degeneration. In this way, if new accessions of germinating foci are added to the tumour, we can understand how it continues to grow even when the energy of its original cells is exhausted.

Now, if this be true, I think Cohnheim's theory will not bear criticism; for, if we hold by it, the tumour ought not to influence the parts which are not the subject of this embryonal peculiarity. We should expect that the embryonic tissue would exhaust itself in time, and that a period of quiescence would at last be reached. This, although true of some tumours, does certainly not hold good of all. There are certain sarcomata and cancers whose virulence seems even to increase as they get older.

The other theory on which the neoplasms might be accounted for is that of a local or general stimulant, acting on the cells of a particular part, and causing them to germinate. We have a parallel to this in the evolution of the uterus and mamma in pregnancy. Both of these organs are evidently in a more unstable condition than the other tissues of the body, from the frequency with which tumours of their respective tissues form. The myoma of the uterus, occurring in one of every ten women, clearly shows that there is a tendency to undue proliferation of the muscular tissue of that organ, and the frequency of cancer of the mamma shows that the epithelium of that gland is also in a similarly unstable state. The stimulation of pregnancy, whatever that may be, is sufficient to cause the increased activity of each. Causes other than pregnancy have a similar, although minor, effect. Cohnheim's theory will not explain this. There is evidently something influencing the uterus or mamma, respectively or collectively, which acts as a stimulant. Whether this be chemical or not, we do not know.

On the whole, although it may be said that the matter is as yet almost purely theoretical, I would be inclined to believe that the tissues generally are capable, under certain circumstances, of deriving new embryonic activity, and that some local influence is the cause of this; that, in some cases, this influence is withdrawn after a time, and that then the tumour becomes benign, but that, in others, it is continuous, and is capable of being propagated to adjacent parts; that, in this way, new germinal material is added to the tumour-mass, and so its growth is progressive in some parts, stable or retrogressive in others. I believe that more experimental evidence is required before the pathogeny of the neoplasmata can be settled.

THE RELATIONS OF PHTHISIS AND ALBUMINURIA.

By C. THEODORE WILLIAMS, M.A., M.D., F.R.C.P.,

Physician to the Hospital for Consumption and Diseases of the Chest, Brompton.

(Concluded from page 1228.)

CASE XII.—Catherine T., aged 38, mother of eleven children, a laundry-maid, was admitted March 6th, 1879. Her mother died of bronchitis. She stated that she had suffered from cough for two years, and that nine months ago she was attacked with shivering and fever, and confined to bed for three weeks; since that date she had been unable to follow her occupation. Cough had persisted and gradually increased. She had had hæmoptysis to a pint and a half two weeks ago, and a week later the expectoration was streaked. She had been steadily losing flesh for the last six weeks. On admission, her cough was hard, expectoration moderate; the catamenia had been absent four months, and irregular before that date. She complained of interscapular pain.

Physical Signs.—Cracked-pot sound was heard as far as the fourth rib on the left side. Cavernal croak was audible from the first to the third rib. The line of resonance of the right lung extended across the sternum to the left sternal margin. The heart's apex was raised; the impulse was between the fourth and fifth ribs. Posteriorly, cavernous sounds were audible above the right scapula; crepitation was heard at lower left base; the respiration was very harsh on the right side. Her weight was 6 stone 2 lbs.; urine normal. The patient suffered from night-sweats, and the temperature rose, in the afternoon, to 100° Fahr. on March 27th. In the beginning of April she complained of great thirst, and on the 16th albumen was detected in the urine, which was of specific gravity 1012. The temperature was then taken five times daily, and the averages were, at 8 A.M., 97.7°; at 11 A.M., 98.3°; at 2 P.M., 98.8°; at 5 P.M., 99.5°; at 8 P.M., 100.9°; maximum, 102.4°; minimum, 96.4°.

April 21st. Albumen had been detected in the urine every day, and the patient was rapidly becoming worse. There was now, in addition to the above physical signs, crepitation over the whole left posterior chest; also crepitation over the whole right lung.

April 22nd. Pulse, 120, small; respirations, 30. The patient was

wandering in her mind. The pupils were unequal, the right one being the larger. The tongue was protruded straight. She complained of dizziness and drowsiness, and died at 10.30 P.M.

