequent exposure to changes of temperature; perhaps, also, his predisposition to gout. The manner in which these debilitating agents operate has been fully explained previously.

2dly, The most prominent attendant symptoms. Of these, perhaps the pains in the head and loins were the most universal. The affection of the head, certainly, was not particularly well marked in this case during its course; but it is generally of a very distressing character, and is described as either a lancinating, darting, throbbing pain, occurring more commonly in the fore part of the head, or a feeling of constriction and tightness, as if an iron hoop were bound round very firmly; it comes on generally towards evening, and relaxes towards morning, going on in this way for some time, and then being absent for days together; it is the symptom usually most complained of, and certainly the one most distressing to the feelings of the patient. There are two patients now in the clinical wards who have just this character of pain; and I have seen it in them almost unbearable. Its acuteness is owing most probably to the inflammatory tendency of the body generally, and of the serous membranes in particular; perhaps also owing to the circulation of unhealthy blood. The pain in the loins was a well-marked symptom in this case; it was seated evidently in the kidney, and fully indicated the mischief going on there; whilst the post-mortem account corroborated it. He had cough, dyspnœa, and slight bronchial affection (frequent though not necessary attendants), for which the morbid state of the lungs and their adhesions fully accounted. He had palpitation; and the left ventricle of the heart was much hypertrophied. This

morbid occurrence is of much interest and importance, and one to which I shall more particularly advert in the pathological remarks.

With regard to the dropsical effusions, there were both ascites and anasarca. The existence of fluid in the cavity of the abdomen gave no sense of fluctuation during life, from the thickened oedematous state of the abdominal parietes. This form of effusion, in connexion with albuminous urine, is not of frequent occurrence. From the observations of Drs. Wells, Christison, Gregory, and Bright*, anasarca, local or general, appears to be much more intimately connected with this morbid state of kidney and urine. In this case, the tendency to anasarca was very great, it being almost general.

Sometimes this affection is only very slight, and there are cases now in the hospital where it is confined to the ankles only (and these scarcely pitting on pressure), or to the face, giving it a bloated, sallow, puffy appearance. This latter is a very characteristic sign, and will often detect the disease. With regard to the œdema of the face, this is sometimes very great, and particularly so early in the morning; the eyelids and cellular membrane, more especially in the direction and extent of the orbiculares palpebrarum, are puffed, sometimes so as to completely obstruct vision. Imperfectness of vision also occurs from another mechanical cause, viz. effusion of serum between some of the membranes of the eye; but whether this is really the case, or whether the brain itself is in some way affected, is not, I believe, quite ascertained; perhaps both causes may operate,—though in favour of the latter I have observed, that when the tendency to head affection is greatest (independent of any œdema), and the paroxysms of pain before described are most violent, vision is decidedly most impaired; and also that the power of vision has improved simultaneously with the cessation of the paroxysms, though the œdema of the face and general anasarca may have remained the same; and this latter affection I have sometimes, though not always, seen less where the head affection was the greatest. Now, supposing these pains to depend partly on any inflammatory state of the membranes of the brain, may the greater

* See the Cyclopædia of Practical Medicine, article *Dropsy*, p. 641.

effusion of serum in other and more distant parts modify, and to a certain extent lessen, this inflammatory action? And again, the cerebral paroxysms coming on worse at night, and the oedema of the face being greatest in the morning, may not this discharge of serum from the more superficial capillaries in some way relieve the congestion of the internal vessels?

