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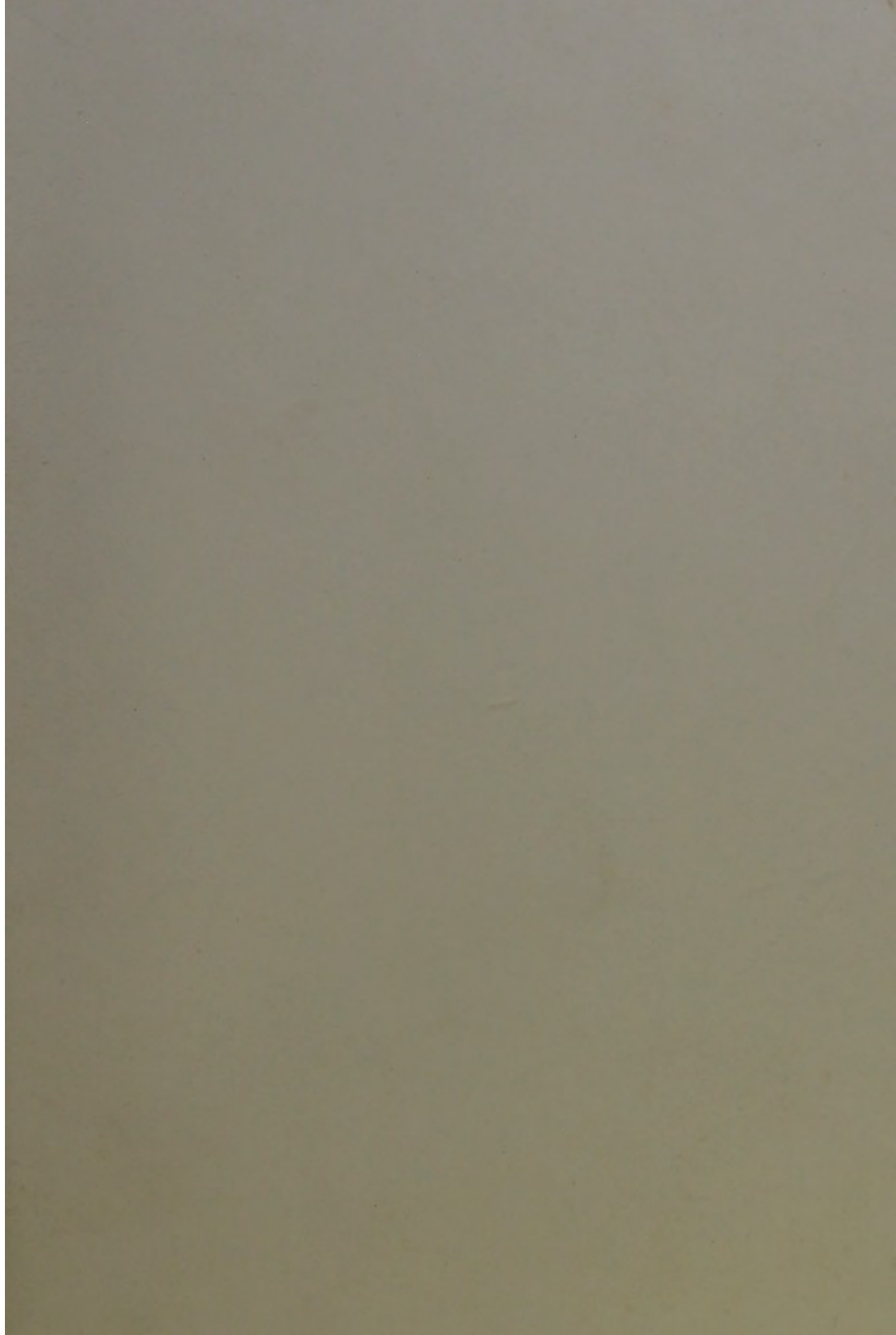
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BRIGHT'S DISEASE.

Bright's Disease, with Analysis of the Urine.—Examination of the Blood and Brain for the presence of Urea.—Note on the Constitution of Nitrate of Urea.