The *necropsy* showed the right lung adherent at the apex and base, especially so to the diaphragm. The lung contained large pigmented patches, two inches in diameter, of transparent tubercle, with caseating centres. The patches were peripheral in the upper and lower axilla. The left lung was adherent at the apex and base; the upper lobe contained several communicating cavities; the lower, some pigmented tubercle. The spleen weighed 11 ozs., and was lardaceous. The liver weighed 5 lbs.; it was not lardaceous. The kidneys weighed 14 ozs., and were rather large. The capsules were adherent; the cortex was not diminished; the right kidney had a cyst of the size of a walnut on its convex surface. The kidneys gave no reaction with iodine, and presented the appearance of interstitial disease with nephritis.

REMARKS.—This case is given more fully, because it was evidently not one of lardaceous disease of the kidneys, though the spleen was lardaceous, a by no means rare occurrence. The history showed phthisis of old standing, manifesting a fresh tubercular outbreak in the opposite lung. The albuminuria seems to have been noted first in the hospital, but probably existed, in some degree, at an earlier date; and the renal lesions, which evidently terminated life by uræmic poisoning, were very acute.

CASE XIII.—Eliza Ann T., aged 46, married, had lost seven children from various chest-complaints. She had pleurisy and congestion of the lungs seven years before admission, and thirteen months ago cough, a sharp pain in the left side, with shortness of breath, and streaked expectoration, which had continued up to the time of admission, and were accompanied by night-sweats, and great loss of flesh. Lately, diarrhoea had come on. On admission, cough was troublesome. She could not sleep at night. She complained of dyspnoea and night-sweats. The urine was of specific gravity 1016, clear, containing one-twentieth of albumen. Crepitation was audible over both lungs, most marked and coarsest over the upper left part of the chest.

The patient remained about the same till April 7th, when the temperature-observations were commenced, and carried on till April 26th inclusive, a period of twenty days. The urine varied in amount from 46 ounces to 52 ounces; the specific gravity from 1008 to 1012; the albumen from one-twelfth to one-sixth of the test-tube. She had some phlebitis of the veins of the left upper extremity, and on April 9th complained of intense pain in the abdomen, of a dragging character; a swelling was discovered to the right of the umbilicus, which was tender and dull on percussion. Vomiting followed, and persisted for some days. She grew rapidly worse; the extremities became anasarctous; the physical signs showed evidence of cavities having formed in both lungs, with extensive consolidations at the bases. She sank and died April 21st.

The temperature-averages for twenty days, *i.e.*, till five days before death, were as follows: At 8 A.M., 98.4°; at 11 A.M., 99.2°; at 2 P.M., 99.7°; at 5 P.M., 100°; at 8 P.M., 100°; maximum 102.4°; minimum, 95°.

The *necropsy* showed a curious hæmatoma or blood-cyst, of the size of a small orange, in the transverse meso-colon, but the source of the blood was not traced. The liver weighed 2 lbs. 10 ozs.; it was nutmeggy, and soft. The spleen had hæmorrhagic patches. The kidneys weighed 8½ ozs.; they were pale and granular, the appearance being due to interstitial disease, with chronic superadded tubal inflammation. The lungs had both pleuræ loosely adherent by oedematous areolar tissue. The lungs themselves were very oedematous, and contained patches of broncho-pneumonia, with emphysema at their borders. The right lung contained a large tuberculated cavity at the apex, and the left, three small ones in the upper lobe, surrounded by a deeply pigmented zone. The intestines were healthy.

REMARKS.—This is another instance of granular disease of the kidneys, supervening on old phthisis, as shown by the character of the cavities, and inducing pulmonary oedema. The thermic chart was, on the whole, low. The complication of hæmatoma was a curious one.

CASE XIV.—Mary P., aged 18, was admitted November 25th, 1879. She had cough, expectoration, and night-sweats, two years. During the last two months she had had diarrhoea, and was greatly wasted. In December, the ankles were noted to be puffy. Diarrhoea ceased after admission, but recurred in January 1880. The urine was found to be of specific gravity 1025, containing one-twentieth albumen.