Another prominent symptom in this case was the dry unperspirable skin, which is a frequent symptom in dropsy generally, perhaps more particularly so in the form now spoken of. It certainly must tend to keep up the irritation in the system; and an attempt to restore the function of the skin must be considered an important point—its re-establishment a favourable sign. The pulse was generally quick and incompressible, indicating an inflammatory state of body, and fully justifying a strict antiphlogistic regimen. The gouty and rheumatic pains that were complained of were much more severe towards the termination of the case, and though always a ground of complaint with him, were not an object of great attention, and could hardly be considered as having any thing to do with his dropsy, though now and then they do occur together, probably by the remote causes being so nearly allied. The urine was uniformly of a pale colour, and coagulable; and this leads me to make some remarks on the nature of albuminous urine in general. This kind of urine differs from all others in its property of coagulation to a greater or less extent by heat, by which we infer the presence of albumen, as no other proximate principle with which we are acquainted possesses this property. The coagulation varies in extent, probably in proportion to the severity of the disease; but this is by no means universally the case. Sometimes, on the application of a gentle heat, the urine becomes suddenly opalescent, and quickly curdles; at others, a thick scum forms at the top first, and remains there; and often a thick film passes suddenly through the heated liquid, and in a few seconds the whole becomes a tremulous milky mass. At an interval varying from a few seconds to two or three minutes, the whole of the albumen becomes precipitated, either in dense flakes or in curdled clots, and settles to the bottom of the tube. These phenomena

sometimes do not take place until the urine arrives at the boiling point, and sometimes a little evaporation is necessary. When there is a less quantity of albumen present, the urine is rendered at first only opalescent by heat, and after a time brownish bran-like flocculi are precipitated; sometimes, however, not until the application of nitric acid, which immediately deposits them. Again, nitric acid will occasionally only increase the opalescence, and after some time a brownish coagulum becomes deposited. On what does this brown colour depend? Is it any re-action of nitric acid, or is it the colouring matter of the blood? for I have generally noticed a precipitate of this description to exist in urine more or less dingy, and not in that which is of a pale straw colour. It is always necessary to apply the test of nitric acid, as some of the phosphates are precipitated by heat (according to Mr. Rees, from the decomposition of urea and generation of ammonia), and present the same appearance as albumen, and the application of the acid will re-dissolve them; whereas, if it were albumen, the opalescence and precipitate would rather be increased. Again, nitric acid will sometimes give a precipitate that will be re-dissolved by heat; this probably arising from the presence of the lithates. It is therefore obvious, that to prove correctly the existence of albumen, neither the test of heat or nitric acid individually can be sufficient; but when applied conjointly, and the precipitate given by the one is not re-dissolved by the other, the evidence of albumen is pretty certain and correct. There are other tests*, but unimportant as regards the present subject, as I think, should the two former powerful events fail, even though albumen be obtained by a more delicate test, the existence of much renal disease can scarcely be inferred. As far as I am at present aware, a lithate or phosphatic deposit, though occasionally happening, is by no means frequent, and has no connexion with the albuminous state of the urine. The colour of albuminous urine, and quantity passed, will be found to vary, being sometimes quite pale and straw-coloured, with no sediment, co-

* Bi-chloride of mercury and the acetic acid, with the ferro-prussiate of potass, are delicate tests of the presence of albumen.

pious in quantity, and of a ropy, very slightly unctuous appearance; at others presenting all varieties of shade, from a simple dingy to a dark reddish brown, or completely bloody appearance, each shade of colour being with or without more or less bloody deposit; the most frequent kind, probably, is the pale. These different forms of coagulation and varieties of colour I have had repeated opportunities of observing in the several cases that have occurred during the present clinical session. It would be highly important to know if these different appearances can be associated with different stages or forms of diseased action; if from them we can infer the state of disease actually present in the kidney, and consequently the danger to be apprehended; and lastly, if they can be considered any guide to our practice, as pointing out an indication of cure, and regulating the activity of our treatment. If such were the case, probably much good might be effected in the way of remedies; but from what has been written on this subject, and from my own experience, I should fear that such were not so. I have certainly seen equally bad and similar cases accompanied by totally opposite states of urine, both as regards its pale or dingy colour, its quantity, and the curdled, flaky, or flocculent nature, of the albuminous precipitate.

