ON A CASE OF ALBUMINOUS AND FATTY URINE.

BY

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CASES of so-called chylous urine are so rare, that no extended investigation of the complaint has yet been made. Indeed no very minute investigation of a single case has, as yet, been published.

Some minute chemical details of the following case were communicated to the Royal Society, and the chemical investigation of the fatty matter will be the subject of a paper by Dr. Hofmann. The more purely medical part, consisting of the microscopical examination of the urine, of the history of the case, of the effects of the different kinds of diet to which the patient was restricted, and of the different medicines he took, may be considered worthy of the notice of the Royal Medical and Chirurgical Society. The records of the treatment are the more interesting as the disease proved to be under the control of medicine; the urine returned to a perfectly healthy state. The patient resumed his occupation after giving up work for nine months and a half, and after the complaint had existed for fourteen and a half months at the least.

On 17th of October, 1849, I received from Mr. Partridge three specimens of urine passed at different hours of the same day.

The first specimen was in quantity about four ounces, made at 9:30 a.m., an hour and a half after breakfast, the

patient remaining in bed. It was clear, acid to test-paper, not light coloured. Specific gravity 1022.5. It did not coagulate when boiled, and when nitric acid was added; but the acid made the colour deeper. On the surface there was a slight appearance of oil, which under the microscope was seen to consist of large and small oil-globules, and some streaks of oil. One or two blood-globules were also seen.

1022.5 grains of this urine evaporated to dry- } 57.8 grains of solid
ness in vacuo over sulphuric acid, gave . } residue,
=56.5 grains of solid matter per 1000 grains of urine.

The residue, dissolved in distilled water, became solid on the addition of nitric acid from nitrate of urea. By the addition of acetic acid to the urine, plenty of uric acid crystals, after some time, were deposited.

The second specimen of urine was in quantity six ounces, passed at 11:30 a.m., two hours after being up. It was of a yellowish-milk colour, quite thick, and spontaneously coagulated, so that it could not be poured from the bottle. The specific gravity was 1017.0. It was very feebly acid to test-paper. Nitric acid and heat gave a considerable precipitate. Under the microscope, I saw blood-globules in some quantity. No trace of oil-globules, but a large quantity of very minute molecular matter, scarcely resolvable by a magnifying power of 320 times. No trace of casts of the ducts could anywhere be found. Little films of coagulum could be seen containing many blood-globules. Treated with ether, the ethereal solution was clear, the urine below was cloudy, but on long standing became clear. The ethereal solution, on evaporation, gave a great mass of oil-globules; but with the microscope no decidedly crystalline fat was seen.

The spontaneous coagulum was broken up by agitation. It was insoluble at 96° F. It could be kneaded like fibrin. It was washed with distilled water, and gelatinized with strong acetic acid.

1017 grs. of urine evaporated to dryness, gave dry residue =49.1 grs.,
=48.28 grs. of solid matter per 1000 grs. of urine.

The urine, on standing, had the appearance of cream on

the surface. It remained of the same appearance for days; the only change perceptible was, that the blood-globules, after the coagulum was broken by agitation, fell, forming a visible deposit of blood at the bottom of the bottle.

The third specimen of urine was passed at 3:30 p.m., about two hours after dinner. It was about six ounces in quantity; thick, milky throughout. It also would not pour out of the bottle on account of the spontaneous coagulum which had formed. Specific gravity 1016·5. Very feebly acid. Under the microscope, more blood-globules than in the previous specimen were seen. No trace of oil-globules was found; but plenty of molecular matter. No moulds of the ducts could be discovered. The coagulum was much more streaky from blood. The liquid, freed from the coagulum by filtration, gave a considerable precipitate with heat and acid.

1016·5 grs. of urine, evaporated to dryness as before, } = 49·20 grs.,
 gave residue }
 = 48·40 grs. of solid matter per 1000 grs. of urine.

Mixed with three times its volume of alcohol, a large precipitate formed, and the urine filtered clear. Two ounces of this specimen of urine were well agitated with an ounce of ether. After perfect separation, the etherial liquid was removed, and the urine freed from fat was evaporated to dryness, and the solid residue was treated with distilled water. The filtered liquid was tested for sugar, but no trace of it was found by the sulphate of copper and liq. potassæ test. Torulæ formed in this urine very quickly and plentifully.

From these reactions, the last two specimens of urine contained fat, fibrin, albumen, and blood-globules. By agitating the coagulum, the fibrin could be broken up, and then could be separated by a filter,—a very small quantity of fibrin giving a very large and weak coagulum. The filtered liquid, on standing, deposited a layer of blood-globules at the bottom of the glass. The milky liquid poured off, agitated with ether, became clear, the fat and oil being

dissolved. After drawing off the etherial solution, on the addition of alcohol to the clear urine, albumen in plenty was precipitated.

The patient, æt. 32, gave me the following history :—His father, a Scotchman, died æt. 65 ; his mother, a woman of colour, is still alive ? He was born in Trinidad, but was sent to Scotland when 7 or 8 years old. He was apprenticed to a harness maker when 12 ; but the last three years he has been standing cutting out clothes. He is about five feet ten inches tall ; weighs nine stone four pounds. He has been married seven years, and had one child, who died when thirteen months old. He had seven brothers, six of them are alive and well. He has been in London for the last twelve years constantly, and has had good health generally all his life.

Last winter he had very hard work, from 6 a.m. to 6, 8, 10, 12 o'clock at night. At times during the winter he had to do porter's work, packing equipments for India. He perspired excessively, and used to return home much exhausted.

During the last seven years he has occasionally endured great hardships and want. He is very sober, and has led a steady life. About Christmas 1848, the urine was observed to be occasionally thick and white, and at times it deposited a pink sediment ; and for this peculiar appearance of the water, with pains in the loins and general debility, he applied for medical advice soon after Christmas 1848. He was given steel, and at first improved whilst taking it. He continued his work ; the pink sediment and the milkiness of the water very frequently appeared ; and he ceased to work on the 26th of May, 1849.