Physical Signs.—On the right side there was crepitation to the third rib. On the left, distant cavernous sounds were heard from

the clavicle to the fourth rib. There was crepitation below, at the front and back. Observations on the temperature and urine were carried on from February 17th, 1880, to March 4th, a period of sixteen days, when the patient left the hospital and was lost sight of.

She suffered from diarrhoea to a slight extent during this period, the number of motions not exceeding two or three a day. Once, on March 1st, she vomited, and the vomited material was tested for urea, but none was found.

During this period the temperature gave the following averages: At 8 A.M., 97.8°; at 11 A.M., 98.2°; at 2 P.M., 99.2°; at 5 P.M., 100°; at 8 P.M., 99.7°; maximum, 101.4°; minimum, 97.2°.

The urine varied in quantity from twenty ounces down to two and a half ounces, the average being as low as seven ounces; the specific gravity varied from 1032 to 1047, the average being 1039. The amount of albumen was very large, being at least two-thirds of the test-tube, and on two occasions the urine became almost solid on boiling. The urea varied in quantity from seventy-four to ninety-three grains in the twenty-four hours, a very low rate of excretion. Crystals of oxalate of lime and urate of soda were present in the urine on more than one occasion.

REMARKS.—This was a case of chronic phthisis, with a certain degree of activity, as evidenced by the physical signs. The kidney-disease was most marked, and the condition of the urine pointed to very great obstruction in the Malpighian tubes. The reason that, with so small an amount of urea excreted by the kidneys, no symptoms of coma supervened is, I think, to be found in the diarrhoea, which probably carried off some of the urea and urinary salts. The large amount of albumen, and the reduced quantity of water, point more to nephritis than to any other form of kidney-disease.

CASE XV.—Mr. B., aged 29, man-cook, came under my care for renal symptoms on December 1876. His father died of cancer. The patient had erysipelas eight years ago; not recurring. Cough and hæmoptysis commenced seven years ago; the latter was repeated on several occasions, but was never copious. The last was one month ago, to the extent of a drachm. Cough had ceased four years, but returned three years ago, accompanied by expectoration, occasionally streaked with blood. There had been gradual emaciation for two and a half years, most marked during last year. In August, he had dry pleurisy of the right side, with considerable pyrexia, subsiding in ten days, but recurring three weeks later with great pain in the side. In June, an abscess formed in the right axilla, and discharged, with diminution of cough and expectoration, and considerable temporary relief. In November his breath became shorter, and after a chill, when coming out of a club-kitchen, drowsiness and oedema of the feet supervened. The urine was found (December 2nd) to be of specific gravity 1016; it contained one-eighth of albumen, but no casts. Diarrhoea commenced December 4th, and continued more or less up to the patient's death.

The physical signs in December were:—fluttering and defective breath in both sides; in the right side, dulness, coarse crepitation over the upper third, front and back; fine crepitation at both bases. Observations were taken six times a day, at 8 and 11 A.M., 2, 5, 8, and 11 P.M., during the last four weeks of life. The urine was examined daily, and always found albuminuric, of a specific gravity varying from 1010 to 1014. The diarrhoea was to some extent checked by medicine, but oedema of the lower extremities supervened, and the patient died January 9th, 1877. Unfortunately no *post mortem* examination could be obtained. The averages of temperature were as follows: at 8 A.M., 97.6°; at 11 A.M., 97.3°; at 2 P.M., 98.0°; at 5 P.M., 98.9°; at 8 P.M., 99.8°; at 11 P.M., 101.1°; maximum, 94°; minimum, 102.3°.

REMARKS.—Here the history began with syphilis, which predisposed to the subsequent lung-mischief; though the general course of the symptoms separated it from the specific forms of the disease, and specially the diarrhoea, which came on with the renal symptoms. The temperatures, compared with the active lung-mischief, were decidedly low.

CASE XVI.—Reuben B., aged 28, was admitted, January 1880, under the care of Dr. Tatham, who kindly allowed me to make observations on his temperature and urine. He had suffered from cough and copious expectoration, occasionally streaked with blood, for eleven weeks. He had occasional night-sweats, and, lately, marked dyspnoea; oedema of the lower extremities had appeared in the last two weeks. The physical signs showed the existence of a cavity in the left lung, and active tuberculation proceeding in the upper lobe of the right lung.