Resuming the remarks on coagulable urine in general: the specific gravity is said to be low. Dr. Bostock observes, that of 28 cases examined, the highest was 1.032, the lowest 1.006, the average 1.017. I have not myself seen it remarkably low: of 12 different cases, the highest was 1.020, the lowest 1.011, the average 1.018. It is said, that the lower the specific gravity, the more albumen there is; but this is not necessarily the case. Albuminous urine is almost always acid: out of 18 cases, 16 were acid; the other two were neutral. And when, in the course of renal disease, urine that has hitherto coagulated, and one particular day has not this property, will on that day generally be found to be alkaline or neutral. I have observed this to happen in three cases. This alkaline property, then, may be considered, perhaps, as a cause of the urine not coagulating; but whether it is that the re-agency of the tests is prevented, or that there really is no albumen present? Supposing the former to be the case, would the albumen be appreciable

by test if the alkali were neutralized*? If so, nitric acid in excess would probably be the best test that could be employed; it would both neutralize the alkali and precipitate the albumen. Dr. Wells has considered a deficiency of salts in the urine a cause of its non-coagulation. Dropsical urine generally, and albuminous urine in particular, I have found by experiment to be less prone to decomposition than otherwise diseased or healthy urine; it also contains but little urea, and this Dr. Bostock considers may be a cause for the tardiness of putridity.

Blood drawn from patients labouring under this disease generally presents a true inflammatory character; it appears to be in some way or other vitiated; and the experiments of many distinguished chemists pretty nearly prove that it contains urea†; and moreover, that this latter substance always exists in the blood previous to its elimination from thence by the kidneys and subsequent appearance in the urine‡. From the serum of the blood drawn from a patient now in Lydia ward, Dr. Barlow obtained some crystals, which he has strong reasons for supposing to be nitrate of urea. I am aware it is a matter of great dispute as to whether it always exists; but as this subject has been repeatedly discussed in this theatre, and not yet settled, it would be as well if it were not resumed *this evening*, but rather allowed to give place to any remarks that may arise upon the pathology and the hitherto unsettled treatment of this formidable disease; not but that I allow the question is one of immense importance, and would, if settled, perhaps account for several singular phenomena that do now and then arise in the course of this complaint. It is impossible to doubt but that the circulation of unhealthy blood would greatly aggravate symptoms, and prove a source of much irritation to the system generally.

The presence of albumen in the urine is considered by some as of frequent occurrence, and very slight causes, it is supposed, will prove effectual

* In one case where the alkaline state depended on the presence of ammonia, by continuing the heat for some time the albumen was precipitated in small flakes.

† Experiments of Drs. Christison, Gregory, Babington, &c.

‡ Experiments of Prévost and Dumas, Gmelin and Tiedemann.

in producing it; such as mere errors in diet, or excess of any kind. This may or may not be the case; and I am more inclined to believe that often the precipitate in such instances has not been fairly tested, and that it has not been albumen. With regard to the frequency of its occurrence, from the experiments of others, and from my own, I am inclined to think that albuminous urine, unconnected with dropsical effusion, but rarely occurs. These experiments I will relate more in detail. Dr. Barlow, Mr. Tweedie, and Mr. Rees, examined the urine of 296 patients, taken promiscuously, and found that 26 were coagulable by heat and nitric acid; of these 26, 11 had symptoms of anasarca, consequently 15 (very nearly 5 per cent.) had coagulable urine, and no dropsical effusion discoverable. My friend, Mr. Gorham (whose kind and zealous assistance I am happy to acknowledge), and myself tested the urine of 141 patients, taken promiscuously, by heat and nitric acid, and we found 18 to be positively albuminous*; of these, 17 were labouring under different forms of dropsical effusion, one of whom was undergoing a mercurial course, the remaining one was in a state of confirmed phthisis, and the albuminous deposit was very trifling. Thus, then, out of 141 patients, one only had coagulable urine without every other concomitant symptom of renal disease†. I think these different experiments go far to prove that the presence of albumen in the urine, if not to be relied on as a test, can surely be considered as an indication and a guide to our practice.