The accompanying Table, which he made himself from the 24th of May to the 18th of August, during which time he was under Dr. Prout's care, shows the state of the disease at that time. I first saw him on the 19th of October. His pulse was 72, very small. The tongue was clean, but slightly coated at the back. His skin was cold ; but he perspired when walking, and was in a perspiration when he came to me. He complains now of acute pains at times across the loins ; and if he leans against anything, or remains for a few minutes in one

position, he feels pain in the loins on moving. He is very thin, with sunken cheeks, and says his appetite is very good. He had been sent to Margate on the 2d of July, and says, that when there, "his legs took to swelling;" and he thinks the left leg rather swelled now. I did not find it œdematous. The bowels are very confined. His right thumb was stiff from pain some time since; but he has had no general rheumatism.

He can give no reason for the appearance of this complaint, except that it comes from the change of a sitting occupation for a very laborious standing one. Many fellow-workmen were made ill by the work last winter; but he never heard that any of them had any illness like his.

From the following notes he took, it appears that on first giving up work, the urine was clear for eleven days; it then became more constantly milky, but was more clear, for nearly a month, when at Margate, taking warm-baths and cod-liver oil. He continued the oil upwards of seven weeks; but finding the milkiness of the water more constant, he returned from Margate. Four days after this the urine coagulated so strongly in the bladder, that he was unable to pass his water for some hours.

The following notes of the appearances of the urine, from the 24th of May to the 18th of August, are worth recording. Dilute nitric acid and hydrochloric acid, of each fifteen minims twice a day in water, were taken:

May 24-25. White all day.

„ 26. White all day. Gave up work.

„ 27. White all day.

„ 28-29-30-31; June 1-2-3-4-5-6-7. Clear all day. Red sand observed frequently.

June 8. White after dinner. Clear the rest of the day.

„ 9. Clear all day.

„ 10. White after tea. Clear the rest of the day.

„ 11-12. White; fluctuating during the day.

„ 13-14. Clear all day.

„ 15. White after dinner. Clear the rest of the day.

„ 16. White all day.

Total clear days, 15½ days; total white, 8½ days; whilst taking the acid medicine.

Half a drachm of dilute sulphuric acid, and eight and a

half grains of alum, were taken three times a day in water for seven days :

June 17-18-19-20-21-22-23. White all day, with settlements of blood on standing, and frequently made of a red appearance. On the last day, the second prescription suspended.

Commenced cod-liver oil, one drachm twice a day, gradually increased to half an ounce twice daily:

June 24-25-26-27-28. White all day, with settlements of blood on standing, and frequently made of a red appearance.

„ 29-30; July 1. Clear all day.

July 2. Clear all day. Went to Margate for warm-baths and sea-air.

„ 3. Clear all day. Red sand in the urine.

„ 4-5. Urate of ammonia deposited, and some red sand.

„ 6. Urate of ammonia during the day; generally clear,

„ 7. Urate of ammonia.

„ 8-9-10. Urate of ammonia the greater part of the day; the rest clear.

„ 11. Clear all day.

„ 12. Urate of ammonia the greater part of the day; the rest clear.

„ 13. Clear all day. Very little red sand.

„ 14. Clear all day.

„ 15. Urate of ammonia half the day; the rest clear. Red sand in small quantity.

„ 16. Clear all day.

„ 17. Clear the greater part of the day. Urate of ammonia and uric acid the rest of the day.

„ 18. Clear all day; some red sand excepted.

„ 19. Clear all day; some red sand.

„ 20. Clear three parts of the day; the rest, urate of ammonia. Very little red sand.

„ 21-22. Urate of ammonia three parts of the day; clear the rest of the day. Some red sand.

„ 23. Clear three parts of the day; the rest, urate of ammonia.

„ 24. Clear all day.

„ 25. Clear three parts of the day; urate of ammonia after breakfast.

„ 26. Clear all day.

„ 27. Clear half the day; the other half, urate of ammonia and uric acid.

„ 28. White three parts of the day; the rest clear.

„ 29. White all day.

„ 30-31. Clear all day.

Red sand in the urine frequently.

- August 1. Clear all day. Some red sand.
- „ 2. Clear three parts of the day. Urate of ammonia after breakfast, and some red sand.
- „ 3. Clear three parts of the day. Urate of ammonia after breakfast, and very little red sand.
- „ 4. Clear three parts of the day. Urate of ammonia after breakfast.
- „ 5. White all day.
- „ 6. Clear three parts of the day ; the rest, urate of ammonia.
- „ 7. Clear half the day, the rest, urate of ammonia, and red sand.
- „ 8. Clear three parts of the day ; the rest, urate of ammonia.
- „ 9. White all day. Began to feel uneasy in the bladder.
- „ 10-11-12. White all day.
- „ 13. Clear three parts of the day ; urate of ammonia after breakfast. Came home from Margate.
- „ 14. White three parts of the day ; clear the rest.
- „ 15. White three parts of the day ; clear the rest. Left off the cod-liver oil. To take liq. potassæ, gutt. xxx, three hours after dinner.
- „ 16. White all day.
- „ 17. White all day. Stoppage took place from internal coagulation ; no instrument, however, was required. He gave up the drops.
- „ 18. He was advised to give up noting the water, as it made him nervous.

The urine has been more or less milky each day, since the 17th of August to the 23d of October.

On the 23d of October I began my chemical experiments, by examining the water each time it was passed. (The result will be printed in the 'Philosophical Transactions' for 1850.) I thereby determined the influence of the circulation on the appearance of the albumen and fat in the urine.

Previous to beginning any course of treatment, I got my patient to make constant and careful observations on the appearance of the urine each time it was passed, whilst he took different kinds of diet. It appears from these observations, that the urine was always most clear before breakfast ; and that on a more animal diet it was oftener chylous than when he lived on a more vegetable food.

These observations are also interesting, because they show the state of the urine when no medicine was taken. The FIRST SERIES, from November 6 to 16, shows the appearances of the urine for ten days, when as little vegetable food as possible was taken.

November 6, 1849. Breakfast, three quarters of a pint of tea, no milk, little sugar, chop, half a round of bread; lunch, half a pint of beef-tea, one third of a round of bread; dinner at one, steak, round of bread, half a pint of beef-tea; tea, three quarters of a pint of tea, no milk, little sugar, two eggs; supper, half a pint of beef-tea, half a round of bread. Remained in bed until after breakfast. Urine clear previous to breakfast. No internal coagulations. No red blood, but brown settlements.

12:45, just before dinner	. . .	Not so chylous as usual.
4:15, just before tea	. . .	More chylous.
9:30, after supper	. . .	More chylous.
10:15, bedtime	. . .	Rather clearer.

Nov. 7. The food this day was the same as yesterday.