MARCH 24th, 1843.—John Kirwan, admitted in-patient of the Queen's Hospital, æt. 47. Of robust frame. Coach-smith. Of very intemperate habits, having for many years drunk freely of spirits. Three years ago, was confined to his bed with rheumatism during three weeks. Has since been liable to attacks of pain in the chest, accompanied with dyspnoea and palpitation. Six weeks ago, he first observed swelling of his feet and ankles. His body is now generally anasarcaous; his face and eyelids especially are swelled and puffy in the morning. Distension and fluctuation of abdomen. Penis and scrotum much distended with liquid. Distinct bruit accompanies the first sound of the heart; loudest over the sternum below the second rib; indistinct, and occasionally absent, at the apex; heard, also, in the course of the carotids. No pulsation of external jugulars. Percussion natural. Sonorous râles in anterior part of chest. Appetite good. Tongue flabby, coated yellow in the centre. Bowels reported regular. Pulse 100, compressible. During the last six weeks he has been obliged to rise two or three times in the night to pass urine. There is a hard, defined, pulsating tumor, of the size of an orange, in the right popliteal space. Loud bruit is heard on applying the stethoscope to this tumor, which was first perceived six years ago, the patient, at that time, having been struck with a piece of iron on the right popliteal space whilst engaged in tiring a wheel. He has suffered

no inconvenience from it. Before admission, he has taken mercury, as is evident from the foetor of his breath.

The patient continued under my care in the hospital until his death, which occurred in September. The urine contained albumen. An examination of this excretion is subjoined. Hydragogue cathartics, such as elaterium, jalap, and gamboge, were prescribed with temporary benefit. The diuretic treatment was also tried, and with the same result. During the progress of his illness, symptoms of congestive apoplexy supervened, and required active treatment by cupping and venesection. I shall introduce only occasional extracts from my journal.

April 1st.—Bowels have been freely moved; watery stools. Anasarca generally diminished. Pills (Elaterium, gr. $\frac{1}{4}$ in each pill, with Hyoscyamus) occasioned sickness and vomiting. Pulse 100, regular, of moderate strength. Tongue indented by the teeth, on each side coated, clean along a stripe in the centre, and at the edges. Frontal headache. Last night rose twice to pass urine, and four times in the previous night.

May 13th.—Anasarca much increased. Took two elaterium pills yesterday, which produced three watery stools. Great tendency to drowsiness.

Cuc. Cr. Nucha.

15th.—Considerably relieved by the cupping. Passed urine twice last night.

20th.—Yesterday had Cambogiæ gr. iij. c. Potassæ Bitart. ʒj. An hour afterwards had

a copious watery motion. Bowels have been moved four times since. The gamboge-powder did not induce sickness. Cupping at the nape of the neck to f̄iv. was repeated yesterday, and was followed by great relief of the head symptoms. Distension and fluctuation of abdomen. Passed urine three times last night. Tongue moist, pale, and smooth.

24th.—Symptoms as before. Head continues relieved. Much complaint of pain across the loins, but there is no tenderness on pressure in this situation. Leucophlegmatic countenance. Distinct bruit with the first sound of heart.

27th.—Abdomen extremely distended, and tense. A diuretic mixture, containing Tr. Digitalis, Sp. Æth. Nitrici, and Acet. Potassæ, was prescribed. A solution of Bitartrate of Potass and Biborate of Soda for common drink.

11 P.M.—Orthopnoea. Violent sickness, and pain in right iliac region.

V. S. ad 3vj. Effervescing mixture containing Carbonate of Ammonia, Tartaric Acid, and Liquor Opii Sedad.

28th.—Slept well. Feels better. Abdomen not so tense or painful.

June 8th.—A discharge from the right ear. In other respects as before.

14th.—Cough, with muco-purulent expectoration. Sonorous râle. Dyspnoea last night. Inflammation of conjunctiva of right eye.

21st.—Face extremely œdematous. Occasional dyspnoea. Restless night. No vertigo. No return of nausea. Pain referred to lower part of abdomen. No complaint of pain across the loins.

July 1st.—June 28th, f̄vj. of blood taken by cupping at the nape. Relief. Occasional dyspnoea. Sleeps much. Anasarca to a great extent. Passes urine three or four times daily.

16th.—Much worse of late. This morning, wandering delirium. Thinks he has been hung. Red blush in several places on the lower extremities. Scrotum and penis much distended with liquid. Pulse regular, firm.

19th.—I saw him last night. He complained of being tormented with spectres, some of which had no heads. Discharge from both legs in several places. Bruit with the first sound still distinct. Occasionally he appears to be much exhausted. Has taken constantly an æthereal mixture which was prescribed before.