PATHOLOGY.—On examination after death, in this disease, the kidney is very frequently found more in fault than any other organ‡, and derangement, or disorganization, to a greater or less extent, is found to have taken place. Dr. Bright observes, "I have never yet examined the body of a patient dying with dropsy attended with coagulable urine, in whom some obvious derangement was not discovered in the kidneys§." Dr. Blackall gives an account of some dissections, in which the kid-

neys were found more or less in fault and altered in character. Dr. Darwall also notices certain morbid appearances and diseases in the kidney, attended by dropsical effusion*. When this disease has been but of short duration, the kidneys will be found congested or gorged with blood; but sometimes their colour and consistence are altered, being less firm than natural, and of a pale-yellow mottled appearance, both externally and internally;—again, they are found larger or softer than natural, and the texture of the cortical part becomes granulated with numerous white points, or specks of an opaque white matter, distributed throughout its substance, becoming more evident as the disease advances: this state of kidney with coagulable urine, may exist without any marked appearance of anasarca. Lastly, they are found rough and scabrous externally, of a lobulated contracted form, and of a semi-cartilaginous firmness: here generally the urine is highly coagulable. The state of kidney, in the case just read, appears to be referable to the two latter forms. Besides these, the kidneys may be preternaturally soft, or firmer, with concrete-like deposits obstructing the uriniferous tubes, and the vessels of the tubular part assuming a waved direction: in these forms, the urine is only slightly or occasionally coagulable. The liver is generally found pretty healthy; it was so in this case: occasionally, though rarely, it is found congested, or of a spotted mottled appearance. The left ventricle of the heart has been occasionally found dilated and hypertrophied; and in the case related, this morbid appearance was beautifully illustrated. This organic disease of the heart, in conjunction with his apoplectic seizure, and the peculiar features of his complaint, is a point of great importance, as serving to establish a connexion and relation between these different affections. That there is an occasional coincidence between cerebral apoplexy and an albuminous state of the urine, with its consequences, is known; but whether it is of such frequent occurrence as to become an established point of decided importance, is still open (as far as I am aware) to future investigation. The connexion, however, between apoplexy and organic disease of the heart, is, I

* In all these cases, the precipitate given by one test was not re-dissolved by the other.

† Similar experiments were made by Dr. Wells, with similar results.

‡ According to Dr. Bright, in the majority of five to one.

§ Medical Reports, vol. i. p. 2.

* Cyclopaedia of Practical Medicine, article *Dropsy*, p. 644: the state of urine not mentioned.

think, established on a pretty firm basis, by the facts stated in Dr. Hope's admirable paper*; where he observes, that of 42 patients who died of apoplexy, 30 had disease of the heart, and of the muscular structure of this organ especially. Richerand, Bertin, and Andral, have demonstrated this coincidence. Dr. Bright also notices and observes upon its occasional occurrence†. I have myself seen two cases of apoplexy where coagulable urine and hypertrophy of the left ventricle of the heart existed; and still more recently, a case in private practice, where serous effusion in the brain had taken place: the urine was not albuminous, but the left ventricle of the heart was hypertrophied; its walls being exceedingly thickened, firm, and dense in their structure. These facts would seem to trace out some connexion and dependence between these three points, and go partly to prove that in the case related this evening, these three morbid occurrences (which were all well marked) did bear some relation to each other. In forming these conclusions, the circulation of an unhealthy blood, consequent upon the disorganization of the kidney and the derangement of its secretion, must be taken into consideration. Marks of old or recent inflammations of the serous membranes are often found, more particularly the pleuræ. The adhesions in the chest sufficiently proved the previous existence of inflammation in the case before alluded to. The immediate cause of death was the serous effusion in the brain, which the post-mortem statement has sufficiently illustrated.

With regard to the treatment,—this must be directed with a view to restore the healthy function of the kidney, and to guard against any inflammatory affection, or apoplectic seizure, that may and does arise. That it is often unsuccessful, is but too true. We must, however, remember that the coagulable state of the urine may exist long before the anasarca shews itself: the patient's attention is not arrested until this latter affection occurs; and when at length our remedies are administered, the kidney is far advanced in disease. Does it not, therefore, behove every practitioner to examine carefully, in every sus-