6:45, a.m., in bed	. . .	Much clearer.
8:30, just before breakfast		Clear.
10		Not so chylous.
1:10, just before dinner	. . .	Rather clearer.
4:45, just before tea	. . .	Rather clearer.
9:10		More chylous.
10:45, going to bed	. . .	More chylous.

Nov. 8. The food the same as yesterday, excepting beef instead of eggs at tea.

6:45, a.m.	. . .	Much clearer.
8:20, just before breakfast		Clear.
10:45		Not so chylous.
1:25, just before dinner	. . .	Not so chylous; some blood.
3:15		More chylous; some blood.
6, after tea		More chylous; some blood.
10, going to bed		Rather clearer.

Nov. 9. The food the same as yesterday, excepting chop for dinner. Up before breakfast.

6 : 15, a.m.		Not so clear.
8 : 10, just before breakfast		More dull.
9 : 20		Not much chyle.
11		Rather chylous.
1 : 15, just before dinner		More chylous.
4 : 15, just before tea		More chylous.
7		More chylous.
10, bedtime		Not so chylous.

Nov. 10. Up early, before breakfast, which was the same as yesterday, with two eggs; dinner, chop; tea, chop; supper, calf's foot and half a round of bread.

6, a.m.		Not so clear.
8 : 15, just before breakfast		More dull.
11		Not so chylous.
1, just before dinner		More chylous.
3 : 30		More chylous.
5 : 45, after tea		More chylous.
8		Not so chylous.
10 : 15, bedtime		More chylous.
3, a.m.		Rather dull.

Nov. 11. Out of bed before breakfast. Chop for breakfast; lunch, calf's foot and half a round of bread; dinner, roast mutton; tea, two eggs; no supper.

8 : 20, just before breakfast		Clearer.
10 : 30		Rather chylous.
1 : 15, just before dinner		More chylous.
3 : 25		More chylous.
6, just after tea		Rather clearer.
9 : 35, going to bed		Rather clearer.
4, a.m.		Rather clearer.

Nov. 12. In bed until after breakfast. Breakfast, roast mutton; lunch, calf's foot; dinner, roast mutton; tea, two eggs; supper, calf's foot and half a round of bread.

9, just before breakfast		Clear.
11		Rather chylous.
1 : 35, just before dinner		More chylous.
4 : 15, just before tea		More chylous.
7 : 15		More chylous.
10		More chylous.

Nov. 13. In bed until after breakfast, which consisted of roast mutton ; calf's foot and bread for lunch ; dinner, roast mutton ; tea, two eggs ; supper, calf's foot.

6 : 30, a.m.		Not so clear.
8 : 15, just before breakfast		Clear.
10 : 30		Rather chylous.
12		More chylous.
1 : 20, just before dinner		More chylous.
3 : 30		More chylous.
6 : 20, after tea		More chylous.
9 : 30, bedtime		More chylous.

Nov. 14. Out of bed before breakfast. Breakfast, chop ; no lunch ; dinner, chop ; tea, two eggs ; supper, beef-tea.

5 : 45, a.m.		Not so clear.
7		Much clearer.
12 : 15		Chylous.
3 : 20		More chylous.
7 : 30		More chylous.
10, bedtime		More chylous.

Nov. 15. Up before breakfast. Breakfast, two eggs ; dinner, chop ; tea, two eggs ; supper, beef-tea.

6, a.m.		Rather clearer.
8, just before breakfast		Clear.
10		Rather chylous.
1, just before dinner		More chylous.
4		More chylous.
8 : 30		Not so chylous.
10 : 15, bedtime		Not so chylous.
6 : 30		Rather clearer.
8 : 15, just before breakfast		Much clearer.

The SECOND SERIES shows the appearances of the urine for fourteen days, from Nov. 16 to 30, when a much more vegetable diet was taken. The first three and the last five days of this Series gave the following results :

Nov. 16. Up half an hour before breakfast ; tea and bread for breakfast ; dinner, chop, boiled rice, broccoli, bread ; tea, pint of sago and bread ; supper, sago and bread.

11, a.m.		Not so chylous.
1 : 20, just before dinner		Not so chylous.
4 : 30, just before tea		Not so chylous.
8 : 30, just before supper		Not so chylous.
10, bedtime		Not so chylous.
2		Rather pale.

Nov. 17. Out of bed one hour before breakfast. Breakfast, arrow-root and toast ; dinner, chop, cabbage, and bread ; same as breakfast for tea ; supper, arrow-root and bread.

6 : 30, a.m.		More natural, clear.
8 : 25, just before breakfast		Rather dull.
10		Dull red colour.
11		Slightly chylous.
1 : 30		Slightly chylous, coagulated.
4 : 15, just before tea		More chylous.
10, bedtime		More chylous.
3 : 30		Rather pale.

Nov. 18. Up half an hour before breakfast. Breakfast, sago and bread ; dinner, chop, broccoli, boiled rice, and bread ; tea, sago and bread ; supper, sago and bread.

7 : 15, a.m.		More natural.
8 : 45, just before breakfast		Rather dull.
11 : 30		Slightly chylous, coagulated.
1, just before dinner		Slightly chylous, coagulated.
4 : 30, just before tea		{ Rather more chylous, coagulated masses.
9		
10 : 15, bedtime		More chylous.
3 : 30		Rather pale.

Nov. 25. In bed until after breakfast. Breakfast, tapioca and bread ; dinner, chop, broccoli, and boiled rice ; tea, sago and bread ; supper, tea and bread.

5 : 30, a.m.		Not so clear.
9 : 15, just before breakfast		More natural.
1 : 15, just before dinner		{ Slightly chylous ; internal and external coagula.
4 : 45, just before tea		
10, bedtime		More chylous.
5 : 30		Slightly chylous.
		Pale, not so clear.

Nov. 26. In bed until 9 : 20. Breakfast, sago and bread ; dinner, chop, broccoli, and bread ; tea, tapioca and bread ; supper, tea and bread.

8 : 15, just before breakfast . . .	Natural.
1, just before dinner . . .	Natural ; deposit of urates.
4 : 15, just before tea . . .	Chylous.
8 : 40	Not so chylous.
10 : 30, bedtime	Not so chylous.
6 : 30	Natural.

Nov. 27. In bed until after breakfast. Breakfast, as yesterday ; dinner, mutton, broccoli, bread, and rice ; tea and supper as yesterday.