Aug. 30th.—During the last several weeks he has continued considerably improved. The places from which liquid had escaped were progressing towards healing. Liquid, however, is now discharged from them. Ascites continues. Anasarca greatly di-

minished. Cough, with expectoration; "cannot get up his phlegm." Lies most easily on the right side. Aspect of countenance leucophlegmatic, having a yellowish-white tinge, expressive of anæmia.

Sept. 9th.—The sores from which the serous liquid has been long draining are now almost entirely healed, with the exception of one or two spots on the inner part of the right thigh. Œdema of face considerably increased.

He died comatose Sept. 15th.

Autopsy.—*Head*:—Brain somewhat softened.

Chest:—Clear dark-coloured serous liquid in both pleural cavities, largest quantity in the right. No adhesions. No evidence of disease in either lung. *Heart*:—Nearly four ounces of clear yellow liquid in the pericardium. Recent and slender adhesions. Weight of heart, with the vessels, 1 lb. 1 oz. (avoirdupois). No coagula. Aorta dilated at its origin. Internal surface rough. All the valves without deposit, normal.

Abdomen:—Peritoneal cavity contained about eight quarts of clear liquid. Shreds of lymph about the umbilicus. *Stomach*:—Small and contracted; coats very thick. *Small intestines* contracted. *Liver*:—Weight, 4½ lbs. (avoird.) Peritoneal surface opaque, and thickened in places. *Kidneys*:—Weight of right 5 oz. (avoird.); of left, 4½. Distinct appearance of granular degeneration on the surface, deprived of fibrous coat, and internally.

The tumor in the popliteal space was found, as expected, to be a true aneurism, of the size of a small orange.

Examination of the urine.

March 25th.—Urine passed this morning; very pale; not clear, even after standing; mucous cloud; filters bright; reddens litmus; frothy by agitation; sp. gr. 1016°; temp. 61° Fah.; abundantly coagulated by heat and nitric acid. I boiled some of the urine for several minutes; filtered perfectly bright; no further coagulation by addition of nitric acid to filtered liquid. I proceeded to make an analysis; but, unfortunately, an accident occurred in the determination of the urea, which, however, only existed in small quantity. 1,000 grains contained, of—

Water		964.92
Albumen		9.78
Fixed saline matter		8.80

The whole amount of solid matter being 35.08, we have, by deducting from this quantity the sum of the albumen and fixed saline matter (18.58), 16.50 of urea and indeterminate organic matter. The evaporation was effected, first over the ordinary steam bath, and then in Berzelius' apparatus. The fixed saline matter contained alkaline

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carbonate, the aqueous solution restoring the colour of reddened litmus. I found also earthy phosphate, alkaline chloride, and sulphate; but I did not search for alkaline phosphate.

May 16th.—Urine passed yesterday; pale brown; sp. gr. 1020°; turbid, and slightly so after filtration; abundant coagulation by heat, and also by nitric acid; filters perfectly bright after boiling; no turbidity produced by nitric acid in the filtered liquid; strongly acid; I was not able to detect globules by the aid of the microscope. In this analysis I operated, as usual, upon three portions, of 500·0 grains each. The drying was effected in Berzelius' apparatus, at 212° Fah. 500 grains left 26·59 of dry residuum. The albumen was determined by washing the dry residuum, first with alcohol of 0·834, and then with distilled water, until the solution ceased to be affected by nitrate of silver. By the ordinary process I obtained 7·86 grains of nitrate of urea, which (estimating the salt as $(C_2 N, O + NH_3 + HO) + NO_5 + HO = 123·912$) corresponds to 3·84 of pure urea.

Analysis of 1,000 grains.

Water	946·82
Albumen*	22·64
Urea	7·68
Uric† acid and indeterminate organic matter	17·52
Fixed salts soluble in water	5·20
Chlorine, sulphuric, phosphoric, and carbonic acids	
Potass and soda	
Earthy phosphate	0·14
	1000·00

On the addition of distilled water to the incinerated residuum, in numerous spots where the little masses of ash were detached by the water, the platinum had a blue colour. The solution was strongly alkaline, immediately restoring the colour of reddened litmus. Phosphoric acid was abundant; and copious precipitation was occasioned by the addition of bichloride of platinum. The proportion of earthy phosphate, it will be observed, was small.