Observations were made on the temperature and urine for twenty-three days, up to March 14th, when the patient left the hospital,

with the subjoined averages: at 8 A.M., 98.6°; at 11 A.M., 98.98°; at 2 P.M., 99.9°; at 5 P.M., 98.4°; at 8 A.M., 100°.

The urine was slightly alkaline, varying in quantity from 31 to 70 ozs., with an average of 38 ozs.; with a specific gravity ranging from 1014 to 1024, as a rule about 1019. The albumen occupied generally half the test-tube, and small granular and hyaline casts were discovered under the microscope. The urea varied from 197.5 grains to 292.74 grains, this latter amount being excreted after a hot-air bath, which relieved the breathing temporarily.

REMARKS.—This case showed the same lowered temperatures as some of the preceding cases, the averages being almost normal. The state of the lungs, and the comparatively short period elapsing between the date of attack and admission into the hospital, point to a tolerably acute form of disease. As the patient passed from observation, no opportunity was afforded for ascertaining the exact condition of the kidneys. They were probably lardaceous, with a considerable amount of nephritis, set up, as Dr. Dickinson says, by the irritation of the extruded lardaceous material.

GENERAL REMARKS.—In order to place the temperatures on a broader basis, the averages of the sixteen patients (including one to be given hereafter) are taken as a whole, and embodied in Table I. In this, in connection with the temperatures of each case, is entered a short account of the condition of the lungs, which will show, at a glance, the amount involved, and the degree of severity of the disease.

All appear to be active third-stage cases; in eight, cavities had formed, or were forming, in both lungs. In the rest, excavation had taken place in one lung, and tuberculation was proceeding in the same or the opposite lung. In six, at least, there was ulceration of the intestines, and probably this was the case in two more. Ulceration of the larynx occurred in five.

It will be seen that the total averages of the temperature are: at 8 A.M., 97.7°; at 11 A.M., 98.5°; at 2 P.M., 99.1°; at 5 P.M., 99.4°; at 8 P.M., 99.8°. These figures show a gradual rise from 2 P.M. to 8 P.M., as is usual in phthisis, but the temperatures are below the febrile standard.

For comparison, I have placed on Diagram II the curve (continuous)

Diagram II.

of the averages of temperature of acute third-stage phthisis, founded on forty-three cases without albuminuria. Below it is the curve (broken line) of the albuminuria third-stage cases. This demonstrates a steady lowering of about one degree at each period of observation.

It will be noted that the temperature-curve of the albuminous cases is exactly the same as that of the other; only, owing to the cooling influence of the blood-poisoning, it is carried on one degree lower.

The maxima and minima also show the tendency to extremes common to active third-stage cases, the range varying from 94° Fahr. to 104.2° Fahr.; the average maximum of the sixteen cases being 100.7° Fahr., and the average minimum being 96.5° Fahr.

Dr. Whipple communicated to the Medical Society, January 29th, 1883, a case of acute tuberculosis, where lardaceous disease of the liver, spleen, and kidneys had supervened, in which the temperature-course was normal or subnormal. The case was interesting as

TABLE I.—*Showing Extent of Disease and Lowering of Temperature of Phthisis in the third stage, active, complicated with Albuminuria.*