8 : 45, just before breakfast . . .	Natural.
1, just before dinner . . .	{ Slightly chylous ; external coagulum.
4, just before tea . . .	
9	{ Very chylous ; internal and external coagulum.
10, bedtime	
6 : 30	Not so chylous.
	Rather pale.

Nov. 28. In bed until after breakfast. Breakfast, sago and bread ; dinner, steak, rice, and bread ; tea, tapioca and dry toast ; no supper.

8 : 30, just before breakfast . . .	Natural.
11 : 45, just before dinner . . .	Slightly chylous.
4 : 30, just before tea . . .	Rather more chylous.
10 : 30, bedtime	Rather more chylous.
6 : 30	Rather pale.

Nov. 29. Up half an hour before breakfast. Breakfast, as yesterday ; dinner, beef, broccoli, and bread ; tea, tapioca and bread ; supper, tea and bread.

8 : 15, just before breakfast . . .	Natural.
10 : 15	Rather dull.
1, just before dinner . . .	Slightly chylous.
4 : 45, just before tea . . .	Rather more chylous.
10 : 30, bedtime	Rather more chylous.
4	Not so clear ; pale.

Nov. 30. Up an hour after breakfast. Breakfast, chop,

weak tea, bread; dinner, chop, bread, beef-tea; tea, two eggs, bread; supper, beef-tea, bread.

7:15, a.m. Natural
10:15 Rather chylous.

THIRD SERIES; for three days more animal food was taken. From November 30 to December 2.

1, just before dinner Very chylous.
4:45, just before tea Not so chylous.
10:15, bedtime More chylous.
5 Slightly chylous.

Dec. 1. Up an hour and a half after breakfast. Breakfast, tea, two eggs, bread; dinner, chop and bread; tea, chop; supper, beef-tea and bread.

8, just before breakfast Natural but dull, with chyle.
9:45 Rather chylous.
1, just before dinner More chylous.
4:20, just before tea Very chylous.
9:15 Very chylous.
6 Rather chylous.

Dec. 2. In bed all day. Breakfast, tea, two eggs, and bread; dinner, roast mutton and bread; tea, two eggs; supper, dry bread.

9, just before breakfast { Natural, but dull with
chyle, became thick
from urates.
1, just before dinner Slightly chylous.
4:45, just before tea Slightly more chylous.
9:30 Not so chylous.
6:30 { More natural, but dull
with chyle.

	Very chylous.	Chylous.	Slightly chylous.	Not chylous
Thus: 1st Series. Ten days, more animal food—71 observations } —	34	32	5	
2d Series. Fourteen days, more vegetable food—91 observs. } 2	20	40	29	
3d Series. Three days, more animal food—17 observations } 3	3	8	3	
Hence: Total. Animal food—88 observations } 3	37	40	8	
Total. Vegetable food—91 observations } 2	20	40	29	

From the same observations, the periods of the day, at which the urine was most loaded, and most free from chyle, may be seen. Thus:—

	Long before breakfast.	Just before breakfast.	After breakfast.	Before dinner.	Before tea.	Before supper.	Bedtime.
1st Series. More animal food for ten days.	Slightly chylous ten days.	Slightly chylous five days. Clear five days.	Slightly chylous nine days.	Chylous eight days. Slightly so two days.	Chylous nine days. Slightly so one day.	Chylous eight days. Slightly so two days.	Chylous five days. Slightly so five days.
3d Series. More animal food for three days.	Slightly chylous three days.	Slightly chylous two days. Not chylous one day.	Slightly chylous one day.	Very chylous one day. Chylous one day. Slightly so one day.	Very chylous one day. Chylous one day. Slightly chylous one day.	—	Very chylous one day. Chylous one day. Slightly chylous one day.
Hence: total,— thirteen days. More animal food.	Slightly chylous thirteen days.	Slightly chylous seven days. Not chylous six days.	Slightly chylous ten days.	Very chylous one day. Chylous nine days. Slightly chylous three days.	Very chylous one day. Chylous ten days. Slightly chylous two days.	Chylous eight days. Slightly chylous two days.	Very chylous one day. Chylous six days. Slightly chylous six days.
2d Series. Vegetable food for fourteen days.	Slightly chylous five days. Not chylous eight days.	Slightly chylous five days. Not chylous nine days.	Slightly chylous nine days. Not chylous one day.	Chylous one day. Slightly chylous eleven days. Not chylous two days.	Very chylous two days. Chylous nine days. Slightly chylous three days.	Chylous five days. Slightly chylous five days.	Chylous five days. Slightly chylous seven days. Not chylous one day.

Whether the diet was vegetable or animal, the urine was most chylous after dinner, and least chylous before breakfast. It was more frequently chylous after animal, than after vegetable, food; and it was oftener free from chyle before breakfast, when the diet was vegetable, than when it consisted more of animal food.

Having thus satisfied myself that animal diet had no advantage over vegetable food, I next endeavoured to determine what the influence of pressure would be. A stout, well-padded belt was made, so that by straps, considerable pressure could be made on the abdomen and over the region of the kidneys.

FOURTH SERIES of Observations. For five days the belt was kept as tight as he could bear it.

Dec. 7. Out of bed an hour and half before breakfast, which consisted of sago and bread; dinner, chop, cabbage, and bread; tea and supper, sago and bread.

6 : 30, a.m.	Natural.
8 : 30, just before breakfast	{ Slightly loaded with urates of ammonia.
1, just before dinner	
4 : 45, just before tea	More loaded with urates.
8 : 30	Very chylous.
10 : 15, after supper	Slightly chylous.
12 : 30	Rather more chylous.
	{ Pale, but slightly tinged with chyle.

Dec. 8. In bed until after breakfast. Breakfast, sago and bread; dinner, chop, cabbage, and bread: tea, sago and bread; supper, sago and dry toast.

7, a.m.	Natural.
6 : 45, just before breakfast	Natural.
12 : 15	Slightly chylous.
4 : 30, just before tea	More chylous.
10	Not so chylous.
4 : 30	Pale, but more natural.

Dec. 9. In bed until after breakfast. Breakfast as

before ; dinner, mutton, broccoli, and bread ; tea, sago and bread ; supper, coffee and bread.

7 : 30, a.m.	Natural.
1, just before dinner	Slightly loaded with urates.
6 : 30	Very chylous.
10	Not so chylous.
2 : 30	Pale, but more natural.