picious case, the state of the urinary secretion? General and local depletion, and a strict antiphlogistic regimen, are the principal indications of cure; for (as Dr. Bright observes) there is reason to believe that a state of great congestion, perhaps an actual process of slow inflammation, exists in various internal organs, and particularly in the kidneys, where it probably lays the foundation for their future disorganization. Hydragogue cathartics act well—as jalap, elaterium, &c.; but we must be cautious not to purge too much, for there is a fear of abrasion of the mucous membrane of the intestines; perhaps also a danger of exciting or increasing inflammatory action in the kidney. Digitalis may be employed, with caution. Supertartrate of potash, from its gently purgative and diuretic property, is of great service; but all stimulating irritating diuretics are to be avoided, and we must act gently on the skin by saline diaphoretics. The loins should be surrounded with a large linseed poultice, which acts as a fomentation to the part, and will be found a very soothing application. Milk diet is the best. Tonics are indicated by the debility occasionally present, and, in the more chronic forms, Dr. Bright is inclined to think they may be of benefit. Dr. Blackall also speaks of the use of tonic remedies. The occasional alkaline property of the urine in confirmed renal disease, in connexion with the absence of albumen, as before alluded to, would seem to indicate the employment of an alkaline remedy. Dr. Bright, with this view, tried the liq. potassæ in one case, but not with much apparent benefit. The uva ursi and bismuth also have been tried. In the case related, this plan of treatment, to a certain extent, was followed, but with how little success the result shews; indeed, when frequently occurring, or when long established, this disease appears incurable, and palliative, and not active, remedies must be employed; such a deep-rooted foundation does there appear laid for it in the broken down, debilitated habits, in which it occurs. Still we may hope that pathology and experience will yet point out a more efficient plan of treatment, enabling us to restore the healthy functions of the body, and to avert those formidable symptoms that now and then arise, and which, when present, baffle the art of the most skilful physician.

* On the Connexion of Apoplexy and Palsy with Organic Disease of the Heart: published in the Med. Gazette for February 28, 1835.

† Gulstonian Lectures.

The propriety of giving mercury in these cases is very questionable; perhaps almost inadmissible. It appears probable, even almost certain, that mercury possesses the power of setting up that deranged action in the kidney, and, when already present, of increasing it; the result of which is albuminous urine, and the ptyalism produced is most distressing to the patient. Dr. Wells has known it to produce albumen in the urine*. Dr. Blackall gives it as a positive cause for anasarca, and considers its exhibition as equivocal and hazardous†. Dr. Darwall is of the same opinion‡; and Dr. Bright observes, "the cases which have proved most successful in my own practice, have generally been those in which I have rigidly abstained from the use of mercury." As far as my own experience goes, I have undoubtedly seen the urine become more coagulable under its employment (in one case distinctly so), and cases also have occurred where I have tried the urine almost daily before the use of mercury, and, when the mouth has become sore, albumen has appeared; which albumen has gradually disappeared again with the discontinuance of the mercury and the decline of its salivating effects. These phenomena are by no means universal, but they do now and then occur in a very marked degree. Cases may also occur that are so complicated with bronchial and other affections, and where the disease in the kidney may be considered as secondary only, that the use of a small quantity of mercury is advisable and beneficial; but upon the whole, when the renal symptoms occur in a marked degree, and the urine is decidedly coagulable, arguing from facts, the employment of mercury can scarcely be sanctioned.

Anasarca (even inflammatory) may and does occur without albuminous urine; and it is by no means necessary to the existence of renal disease that anasarca should be present; coagulable urine does, though rarely, occur without it, as instanced in the experiments of Dr. Barlow, &c. before alluded to. In apoplexy this may happen; and in one of

the cases before mentioned, I think I am correct in saying there was no dropsical effusion. In dyspepsia the urine is said to be albuminous; this coincidence I have not yet noticed; but the sympathy between the stomach and kidney, and deranged state of the former, render it possible and probable. In diabetes again, the presence of albumen is now and then manifest, and is said to be a favourable occurrence. The last stage of phthisis is occasionally accompanied by albuminous urine: three cases of this kind have occurred to me*. It must, however, be remembered, that any of these morbid states may be accompanied by certain degrees of dropsical effusion; and on a careful review of the different diseases just enumerated, a certain occasional degree of similarity in their terminations will be discovered; whether this can have the most distant relation to, or be in any way the consequence of, the morbid state of the urine, is still open for investigation.