Sept. 15th.—Urine last passed. Colour pale brown; sp. gr. 1015°; temp. 70° Fah.; turbid, and continues so after filtration; extremely offensive and ammoniacal; an abundance of minute prismatic crystals of ammoniaco-magnesian phosphate; flocculi separated by heat, insoluble by the aid of nitric acid. A portion was evaporated and incinerated, and the incineration was aided by nitrate of ammonia. The aqueous solution of the residuum instantly restored the

* Ash deducted.

† Small crystals of uric acid were separated by addition of acetic acid.

colour of reddened litmus. Only a trace of chlorine was detected by the addition of nitrate of silver and nitric acid.

Tables of the specific gravity of the urine. In the second table is indicated the specific gravity of the urine passed during the night.

Date.	Morning.	Noon.	Night.
March.			
25	1015		
26	1016	1018	1017
27	1016	1016	1020
28	1016	1017	1018
29			1020

Date.	Sp. grav.	Date.	Sp. grav.
March 30	1015	May 10	1018
April 20	1037	12	1015
21	1030	13	1016
22	1016	14	1017
23	1014	16	1015
26	1014	17	1018
27	1013	18	1016
28	1018	19	1019
29	1016	20	1019
30	1018	22	1019
May 1	1016	23	1019
2	1015	25	1008
3	1017	27	1010
4	1016	29	1015
5	1015	30	1016
7	1014	31	1016
8	1015	June 1	1013
9	1016	3	1015

Examination of the blood, with a view to the detection of urea.

May 19th.—I took 400·0 grains of the serum of Kirwan's blood, obtained by cupping at the nape this morning. I evaporated to dryness over the steam bath; the residuum was twice treated with distilled water at a gentle heat; the aqueous solution was decanted, and evaporated to dryness; the residuum was twice treated with alcohol, sp. gr. 0·834; the alcoholic solution was filtered, and evaporated to dryness; to what remained was added a small quantity of water, and then nitric acid.

22d.—I observed a minute quantity of precipitate, in which, however, I could not, by the aid of the microscope, detect any crystals of definite form; the result must, therefore, be considered negative.

Examination of the brain, with a view to the detection of urea.

Jan. 20th, 1844.—Having left a portion of Kirwan's brain, well broken up, in alcohol

since the period of his death to the present time, I proceeded to search for urea. Filtered alcoholic solution; filtered liquid became slightly turbid. I evaporated first in the chloride of calcium bath, and then, at a gentle temperature, on the sand bath. Oily matter separated as the evaporation proceeded. Added water to the residuum; filtered; evaporated filtered solution; and to residuum added nitric acid of sp. gr. 1.2 in excess.

24th.—No trace of crystallization of nitrate of urea. In this case, also, the result is negative.

Note on the constitution of nitrate of urea.

I may here appropriately append a note on the constitution of nitrate of urea. It will be observed that I have estimated the salt as containing an equivalent of water, according to Regnault's experiment, which I am persuaded is correct; and in proof of which I introduce an analysis of my own.

I took 34.04 grains of pure nitrate of urea, reduced to fine powder, and dried during several days consecutively in Berzelius' apparatus at 212° , but without desiccation of the air by chloride of calcium. I dissolved the nitrate in distilled water, and cautiously added pure carbonate of baryta in excess. The nitrate of baryta was decomposed by an excess of sulphuric acid, and the weight of sulphate of baryta was accurately determined. From this I could deduce the weight of nitric acid existing in combination with the urea, and could consequently deduce also the weight of urea. I obtained 31.974 of Ba, SO_4 . Admitting urea to be $\text{C}_2\text{N, O} + \text{NH}_3 + \text{HO, C} = 6.125$, $\text{N} = 14.186$, $\text{O} = 8.013$, $\text{H} = 1$, $\text{Ba} = 76.676$, and $\text{SO}_4 = 40.159$ (on the authority of Berzelius, vide *Traité de Chimie*, t. 5ième), we have

Ba, SO_4	=	31.974
Ba	=	20.983
NO_5	=	14.846
Urea	=	16.596
Water	=	2.598
For, 34.04 — (14.846 + 16.596) = 2.598		
Per cent		
Urea	.	48.754
Nitric acid	.	43.613
Water	.	7.632
		99.999

Regnault's analysis (*Becquerel, Semeiotique des Urines*, p. 33—)

Urea	.	48.938
Nitric acid	.	43.781
Water	.	7.281
		100.000

Calculated			
Urea	.	.	48.945
Nitric acid	.	.	43.781
Water	.	.	7.273
			99.999

It is evident that the nitrate of urea which I employed was not perfectly deprived of hygroscopic water; for the excess of water, as shewn by the calculated analysis, amounts to 0.359 per cent.