Dec. 10. Out of bed half an hour before breakfast, which was as before ; dinner, mutton, cabbage, and bread ; tea, sago and bread ; supper, tea and bread.

8 : 15, before breakfast	Natural.
1, just before dinner	Slightly loaded with urates.
4 : 15, just before tea	Not the very chylous.
10	Not so chylous.
1	Clearer, but loaded with chyle

Dec. 11. Out of bed half an hour before breakfast, which was as yesterday ; dinner, chop, a little mutton-broth, and bread ; tea, sago and bread ; supper, coffee and bread.

7 : 30, a.m.	Natural.
1	{ Very slightly chylous, external coagulum.
4 : 30	{ Not the very chylous, internal coagulum.
10	Not so chylous.
2	Pale, but more natural.

	Very chylous.	Chylous.	Slightly chylous.	Not chylous.
This series contains 27 observations	2	7	6	12

For six days the belt was worn much more loose.

FIFTH SERIES.

Dec. 12. Out of bed half an hour before breakfast. Breakfast, sago and bread ; dinner, rabbit, with cabbage and bread : tea, sago and bread ; supper, sago and bread.

8, a.m.	Natural.
1, just before dinner	Very slightly chylous.
4 : 30, just before tea	Very chylous.
10	Very chylous.
4	Slightly chylous.

Dec. 13. In bed one hour after breakfast. Breakfast as before; dinner, mutton, ham, cabbage, and bread; tea, sago and bread; supper, coffee and bread.

7 : 45, a.m.	Natural.
10 : 30	Natural.
1, just before dinner	Slightly chylous.
4, just before tea	Not the very chylous.
8	Not so chylous.
10	Much clearer.
12	Pale as water.

Dec. 14. In bed half an hour after breakfast, which was as before; dinner, mutton, cabbage, and bread; tea and supper as yesterday.

5 : 30, a.m.	More natural.
7 : 45	Natural.
10 : 30	Slightly loaded with urates.
1, just before dinner	Slightly chylous.
4 : 15, just before tea	Not the very chylous.
9 : 30	Not the very chylous.

Dec. 15. Up one hour before breakfast, which was as yesterday; dinner, tea, and supper, the same.

5 : 15, a.m.	{ More natural, but dull with chyle.
7 : 30	Natural.
10 : 15	Slightly chylous.
1, just before dinner	Slightly chylous.
4 : 15, just before tea	More chylous.
8	More chylous.
10	Not so chylous.
2 : 30	Pale, but more natural.

Dec. 16. In bed until after breakfast, which was as yesterday; so also other meals.

7 : 30, a.m.	Natural.
9 : 45	Natural.
1, just before dinner	Slightly chylous.
5, just before tea	Not the very chylous.
10	Not the very chylous.
5 : 30	{ Dull with chyle, but more natural.

Dec. 17. In bed until after breakfast, which was as before; lunch, mutton and bread; dinner, roast pork and bread; tea and supper as before.

8 : 20, a.m.	Natural
10 : 30	Slightly chylous.
1, just before dinner	{ Rather more chylous, internal coagula.
4 : 15	Very chylous.
7 : 30	Very chylous.
10	{ Not so chylous, internal coagula.
1	Pale, but loaded with chyle.

Dec. 18. Up half an hour before breakfast, which was as yesterday; dinner, mutton, cabbage, boiled rice and bread; tea and supper as before.

7 : 30 a.m.	Natural.
10 : 30	Slightly chylous.
1, just before dinner	{ Rather more chylous, external coagula,

	Very chylous.	Chylous.	Slightly chylous.	Not chylous.
In this Series 42 observations were made	5	11	12	14

The belt was again made as tight as possible for eight days.

SIXTH SERIES.—Dec. 18.

2 : 30, a.m.	{ More chylous, mixed with blood, internal coagulum.
5	{ Not so chylous, more free from blood.
8 : 15	Not so chylous, less blood.
10	Not so chylous, less blood.
2	{ Pale, but more natural, slightly loaded with chyle.

Dec. 19. Out of bed half an hour before breakfast, which was the same as yesterday. So also dinner and tea. Improved.

7 : 45, a.m.	Natural.
10	Still natural.
1, just before dinner	Very slightly chylous.
5, just before tea	Rather more chylous.
9	Rather more chylous.
11	Pale, but loaded with chyle.

Dec. 20. Out of bed half an hour before breakfast, which was as before ; dinner, rabbit, cabbage, rice, and bread : tea as before ; no supper. Improved.

2, a.m.		Natural.
8 : 30		Natural.
1		Very slightly chylous.
4 : 15, just before tea		Rather more chylous.
7 : 15		Rather more chylous.
10		Rather more chylous.
5 : 30		Natural.

Dec. 21. As yesterday, except dry toast at supper. Improved.

8 : 30, just before breakfast		Natural.
10		Natural.
1, just before dinner		Slightly loaded.
4 : 15, just before tea		Rather chylous.
8		Not so chylous.
10		Still less chylous.
5 : 15		{ Natural, but slightly loaded with chyle.

Dec. 22. In bed till after breakfast, as before : dinner, mutton, rice, cabbage, and bread ; tea, sago and bread ; supper, mutton and bread. Improved.

8 : 30, just before breakfast		Natural.
10 : 15		Natural.
1, just before dinner		Slightly loaded.
4 : 15, just before tea		Rather chylous.
8, just before supper		Not so chylous.
10		More chylous.
4		{ More natural, but loaded with chyle.

Dec. 23. In bed until after breakfast. Breakfast, sago and bread ; dinner, roast mutton, cabbage, and bread ; tea, sago and dry toast ; supper, dry bread.

7, a.m.		Natural.
10		Natural.
1, just before dinner		Very slightly loaded.
4 : 15, just before tea		Not the very chylous.
7 : 30		Not so chylous.
10		Still less chylous.
1 : 15		{ Rather natural, but loaded with chyle.

Dec. 24. In bed until after breakfast, which was as before ; dinner also ; tea, sago and bread ; supper, dry toast.

6, a.m.		Natural.
10		Natural.
12, just before dinner		Very slightly chylous.
4:15		Not the very chylous.
9		Not so chylous.

Dec. 25. In bed until after breakfast, which was as yesterday ; dinner also, with rice ; tea, sago, dry toast ; no supper.