In drawing towards a conclusion, it is but right to state that there are a few cases on record which would seem to shake our confidence in the importance of the coagulable state of the urine, and create a doubt as to whether the inferences just drawn are accurate—the treatment advanced correct—the principles laid down established on a sufficiently firm basis: added to this, the oppositions and objections of many eminent physicians; the opinion of many that the presence of albumen in the urine is so frequent, and so easily produced, as to afford no diagnostic mark whatever; and a generally prevalent idea, that in every case where the urine is coagulable, the kidney must be in a state of disorganization. To observe upon, and attempt to answer, these different theories and opinions, and more particularly to shew the entire fallacy of the latter, would lead to arguments equally long as unnecessary at present; they may probably form the subject of a future communication.

From what has been written, as partly the result of my own observations (however inadequate to the importance of the

* *Cyclopædia of Practical Medicine*, article *Dropsy*, page 641.

† See some excellent observations and arguments on this subject, in Dr. Blackall's work, before quoted.

‡ *Cyclopædia of Practical Medicine*, article, *Anasarca* 76.

* In one of these cases the urine assumed a form not often met with where albumen is present; it was excessively turbid when made, became clear at a temperature of about 150° F., and remained so for a few seconds. By continuing the heat, a copious precipitate of albumen, of the curdled form, took place. The anasarca was the most extensive I almost ever witnessed.

subject), and from the opinions of several eminent men whose works I have referred to, we may, I think, reasonably and unerringly infer, that there does appear to be some great and intimate connexion between these three points—coagulable urine, diseased kidney, and dropsical effusion. The importance of the former will be found principally in serving as a guide to our treatment, and being, as it were, a presumptive evidence of deranged kidney, before that derangement could, without some such evidence, be appreciable by us: not that we are to be entirely guided by the quantity, colour, or firmness of the coagulum,—this will be found fallacious; but, when this phenomenon is present, we may be assured the kidney is more or less involved; there is tendency to inflammation, to serous effusion, and active antiphlogistic remedies are peremptorily called for. The healing and reparative powers of the body will also be found much impaired and weakened in energy.

I fear I have already encroached too

long on the time of the society; but the extent, interest, and immense importance of the subject, must be my apology; and, in conclusion, would beg to offer the following points for discussion:—

1st, The frequency of albuminous urine unconnected with dropsical effusion, but in conjunction with serous or sanguineous effusion, independent of general anasarca; and whether the different quantities of albumen present are to be considered as so many stages of diseased action.

2d, The connexion (if any?) between anasarca with coagulable urine, apoplexy, and organic disease of the heart, whether of the muscular or valvular structures, but principally with regard to hypertrophy of the left ventricle.

3d, The connexion and relation between anasarca, diseased kidney, and the presence of albumen in the urine.

4th, The pathology, as directing the plan of treatment; and

5th, The treatment most admissible and successful.

George-Street, Richmond.

TABLE.

The following is a TABLE, in part illustrative of the Experiments before detailed, shewing the state of the Urine in various Diseases, principally with regard to its coagulability by heat and acid, taken from 50 Patients promiscuously. The Urine of the remaining 91 was examined in a nearly similar manner.—With regard to the specific gravities, those will be found high where the Urine had a copious sediment, from this latter not having been allowed to settle,—the most correct way, as I was then informed, of taking the specific gravity of urine of that nature.