OBSERVATIONS.—The case which is here detailed does not present any remarkable feature of interest, affording only an ordinary illustration of the course of Bright's disease, or granular degeneration of the kidneys. The predisposing cause may be clearly traced to the excessive use of ardent spirits, as it appears to be well ascertained that habitual intemperance is frequently followed by the disease in question. The evacuation of serous liquid by spontaneous openings in the skin in several parts of the body was attended by obvious temporary relief. I expected that diffuse cellular inflammation would be the consequence, and was surprised to observe that these openings, notwithstanding the constant drain from them during a considerable period, were at length nearly all healed. We should be cautious in inferring from a case of this kind the propriety of removing the anasarca by artificial scarification, as fatal effects have been speedily induced by such practice, death being occasioned by exhaustion consequent on diffuse cellular inflammation. I have myself witnessed fatal cases of this kind. It has been suggested, if I mistake not, by Dr. Budd of King's College, that the urea existing in the serous liquid may, probably, by virtue of its irritant property, be the exciting cause of this inflammation in the case of evacuation from openings on the surface. This suggestion, however plausible, requires to be verified. In the case of Kirwan, urea was, comparatively speaking, excreted in considerable quantity in the urine; and I was unable to detect this substance in the blood, when the symptoms suggested the probability of the brain being injuriously affected by its presence in increased proportion. It has, however, as is well known, been frequently separated from the blood in

Bright's disease in very sensible quantity. From the bruit which accompanied the first sound of the heart, I suspected the existence of disease of the semilunar valves of the aorta; but this suspicion was not confirmed by the autopsy, which revealed only as the cause the roughened condition of the internal surface of the arch of the aorta. Of the popliteal aneurism the patient made no complaint, and it was some time after his admission before the tumor was discovered. It is singular that it existed for so long a time without appreciably increasing. In respect to treatment in the confirmed stage of this disease it is obvious that the only indication is the diminution or removal of the anasarca either by the kidneys or from the cutaneous or intestinal surface. In the case before us, hydragogue cathartics appeared to afford the most relief. However, from any plan of treatment we can only anticipate temporary benefit. Local depletion, as cupping at the nape, is urgently required when there is threatening of coma. In proof of this,

I may confidently appeal to the history of the case before us.

The urine presented the characters common to that excretion in Bright's disease. The average specific gravity deduced from the second table was only moderately low, being 1016.6. The extremes, so far as our observations extended, were 1037 and 1008. I did not accurately ascertain the average quantity of urine passed; although I am satisfied that generally it was not in that respect below the standard of health. The urea was not evacuated in the natural proportion. In the analysis given it amounted only to 7.68 parts in the thousand; whereas, in health, it at least amounts to double that quantity. The proportion of earthy phosphate was much less than in healthy urine, in which it exists generally in the proportion of 1 to 1000. In the last urine passed, only a trace of chlorine, in combination with a fixed base, was detected. Whether it existed in larger quantity in the urine before evaporation and incineration, I did not ascertain.

CASES OF DIABETES MELLITUS :

WITH PRECISE OBSERVATIONS CONCERNING THE INFLUENCE
OF ANIMAL DIET UPON THE URINE.

CASE I.—Admitted in-patient of the Queen's Hospital, September 15, 1843, Edward R——s, æt. 37. Dark hair and eyes. Short stature. Married twelve years, and has one child eight years old; his wife has not since been pregnant. By trade a bridle-cutter. He has been accustomed to work in a top story, which, during the summer, was exceedingly hot, and during the evenings of winter was rendered hot and oppressive by gas-lights. Of general good health. Never remembers having been confined to bed by any illness. Habits temperate, though occasionally he has been guilty of slight excesses. Had syphilis eighteen years ago. A year ago an eruption of minute millet-like spots, not attended by itching, appeared on the fore-arms; previously, had never any cutaneous affection. Has never spat blood.