7, a.m.		{ More natural, but loaded with chyle.
10		
1, just before dinner		Very slightly chylous.
4:15, just before tea		Not the very chylous.
10		{ Pale, but slightly loaded with chyle.

Dec. 26. In bed until after breakfast. Breakfast as yesterday ; dinner, chop, cabbage, rice, bread ; tea, sago and bread ; no supper.

2:45, a.m.		{ Rather more natural, but loaded with chyle.
7		
9		Natural.
1, just before dinner		Natural.
		Slightly chylous.

In this Sixth Series, 53 observations were made }	Very chylous.	Chylous.	Slightly chylous.	Not chylous.
	1	16	17	19
Hence: Fourth and Sixth Series— 80 observations: belt tight }	3	22	24	31
Fifth Series— 42 observations: belt loose }	5	11	12	14

From this it appears, that during the days the belt was tight the urine was less chylous than on the days when the belt was loose. The difference was not, however, very great, though he stated, that the pressure relieved the pain in the back very considerably.

The effect of medicines on the urine was next observed. The first medicine chosen was matico, and this was selected for its astringent properties. If its virtues depend, as is said, on a stimulating essential oil, this may account for its

not having fully answered the end of restoring the urine to its healthy state. At first two drachms of the leaves were infused in a pint of boiling water, and two ounces of this were taken three times a day. The strength of the infusion was gradually increased, until eight drachms of the leaves were infused in a pint of water, and from three to eight ounces of the infusion were taken in the day. The experiments were continued from Dec. 26 to Feb. 11, inclusive. The last fortnight, when the strongest doses of the matico were taken, will probably be considered as best exemplifying its effect on the urine. I may sum up the previous observations when matico was taken thus :

SEVENTH SERIES.—From Dec. 26 to Jan. 28, inclusive, is 34 days ; in this time 211 observations were made :

Very chylous.	Chylous.	Slightly chylous.	Not chylous.
7	27	69	108

EIGHTH SERIES.—From Jan. 29 to Feb. 11, inclusive, matico in stronger doses was taken.

Jan. 29. Out of bed before breakfast. Breakfast, sago and bread ; dinner, mutton, rice, and bread ; tea, sago and bread ; supper, coffee and bread.

7, a.m.	.	.	Natural.
9 : 30	.	.	Very slightly loaded with urates.
1	.	.	Rather more urates.
5	.	.	Rather chylous.
9 : 30	.	.	Still less chylous.
12	.	.	Rather pale, but natural.

Jan. 30. Out of bed before breakfast. Breakfast, sago and bread ; dinner, mutton chop and bread ; tea, sago and bread ; supper, coffee and bread.

7 : 15	.	.	Natural.
9 : 30	.	.	Very slightly loaded with urates.
12 : 30	.	.	Rather more urates.
2 : 30	.	.	Rather more urates.
5	.	.	Not so chylous.
8	.	.	Still less chylous.
10	.	.	Pale, but slightly loaded with chyle.
1	.	.	Rather pale, but natural.

Jan. 31. Out of bed before breakfast. Breakfast, sago and bread; dinner, mutton, cabbage, and bread; tea, sago and bread; supper, coffee and bread.

7, a.m.	.	.	.	.	Natural.
10 : 45	.	.	.	.	Rather loaded with urates.
1	.	.	.	.	Rather pale, but clear—natural.
5	.	.	.	.	Not so chylous.
9 : 30	.	.	.	.	Still less chylous.
3 : 45	.	.	.	.	Pale, and rather loaded with chyle.

Feb. 1. As yesterday in all things.

8 : 30, a.m.	.	.	.	.	Natural.
10	.	.	.	.	Rather loaded with urates.
1	.	.	.	.	More loaded with urates.
6 : 25	.	.	.	.	Not so chylous.
10	.	.	.	.	Still less chylous.
12 : 25	.	.	.	.	Rather pale, but more natural.

Feb. 2. As the day previous.

4, a.m.	.	.	.	.	Natural.
7 : 15	.	.	.	.	Natural.
9 : 15	.	.	.	.	Natural.
10 : 15	.	.	.	.	Slightly loaded with urates.
1	.	.	.	.	More urates.
5 : 10	.	.	.	.	Rather chylous.
10 : 30	.	.	.	.	Not so chylous.
12 : 45	.	.	.	.	Pale, but rather loaded with chyle.

Feb. 3. As before, except that no supper was taken.

7 : 45	.	.	.	.	Natural.
10 : 15	.	.	.	.	Slightly loaded with urates.
1	.	.	.	.	More urates.
7 : 20	.	.	.	.	Rather chylous.
10	.	.	.	.	Not so chylous.
12 : 15	.	.	.	.	Pale, but loaded with chyle.

Feb. 4. As yesterday.

7 : 15	.	.	.	.	Natural.
10	.	.	.	.	Rather loaded with urates.
1	.	.	.	.	More urates.
5	.	.	.	.	Not so chylous.
10 : 30	.	.	.	.	Still less chylous.
1 : 45	.	.	.	.	Rather pale, but natural.

Feb. 5. As yesterday.

7 : 16, a.m.		Natural.
10 : 30		Rather loaded with urates.
1		More urates.
5 : 30		Not so chylous.
10		Still less chylous.
12 : 15		{ Pale, slightly loaded with chyle.

Feb. 6. In bed until after breakfast. Breakfast, sago and bread; dinner, fish and bread; tea, sago and bread; supper, coffee and bread.

6 : 45 a.m.		Natural.
10		Some urates.
1		Rather pale, but more natural
5 : 15		Not so chylous.
8 : 30		Still less chylous.
10 : 15		Much less chylous.

Feb. 7. Out of bed before breakfast, which consisted of sago and bread; dinner, mutton, rice, and bread; tea, sago and bread; supper, coffee and bread.

7, a.m.		Rather pale, but natural.
10		Slightly loaded with urates.
1		Not so loaded.
4		Not so chylous.
7 : 45		More chylous.
10		{ Pale, and slightly loaded with chyle.
1 : 30		Rather pale, but natural.

Feb. 8. As yesterday, except cabbage instead of rice at dinner.

7 : 15, a.m.		Natural.
10 : 15		Rather loaded with urates.
1		More urates.
4 : 45		Not so chylous.
10		Still less chylous.
11 : 30		{ Pale, and slightly loaded with chyle.

Feb. 9. Out of bed one hour before breakfast. Breakfast, sago; dinner, fish and bread; tea and supper as yesterday.