Case.	Name.	Stage and Extent of Disease.	Temperature.						
			Means.					Max.	Min.
			8 a.m.	11 a.m.	2 p.m.	5 p.m.	8 p.m.		
1	E. G.	Phthisis III, active. Diarrhoea. Excavation and Tuberculation in both lungs	97.4	98.8	99.0	98.7	98.6	102.4	96.0
2	W. W.	Phthisis III, active. Diarrhoea. Cavities in right lung. Tuberculation. Intestinal Ulceration	98.4	99.0	99.8	99.5	100.0	102.0	98.0
3	Alfred B.	Phthisis III, active. Cavities in both lungs. Tuberculation.	97.9	97.9	98.3	98.9	99.9	101.2	97.0
4	Mary A. P.	Phthisis III. Cavities in both lungs. Caseous Pneumonia. Intestinal Ulceration. Peritonitis.	97.3	97.4	97.2	97.8	98.2	99.2	96.0
5	Thomas T.	Phthisis III, active. Cavity in right lung. Tuberculation proceeding in both lungs.	98.6	99.1	99.2	99.6	100.1	102.4	98.0
6	John B.	Phthisis III, active. Cavities in both lungs. Tuberculation in right lung. Intestinal Ulceration	97.4	98.8	99.5	99.1	98.2	100.0	97.0
7	George M.	Phthisis III, active. Cavities in both lungs. Syphilis. Ulceration of Larynx and Intestines	97.4	97.8	98.1	98.5	98.9	100.8	96.4
8	Frederick G.	Phthisis III, active. Cavities in both lungs. Tuberculation. Ulceration of Larynx and Intestines	97.7	98.4	99.1	99.4	99.9	101.8	96.8
9	James R.	Phthisis III, active. Cavity in left lung. Tuberculation of both lungs	100.2	101.6	101.8	102.0	102.4	104.2	98.2
10	J. T.	Phthisis III. Cavities in both lungs. Recent Tuberculation. Pleurisy	98.1	98.6	99.4	100.0	100.2	101.6	96.0
11	J. M. W.	Phthisis III, active. Cavities forming in both lungs. Tuberculation	100.6	99.3	100.3	101.0	101.3	103.8	94.0
12	Catherine T.	Phthisis III, active. Cavities in left lung. Tuberculation of right lung	97.7	99.3	98.8	99.5	100.9	102.4	96.4
13	Eliza Ann T.	Phthisis III, active. Cavities forming in right lung. Fresh Tuberculation in left lung. Edema and Emphysema of lungs	98.4	99.2	99.7	100.0	100.0	102.4	95.0
14	Mary P.	Phthisis III, active. Cavity in left lung. Tuberculation of right lung	97.8	98.2	99.2	100.0	99.7	101.4	97.0
15	Mr. B.	Phthisis III, after Syphilis. Pleurisy with fresh Tuberculation	97.6	97.3	98.0	98.9	99.8	102.3	94.0
16	Reuben B.	Phthisis III, active. Cavity in left lung. Tuberculation in right lung	98.6	98.9	99.3	98.4	100.0	100.4	98.2
Averages of Means of 16 cases.....			97.7	98.5	99.1	99.4	99.8	101.7	96.5

TABLE II.—*Illustrating Condition of Urine and Morbid Anatomy of Kidneys.*

Case.	Name.	Age.	Urine.					Morbid Anatomy.	
			Average Quantity.	Average Specific Gravity.	Albumen.	Urea.	Rate per lb. body weight.	Kidneys.	Other Organs.
1	E. G.	18	ozs. 23	1021	§	grains. 236.8	2.27	Lardaceous (incipient)	
2	W. W.	16	17	1014 rising to 1040	1 to solidity.	201	to 54	Lardaceous, nephritis	Liver fatty, fibroid and lardaceous. Spleen lardaceous.
3	A. B.	26	21	1031	§	169	1.37	Lardaceous, large white	
4	M. A. P.	46	36	1026	§	180	1.63	Lardaceous	Liver and intestines lardaceous.
5	T. T.	35	40	1018	§	216		Lardaceous	Spleen lardaceous.
6	J. B.	29	40	1015	§	228	2.03	Lardaceous, large white	Liver fatty and lardaceous. Spleen and pancreas lardaceous.
7	G. M.	38	27	1012	§			Large white and mottled. Nephritis. Weight, 22 ozs.	
8	F. G.	19	17		§	166		Lardaceous	Liver and spleen lardaceous.
9	J. R.	27	39		abundant.			Left hospital	
10	J. T.	30	30	1027	abundant.			Large mottled	
11	J. M. W.	28	44					Chronic nephritis, probably lardaceous	
12	C. T.	38		1012				Not lardaceous; interstitial disease (cyst), and nephritis. Weight, 14 ozs.	Spleen lardaceous.
13	E. T.	48	48	1011	1/6			Interstitial disease with tubal inflammation (granular). Weight, 8 1/2 ozs.	
14	Mary P.	18	7	1039	§	82	.98	Left hospital. Nephritis	
15	Mr. B.	29		1014	§			Died. No post mortem examination	
16	R. B.	28	38	1019	§	207.9		Left hospital	

confirming the above conclusion, and also for the diagnosis of the case, from the presence of bacilli in the system, when the physical signs were obscure.