Name.	Age.	Colour of the Urine.	Colour and Nature of Sediment, if any.	Coagulable by Heat.	Coagulable by Nitric Acid.	Acid or Alkaline Properties.	Sp. Gr. Water being 1000.	Disease the Patient laboured under at the time.
Timothy Calligan	40	natural colour.	no sediment.	no coagulation.	no coagulation.	slightly acid.	1.016	Fever, convalescent.
James Panton	24	natural colour.	no sediment, cloudy.	scanty flaky precipitate.	quite re-dissolved.	acid.	1.017	Fever.
Samuel White	40	dark coloured.	copious dark sediment	no coagulation.	no coagulation.	acid.		Fever, 2 hours before death.
George Tucker	14	natural colour.	no sediment.	sediment not dissolved.	no coagulation.	slightly acid.	1.009	Epilepsy.
Edward Crowney	24	natural colour.	no sediment.	no coagulation.	no coagulation.		1.016	Rheumatism.
Thomas Wiggins	20	natural colour.	slightest flaky sediment.	no coagulation.	no coagulation.		1.021	Epilepsy.
John Saul	53	rather high coloured.	slight flaky sediment.	no coagulation.	no coagulation.	acid.	1.019	Ascites and anasarca.
Joseph New	25	not high coloured, scanty.	copious sediment.	no coagulation.	no coagulation.	acid.	1.033	Acute rheumatism.
John Haynes	47	rather pale colour.	no sediment.	sediment dissolved.	no coagulation.	acid.	1.020	Gastrodynia.
James Betley	51	slightly high coloured.	no sediment.	no coagulation.	no coagulation.	slightly acid.	1.020	Hemiplegia.
Maurice Williams	50	rather pale colour.	copious sediment.	no coagulation.	no coagulation.	alkaline.	1.013	Dysentery, renal disease; œdema of lower extremities.
Joseph Marshall	55	light coloured.	cloudy, no sediment.	opalescent.	brownish coagulum.	acid.	1.011	Bronchitis.
David McGinnis	35	not high coloured, turbid.	copious pinky sediment.	no coagulation.	no coagulation.	very slightly acid.	1.024	Colica pictorum.
Thomas Kennedy	32	rather high coloured.	no sediment.	sediment dissolved.	no coagulation.	slightly acid.	1.027	Cynanche tonsillaris.
Ebenezer Clogg	24	natural colour.	no sediment.	no coagulation.	no coagulation.	acid.	1.022	Renal anasarca.
Edward Larkin	43	rather pale colour.	no sediment.	coagulable.	coagulable.	not very acid.	1.019	