7 : 15, a.m.	.	.	.	.	Natural.
8 : 40, just before breakfast	.	.	.	.	Rather dull.
1	.	.	.	.	More loaded with urates.
5	.	.	.	.	Less chyle.
8 : 30	.	.	.	.	Still less chyle.
11	.	.	.	.	Rather more chylous.
3 : 20	.	.	.	.	Rather pale, but natural.

Feb. 10. Out of bed before breakfast ; dinner, mutton, cabbage, bread ; tea, sago and bread.

7 : 30, a.m.	.	.	.	.	Natural.
9 : 50	.	.	.	.	Rather loaded with urates.
1	.	.	.	.	More clear and natural.
8 : 30	.	.	.	.	Rather chylous.
10 : 20	.	.	.	.	Rather chylous.

Feb. 11. In all respects as yesterday.

7 : 10, a.m.	.	.	.	.	Rather loaded with chyle.
10	.	.	.	.	Slightly chylous
1, just before dinner	.	.	.	.	Slightly chylous.
3 : 25	.	.	.	.	Slightly chylous.
7 : 30	.	.	.	.	Slightly chylous.
10 : 30	.	.	.	.	Rather more chylous.

	Very chylous.	Chylous.	Slightly chylous.	Not chylous.
Eighth Series, 14 days, 89 observations	1	10	28	50

By comparing these results with the observations when animal or vegetable diet was taken, the improvement is distinctly evident.

Though the matico effected a considerable improvement in the urine, yet it did not hinder the fat from passing off ; and the precipitate, by heat and nitric acid, was not diminished. On this account I tried gallic acid, beginning with one drachm dissolved in warm water, taken in divided portions during the day.

The gallic acid was begun after breakfast on the 13th of February, in the morning. The urine, the day previously, was highly albuminous.

NINTH SERIES.—From the 13th to the 16th of February ; 27 observations.

Feb. 13. Out of bed before breakfast. Breakfast, sago and bread ; dinner, cold mutton, cabbage, and bread ; tea, sago and bread ; supper, tea and bread.

8 : 10, a.m., before breakfast	Natural.
1 : 15, just before dinner	Very slightly loaded with urates.
5 : 15, just before tea	Not so chylous.
8 : 30	Very slightly chylous.
10	Rather more chylous.
11 : 30	Pale as water.

Feb. 14. Out of bed before breakfast. Breakfast, as before ; dinner, fish and bread ; tea, as before ; no supper.

7, a.m.	Natural.
12 : 30, before dinner	Very slightly loaded with urates.
2	Rather pale, but clear and natural.
4, before tea	Very slightly chylous.
8	Very slightly chylous.
10	Very slightly loaded with urates.

Feb. 15. Out of bed one hour before breakfast, which was as yesterday ; dinner, mutton chop, cabbage, and bread ; tea, as yesterday ; no supper.

5 : 25, a.m.	Natural.
9 : 15	Natural.
11 : 45, before dinner	Natural.
1 : 45	Much paler.
5, just before tea	Again natural.
9 : 35	Again natural.
10 : 15	Very pale.
12	Pale as water.

Feb. 16. Out of bed one hour before breakfast, which was as before ; dinner, fish and bread ; tea, as before ; no supper.

7 : 10, a.m.	Natural.
9 : 15	Natural.
12, before dinner	Natural.
2 : 30	Rather paler.
6 : 30	Again natural.
10	Again natural.
12	Very pale.

From Feb. 16 to April 7, the gallic acid was continued in decreasing doses.

From the 16th to the 20th of February, the urine was free from chyle ; 19 observations.

Feb. 19.

Urine passed at 7, a.m., clear, contained no albumen.

„ 9:30, clear, no albumen.

„ 12, clear, no albumen.

„ 3:30, slight cloudiness from infusoria; no albumen.

„ 6:45, clear, no albumen.

„ 10 the same.

„ 12:30 the same.

„ 7, a.m. the same.

From Feb. 20 to March 4, the urine was observed 75 times each time it was made, and it was always free from chyle. On the 2d of March, each time it was passed, it was free also from albumen. On the 4th of March the patient resumed his work.

Up to the 9th of March he continued taking 60 grains of gallic acid daily; on this day, breakfast at 8:45, dinner at 1.

Water passed at

7, a.m., slightly cloudy from infusoria, no albumen, sp. gr. = 1010.1

11 clear no albumen, sp. gr. = 1019.7

6:20, p.m., clear no albumen, sp. gr. = 1025.7

10 clear no albumen, sp. gr. = 1026.2

The quantity of gallic acid was diminished to about $46\frac{1}{2}$ grains daily, and this was continued to March 24th. From the 4th to the 24th, the urine was observed 98 times; no chylous appearance was observed. On the 24th of March the urine was free from albumen, and the quantity of gallic acid was diminished to 30 grains daily. On March 31st it was reduced to 15 grains, and on the 6th of April the medicine was taken for the last time. On this day, April 6,

Urine passed at 7:30 a.m., slightly cloudy from infusoria; no albumen.

„ „ 6:10 p.m., clear; no albumen.

„ „ 10 p.m., clear; no albumen.

He observed, on two or three occasions, that the urine, on standing, gave a deposit which redissolved by heat. Since the 24th of March, the urine was observed seventy-two times, and was never chylous. He feels perfectly well, and he works about eight hours daily. The gallic acid was taken for fifty-three days, during which time the urine was passed 290 times. It was more or less chylous five times; free from chyle, 285.

On the 14th of April I again examined the urine, and no albumen was present in it. No medicine had been taken since the 6th. The urine had been passed thirty-nine times, and was never chylous.

The result of these observations, made from the 6th of November to the 7th of April, will be best seen by showing in each series the proportion of the chylous urines to the urines free from chyle, supposing 1000 observations had been made.

		In 1000 observations.	
		Chylous in different degrees.	Free from chyle.
Thus :—1st.	On animal food the proportion is	968 times	32 times.
2d.	Vegetable food „ „ „	910 „	90 „
3d.	Pressure belt loose „ „	667 „	333 „
4th.	Pressure belt tight „ „	638 „	362 „
5th.	When matico was taken „ „	474 „	526 „
6th.	When gallic acid was taken „	17 „	983 „
7th.	After gallic acid was taken „	0 „	1000 „

The second day after taking the gallic acid, the chyle and albumen disappeared from the urine; and for the last fifty-eight days no chyle or albumen has been found to be present in it.