The principal facts relating to the *urine* of these patients has been summarised in Table II, in which some of the results of the *post mortem* examinations are also entered, and it will considerably facilitate our comprehension of the urinary phenomena if we turn to this first. Of the sixteen patients, thirteen died while under observation, and in twelve necropsies were obtained; but we need not here go into the state of the lungs in each case, but will proceed at once to the consideration of the kidneys.

The kidneys in seven of these twelve cases were undoubtedly lardaceous; in three more instances they were described as either large white kidney, or mottled kidney, or chronic nephritis, and it is not improbable that all these cases might, after more careful examination, have been classed as lardaceous. In the remaining two cases, the kidneys were, in one, in a state of interstitial nephritis, and in the other they were granular, with some tubal inflammation. In five of the seven cases of undoubtedly lardaceous kidney, there was similar disease of other organs, namely, of the intestines, liver, spleen, or pancreas, the spleen being most frequently involved. This gives a preponderance of probable lardaceous disease—viz., ten out of twelve, *i.e.*, five-sixths of the cases; but even taking the un-

doubted cases only, more than half were affected with this form of the disease.

In the fatal case in which no necropsy could be obtained, the character of the urine, and the presence of diarrhoea and œdema, pointed to lardaceous disease; and of the survivors, Case XVI was probably lardaceous; while, in Case XIV, the large reduction of the urine and of the urea pointed rather to nephritis, and it is possible that Case IX belonged to the same category. It was only by very careful examination that lardaceous disease was detected; and often, in doubtful cases, microscopic examination settled the question. According to Ecorché, quoted in Hanot's article in the *Nouveau Dictionnaire de Médecine et de Chirurgie Pratiques*, phthisis is present in sixty per cent. of the lardaceous kidneys. Dr. Southey, in his Lumleian lectures at the College of Physicians, gives, as the result of his hospital experience, that phthisis was associated with 8.9 per cent. of the granular kidney, with 12.9 per cent. of the large white kidney, and with 37 per cent. of the lardaceous kidney.

Professor Bamberger, in a valuable contribution based on 2,430 cases of Bright's disease, from the records of the Allgemeines Krankenhaus in Vienna, gives a list of the various diseases to which 1,623 of his cases of Bright's disease were secondary; and in this it appears that in 15.7 per cent. of the whole number, it was secondary to tuberculosis, phthisis, and scrofula.

Bamberger finds that, while lardaceous disease of the kidney and other organs was a tolerably frequent attendant on chronic phthisis, the parenchymatous and tubular forms of nephritis were most common. Wishing to investigate this subject from the other standpoint, I endeavoured to ascertain the number of cases of phthisis in which lardaceous disease of the kidney was found after death, and for this purpose examined the records of the Brompton Hospital for one year and a half, during which period Dr. Ewart had been curator, and had examined most of the kidneys microscopically.

In 133 necropsies in cases of phthisis, the kidneys gave a marked reaction with iodine in 50, or in 37 per cent. In 19 more a slight reaction was obtained, chiefly confined to the Malpighian tufts, giving a total of 69, or 52 per cent. This is a higher percentage of lardaceous disease in phthisis than any previously given; but it must be remembered that the Brompton Hospital has special advantages in point of numbers for investigations of this sort.

The microscopic observations confirm the admirable ones of Dr. Dickinson, demonstrating that the vessels of the Malpighian tufts were those first attacked, and that, later on, the epithelium of the tubuli contorti was involved in the staining. In many instances, fatty changes were also taking place in the epithelium.