About seven months ago, he began to suffer from thirst, and to pass urine more frequently than natural, especially during the night. Afterwards, his attention was directed to white spots on his breeches, occasioned by the evaporation of urine. He has lost flesh: last Christmas (1842) he weighed 143 lbs., and three months ago his weight was reduced to 126 lbs. Perspires but little. Mouth dry and parched. Taste of a "sourish nature." No particular increase of appetite. In a morning has an uneasy sensation referred to epigastrium, relieved by taking food. He is ill-tempered and peevish, without any assignable cause. No headache. Has lost strength and desire for exertion. Lower extremities soon become cold. Food does not lie heavy at the stomach; occasionally much flatus, which escapes

both by the mouth and anus; bowels generally confined. Tongue rough, white, coated, moist. His desire for sexual intercourse is diminished, though he still retains the power. No irritation of the extremity of the penis. No hereditary predisposition; nor is he aware that any of his relatives have ever been affected in a similar manner to himself.

Accurate observations respecting the diet and urine are appended in tables.

September 15th. — Had a vapour-bath, and perspired freely afterwards. Dryness of mouth relieved. Ordered—

Pil. Sap. c. Opio. gr. v. bis die; Ol. Ricin. p. r. n.

23d.—Capiat Creasot. gtt. j. ter die.

27th—Dryness of mouth considerably relieved. During the last two or three days has had occasional abdominal pain, without purging. Feels pretty well. Appetite increased. On the 25th had a biscuit.

Rep. Pil. Sap. c. Opio, ter die; Inter-mitt. Creasotum.

October 4th.—Pain in the bowels, with slight purging. No dryness of the mouth. Does not relish his food. Pulse languid. Skin moist. Has perspired freely.

7th.—Complains of more thirst this morning than he has since the first week of his admission. Tongue white and coated. Passed urine twice in the night. Could take more meat.

11th.—Less dryness of the mouth. Tongue moist and slightly coated. Skin moist. Feels "better in himself."

To take occasionally lime-water flavoured by sassafras chips. Omitt. medicamenta.

21st.—Two days ago he began to

take cod-liver oil (the white variety obtained from Mr. Morson, London). Has taken half an ounce twice daily. Passed urine only once last night. Weight yesterday, 120 lbs.

24th.—Has been purged several times.

Capiat. Mist. Creta, c. Conf. Aromat. Intermit. Ol. Jecoris Aselli.

27th.—Still slightly purged.

R. Sulph. Ferri, gr. ij.; Opii, gr. iss. M. Ft. Pilula. capiat. j. ter die. Repet. Ol.

November 18th.—Feels very well. No dryness of mouth. Pulse improved in strength. Skin warm and moist.

25th.—As before. Tongue moist and slightly coated; it has all along maintained this character. Has not taken the oil for two days, in consequence of his stock having been exhausted. Can now take five or six table spoonfuls without inconvenience, daily. Relishes his food. Passed urine three times last night.

December 2d.—Skin moist. No dryness of mouth. Tongue pale and moist.

16th.—Appetite not quite so good. In other respects as before. Weight 118 lbs.

Omitt. Oleum. Cont. alia.

January 6th.—Is becoming weary of a pure meat diet; does not relish his breakfast. No complaint of thirst or dryness of mouth. Tongue thickly coated posteriorly. Complains of soreness of throat. Slight specks of ulceration on the tonsils. Has perspired freely of late. Skin moist. Pulse 82 (standing), moderately compressible. Feels no depression to-day. Of late has risen once every night to pass urine. Since the 23d of December has been taking a drop of creasote in mixture three times daily.

R. Argenti Nitratis, gr. ij.; Micæ Panis, q. s. M. Ft. Massa, et div. in. pil. xij.; Capiat j. ter die.; Pil. Sap. c. Opio, gr. v. bis quotidie; Cont. oleum. Om. alia medic.

17th.—Diarrhœa last evening.

Cap. Pulv. Ipecac. co. gr. x. ter die.

He had occasionally suffered from diarrhœa, which I was inclined to attribute to the cod liver oil; I accordingly desired him to intermit it, but the diarrhœa occurred during the periods of intermission.

20th.—No complaint of thirst or dry-

ness of the mouth; he feels comfortable, and desires to resume his work. He left the hospital on the 25th, still continuing under my care as an outpatient. I now determined to watch the effect of opium gradually increased, and I again prescribed—

Pil. Sap. c. Opio, gr. v. to be taken twice daily.