For the last forty-one days the patient has resumed his work. For the last eight days no medicine has been taken, and the urine has remained healthy.

For the next sixty-one days, namely, from the 14th of April to the end of the 14th of June, there were 311 observations of the urine. It was never chylous. It was examined once a fortnight, each time it was passed during the day, and I have not found a trace of albumen to be present in it on any occasion.

From the 14th of June to the end of August the urine was healthy.

The following case, which occurred in St. George's Hospital when I was Dr. Hope's clinical clerk, shows how slight the affection of the urine and kidneys may be in this disease, so-called chylous urine.

Harriet Best, æt. 35, married, and has had four children,

all of whom are said to have died of hydrocephalus, one at 3 months, another at 9 months, the third at 17 months, and the last at $3\frac{1}{2}$ years. Admitted into St. George's Hospital, under Dr. Hope, June 27th, 1840; youngest child is 3 weeks old. It was weaned, and died two months afterwards. Eleven years ago, after a confinement, was swelled in the face and legs; has frequently had rheumatic fever; has had some anasarca for six months. A few days after her confinement, her left arm became œdematous and paralysed. At present, complains of dyspnœa and palpitation, with orthopnœa and habitual dry cough; complexion pallid and sallow; pulse 126, very small and weak, rather unequal; respirations forty a minute; tongue clean; bowels regular; urine natural in quantity, but thick and dark. Five months ago had hæmoptysis, to the extent of a quart. Impulse of the heart strong and heaving; murmur with the first sound below the outside of the left mamma; sonorous and mucous rales in the lungs; slight bronchophony in left apex. Bluepill, squill, and digitalis, ter. die; nitric ether and acetate of potash, ter. die.

29th. A slight trace of albumen in the urine; sp. gr. 1016.

July 1st. Gums sore; no fetor; swelling decreases; arm the same; urine more abundant; garg. alum.

2d. Urine still increases; contains a large quantity of albumen.

6th. Dismissed at her own request.

15th. Readmitted under Dr. Wilson. Has anasarca of the lower extremities, dyspnœa, and orthopnœa; countenance pale, dusky, anxious; catamenia have not appeared; tongue white, flabby; bowels relaxed; pulse small and weak; no milk for the last three weeks.

Quinæ sulph., gr. $\frac{3}{4}$; Inf. caryophylæ, $\frac{3}{4}$ ss.; Inf. aurantii, $\frac{3}{4}$ j, t. d.; Ext. lactucæ, gr. iij, o. n. Hr. Rhei, c. m.

18th. Much pain in the bowels, much troubled with flatulence.

19th. At present legs are somewhat œdematous; belly tumid; fluctuation not distinct; complains of cough; slight murmur with the first sound; second sound clear.

20th. Complains of sickness. Tincture of cantharidis, $\mathfrak{m}\mathfrak{x}$, singulis haustibus. Roast slice.

21st. Urine passed last night is of a yellowish white colour, and contains a large white coagulum, like curds floating on the surface, and partly adherent to the sides of the vessel; smells sour, is acid to test paper; specific gravity, 1017; gives a coagulum with heat and with nitric acid, but not with heat when acetic acid is first added.

22d. Urine of the same nature, in much smaller degree.

23d. Urine natural, yellow colour; no trace of spontaneous coagulation; not so much use in the arm as on the 19th.

24th. Urine in large quantity, clear; says that there was the same appearance as on the 21st; twice in the urine when at home, and once when first in the house; bowels relaxed; countenance less dusky.

August 17th, made an out-patient; no return of the appearance in the urine.

Sept. 9th, 1840. Admitted to the Plymouth Dispensary, under Dr. Hingston. She is seated up in bed, and complaining of pain in the left side; cannot bear the recumbent position, and leans towards the side complained of; breathing short and frequent (36 per minute), and unable to inhale deeply, from the aggravation of pain, and a sense of constriction and great distress; has no cough; tongue moist and clean; complexion clear, and of a pale cachectic colour, with a fixed redness of the cheeks, which are puffed; pulse 108, regular, small, and equal; left arm and hand much swollen, and wanting in power to a great extent; abdomen tumid, with indistinct fluctuation; legs very œdematous; bowels open; urine natural in appearance, though lately said to be scanty; appetite good; sleeps much; memory very uncertain; speech sometimes exceedingly impaired.

The impulse of the heart is a little greater than usual, but about its normal place; a soft bruit is heard in connection with the first sound, which is in good relation to the second; but there is an irregular action of the heart during the period (commonly of rest) between the second and first sounds, which is very peculiar; the bruit is most plainly perceived between the fourth and fifth ribs, and seems to diminish in moving the ear downwards towards the apex

It is scarcely audible between the second and third ribs of the left side.

The breathing loud and puerile over the upper part of the chest; in other parts, where there was unequal dullness on percussion, were various rhonchi, mucous and crepitant. She died about a fortnight after her admission.

Post-mortem.—The sternum and cartilages of the ribs being removed, a patch of recent loose fibrin, about three inches in superficial diameter, lies upon the left pulmonary pleura, and connects it to the costal pleura. Pleural surfaces, on either side, almost universally adherent by old adhesions. The lobes of either lung adherent, by the same medium, to each other. The external part of the lungs very dark and livid. The cut surface is of a very dark and livid colour, in spots, easily breaking down under the finger, and on pressure permitting a large quantity of frothy serum to escape. At the base of the left lung, and towards its posterior surface, is a small spot of pulmonary apoplexy.

Pericardial surfaces closely adherent throughout by firm cellular tissue; heart one third larger than natural; parietes of ventricles about their usual thickness, if anything, rather attenuated; both ventricular cavities considerably increased in capacity; auricles much dilated; muscoli pectinati of the right side much developed; lining membrane of the left auricle of a buff colour; thickness of its walls normal; right auriculo-ventricular orifice easily admits three fingers and the thumb; pulmonic opening admits two fingers very readily; artery itself considerably dilated; left auriculo-ventricular orifice, a cartilaginous ring, which tightly embraces the forefinger when thrust into it; the angles of the valve adherent to each other, and the membranes of the valve very thick and cartilaginous; aortic opening natural; spleen rather large; liver of an immense size; its section is just like that of a nutmeg; kidneys rather small, but healthy; stomach large, but presents nothing peculiar; head not examined; there was about a quart of turbid serum in the cavity of the abdomen.