27	Timothy McCarty	natural colour.	slight sediment, rather cloudy.	no coagulation.	no coagulation.	not very acid.	1-016	Fever, convalescent
30	John Brogan	natural colour.	no sediment.	no coagulation.	no coagulation.	acid.	1-016	Chronic bronchitis.
43	Joseph Simpson	natural colour.	no sediment.	no coagulation.	slight white coagulum coagulates slightly.	not acid, not alkaline. slightly acid.	1-012	Phthisis and bronchitis.
30	James Maloney	natural colour.	no sediment.	coagulates slightly.				Ascites and anasarca, undergoing a mercurial course.
53	John Macnamara	pale colour.	no sediment.	no coagulation.	no coagulation.	not acid, not alkaline.	1-034	Diabetes mellitus.
40	Richard Berry	dingy colour.	bloody sediment.	coagulates slightly.	coagulates slightly.	not acid, not alkaline.	1-019	Nephritis, anasarca.
40	Cornelius Sullivan	rather pale colour.	no sediment.	no coagulation.	no coagulation.	not acid, not alkaline.	1-015	Pleuritis, convalescent.
32	Edward Cossington	natural colour.	no sediment.	no coagulation.	no coagulation.	not acid, not alkaline.	1-017	Head affection.
50	David Holly	natural colour.	no sediment.	no coagulation.	no coagulation.	not acid, not alkaline.	1-013	Lepra vulgaris.
27	Rachael Braybrook	natural colour.	no sediment.	no coagulation.	no coagulation.	very acid.	1-012	Icterus, convalescent.
37	Ann Sullivan	natural colour.	slight sediment.	no coagulation.	no coagulation.	acid.	1-017	Quotidian ague.
18	Margaret Atkins	natural colour.	no sediment, cloudy.	no coagulation.	no coagulation.	not acid, not alkaline.	1-012	Fever.
48	William Allen	pale colour.	no sediment, clear.	very coagulable.	very coagulable.	acid.	1-015	Anasarca from mercury.
43	Thomas Toyn	pale colour.	no sediment, cloudy.	very coagulable in deed.	very coagulable in deed.	very acid.	1-014	Anasarca renal; labouring under profuse salivation.
41	Thomas Philips	natural colour.	no sediment, cloudy.	coagulable.	coagulable.	acid.	1-020	Renal anasarca.
42	James Hill	natural colour.	no sediment, clear.	no coagulation.	no coagulation.	acid.	1-020	Gastrodynia.
46	David Murphy	pale colour.	copious sediment.	no coagulation.	no coagulation.	very acid.	1-032	Acute bronchitis.
45	Frederick Crown	pale colour.	rather cloudy.	coagulable.	coagulable.	acid.	1-015	Renal anasarca.
45	George Jennings	pale colour.	no sediment.	opalescent.	coagulable.	acid.	1-018	Renal anasarca.
49	Sarah Fewtrell	pale colour.	no sediment.	coagulable.	coagulable.	acid.	1-011	Renal anasarca.
43	Edward Arnott	very dingy colour.	bloody sediment.	coagulable.	coagulable.			Renal anasarca and bronchitis.
19	Harriet M'Donald	dingy colour.	sediment.	very coagulable.	very coagulable.	not acid, not alkaline.	1-020	Renal anasarca, amenorrhea.
21	George Hopkins	natural colour.	slight sediment.	slightest opalescence.	quite re-dissolved.	acid.	1-022	Hypochondriasis.
48	Peter Wayland	rather high coloured.	no sediment, clear.	no coagulation.	no coagulation.	acid.	1-016	Bronchitis.
28	Timothy Roach	natural colour.	cloudy sediment.	no coagulation.	no coagulation.	acid.	1-020	Phthisis and bronchitis.
18	Samuel Smart	reddish-brown colour.	no sediment.	no coagulation.	no coagulation.	acid.	1-012	Icterus.
29	John Morley	rather high coloured.	copious pink sediment.	no coagulation.	no coagulation.	very acid.	1-034	Creeping paralysis.
47	Owen Woods	natural colour.	clear.	no coagulation.	no coagulation.	acid.	1-018	Bronchitis.
36	William Ralphs	high coloured.	clear, pink sediment.	no coagulation.	no coagulation.	acid.	1-028	Pleuritis and pneumonia.
23	Thomas Burgoyne	pale colour, scanty.	copious white sediment.	slightest precipitate.	re-dissolved.	not acid, not alkaline.	1-022	Dyspepsia.
38	Thomas Gray	pale straw colour.	no sediment.	coagulable.	coagulable.	acid.	1-03	Renal anasarca, ascites.
43	William Symons	rather high coloured.	clear.	opalescent.	slight brown coagulum.	acid.	1-019	Renal anasarca.
24	Charles Hunt	rather high coloured.	clear.	no coagulation.	no coagulation.	acid.	1-020	Delirium tremens.
33	James Davie	natural colour.	clear.	no coagulation.	no coagulation.	acid.	1-023	Erysipelas, convalescent.

Year	Month	Day	Time	Place	Event	Remarks
1891	Jan	1	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	2	10:00	St. Paul	Left	To St. Paul
1891	Jan	3	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	4	10:00	St. Paul	Left	To St. Paul
1891	Jan	5	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	6	10:00	St. Paul	Left	To St. Paul
1891	Jan	7	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	8	10:00	St. Paul	Left	To St. Paul
1891	Jan	9	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	10	10:00	St. Paul	Left	To St. Paul
1891	Jan	11	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	12	10:00	St. Paul	Left	To St. Paul
1891	Jan	13	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	14	10:00	St. Paul	Left	To St. Paul
1891	Jan	15	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	16	10:00	St. Paul	Left	To St. Paul
1891	Jan	17	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	18	10:00	St. Paul	Left	To St. Paul
1891	Jan	19	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	20	10:00	St. Paul	Left	To St. Paul
1891	Jan	21	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	22	10:00	St. Paul	Left	To St. Paul
1891	Jan	23	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	24	10:00	St. Paul	Left	To St. Paul
1891	Jan	25	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	26	10:00	St. Paul	Left	To St. Paul
1891	Jan	27	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	28	10:00	St. Paul	Left	To St. Paul
1891	Jan	29	10:00	St. Paul	Arrived	From St. Paul
1891	Jan	30	10:00	St. Paul	Left	To St. Paul
1891	Jan	31	10:00	St. Paul	Arrived	From St. Paul