29th.—No thirst or dryness of mouth. Appetite good. Can take exercise without fatigue. Perspires on exertion. Complexion improved. Tongue natural. Bowels regular. Passed water twice last night, and once the night before. Has not taken any vegetable food, except tea and coffee, without sugar. Fat bacon agrees well with him; no uneasy sensation at the stomach after taking fat. Not the smallest unpleasant effect from the opium pills.

February 7th.—As before.

Capiat. Pil. Sap. c. Opio. sex quotidie. (The number having been gradually increased).

March 2d.—Has been at work during the last fortnight. A few days ago, on returning from his work at night, he caught a severe cold, followed by shivering, colicky pain, and diarrhœa. I prescribed chalk mixture with aromatic confection, and Tinct. of Opium, and a powder composed of Pulv. Jacobi veri and Pulv. Ipecac. co. This morning there is an eruption about his mouth; diarrhœa; debility; tongue foul; has taken of late a biscuit daily, and this morning about four ounces of common bread.

Cap. Pulv. Ipecac. co. gr. x. ter die.

R. Ammon. Carb. 3j.; Aquæ Anisi, f3viij.; Solve. Cap. f3. ter die.

9th.—Having requested him particularly to examine his urine in respect to acidity instantly after evacuation, he reports that uniformly litmus paper was reddened by it. The examination was repeated several times, and uniformly with the same result. From my knowledge of the patient, I am satisfied that these results may be depended on. These observations were made to test the assertion of Dr. All-bridge, contained in a recent number of the Dublin Medical Journal, namely, that the urine of diabetes mellitus is always *neutral* to test paper, immediately after evacuation. Although I would not attempt to oppose the re-

sults of a single case to those of Dr. Alldridge, yet I may remark that I have always found the reaction of diabetic urine to be decidedly acid in every case which I have had an opportunity of examining.

I now append tables of the diet, and the quantity of urine passed daily. Any conclusions which may be drawn from these data I shall reserve for a future communication respecting the treatment of the disease in question.

Table of the Diet of Roberts, during his residence in the Hospital.

By gluten bread is meant, bread made with wheat flour, from which the greater part of the starch had been removed by washing. It was carefully prepared in the hospital. The liquid which he drank besides milk and beef-tea, was weak tea or coffee without sugar, and water flavoured with sassafras; the quantity may be found by subtracting the amount of beef-tea and milk in the following table from the quantity of liquid indicated in the tables marked A and B. Weights all avoirdupois.

Date.	Meat—Beef or Mutton— Weighed cooked.	Beef-tea.	Milk.	Eggs.	Gluten Bread.	Biscuits.	Cabbage.
	ozs. avoird.	Pints.	Pints.	Number.	ozs. avoird.	Number.	ozs. avoird.
Sept 16	6	1	1	2			
27	8	"	"	"			
Oct. 4	"	2	"	"			4
6	"	"	"	"			omitted.
7	"	"	"	"		2	
10	"	"	"	"		omitted	
Nov. 4	18	3	$\frac{1}{2}$	"			
8	"	2	$\frac{1}{2}$	"			
11	"	3	1	"			
Jan. 2	"	"	"	"	2		
17	"	2	"	"	"		
24	"	"	"	"	4		

TABLE A.

Indicating the quantity of urine passed, and the quantity of fluid drunk, inclusive of milk and beef-tea.

Date.	MORNING. Urine Passed.		Specific Gravity.	EVENING. Urine Passed.		Specific Gravity.	Fluid Drunk.
	lbs.	ozs.		lbs.	ozs.		Pints.
1843.							
Sept 17	2	9	1046	2	10	1046	4
18	1	13	1046	1	10	1040	4
19	2	8	1046	4	4	1043	4
20	1	5	1047	2	8	1045	4
21	1	9	1045	2	14	1043	1
22	2	4	1045	2	8	1046	5
23	1	11	1045	3	0	1045	$4\frac{1}{2}$
24	1	8	1044	4	1	1035	$4\frac{1}{2}$
25	2	6	1043	3	8	1040	5
26	1	10	1050	3	0	1045	4
27	3	7	1040	3	5	1044	3
28	2	0	1047	1	12	1042	3
29	Error		1032	3	0	1040	3
30	2	12	1037	3	0	1036	3
Oct. 1	2	6	1039	3	0	1040	4
2	2	7	1045	3	0	1037	4
3	1	13	1042	2	7	1037	$3\frac{1}{2}$
4	2	1	1041	2	15	1043	3
5	1	15	1042	3	2	1037	$3\frac{1}{2}$