Urine.—Having ascertained the pathological conditions of the kidneys, we can better consider the urine secreted by each form. In the lardaceous cases, the average quantity varied from 17 to 40 ozs. in the 24 hours. In Case XIV, of which the diagnosis was chronic nephritis, it at one time fell to 2½ ozs., the specific gravity rising to 1047. In this case the urea fell to between 74 and 93 grains, and the patient nevertheless showed no head-symptoms. The specific gravity averages of the lardaceous cases varied from 1012 to 1031, a much higher estimate than Dr. Dickinson's, who gives it as 1006 to 1015. In Case III, where great obstruction occurred in the tubes, it rose gradually from 1014 to 1040, with such an enormous increase of albumen, that the urine appeared to be a mere solution of serum. In Case XIII, one of granular kidneys, it fell to 1011.

The albumen was very abundant, and seldom amounted to less than half the test-tube. In Case II, the urine eventually became solid on boiling, and prevented further investigations.

In the "granular case," it averaged one-tenth, but never exceeded one-sixth. In Case VII, one of large white kidney, presenting no lardaceous reaction, the albumen was one-half the test-tube, the specific gravity being only 1012, and the kidneys, after death, weighing 22 oz. Casts were found in six cases, granular in two, granular and hyaline in one, hyaline with oil-globules in one, simple hyaline in one, and blood-casts in one.

The urea was determined by Russell and West's method. The maximum in the cases of lardaceous kidney was 337 grains in the 24 hours, which occurred in Case I, the minimum was 54 grains, which occurred in Case II, the normal amount being about 500 grains *per diem*, showing a great decrease from the ordinary standard.

The most remarkable diminution occurred in Case III, where, in one month, the urea diminished from 201 to 54 grains, the quantity of urine remaining the same, and the dietary not greatly varying. In this case, diarrhoea was present, and increased somewhat towards the end of the period; but the increase was not sufficient to reduce the quantity of the urine passed, though probably some of the urea was excreted by the bowels. Our lardaceous cases, therefore, show a decided diminution of water and urea, but the presence of a very large amount of albumen. Unfortunately, time did not allow of the quantitative analysis of the other constituents of the urine in these cases. In column 7 of the Table II, I have entered the rate of urea-excretion per pound of the patient's weight, according to Parkes' plan, who estimated that a healthy man should excrete daily 3½ grains for every pound of his weight. This shows that the highest rate was 2½ grains, and two of the patients excreted 1.6 grains and 1.3 grains per pound respectively, and one rather less than 1 grain per pound—a very small quantity.

The question arises as to the cause of the lowering of the temperature in the above cases, and we naturally turn to the state of the blood for an explanation. In albuminuria, generally, there is a marked decrease in the number of red corpuscles and of albumen, with a relative increase in the water, fibrin, and leucocytes; hence the great pallor and the tendency to dropsy. As the red corpuscles are the carriers of oxygen to the tissues, it would appear that the diminution in their number, which, according to Dickinson, amounts to one-fifth, may considerably interfere with perfect oxidation; but in many cases of disease, pallor is combined with high temperature, and so this will not afford a complete explanation. Nor will the presence of an increased amount of urea alone do so; for it has

been shown by Hammond's¹ important experiments that, provided the kidneys remain intact, a considerable quantity of urea can be injected into the blood of dogs without greatly disturbing the circulation, and that, when symptoms of uræmia appeared, they disappear under the degenerating action of the kidneys. Even when the kidneys have been removed, or the renal arteries tied, and thus the urinary constituents retained within the blood, uræmia does not take place, if, as has been pointed out by Bernard and Barreswill, the urea or the products of its metamorphosis can be discharged by the stomach and intestines. The state of the kidneys in Case II, blocked by tubal nephritis, and the small quantity of urea and water excreted by them, without any symptoms of coma, with the obstinate, but doubtless necessary diarrhoea, present a remarkable similarity to this set of experiments. Hammond, however, shows that urea, injected into the blood in quantities beyond such an amount as can be excreted, produces toxic effects.

It is probable, however, that the condition known as uræmia is due to the retention within the blood, not of one urinary constituent alone but of many; and an experiment of Stolnikoff (*Centralblatt für die Med. Wiss.*, April 24th, 1880) bears on this. He found, in experimenting on rabbits, that if, before injecting putrid material into the blood and setting up septicæmia, the renal arteries were compressed, and thus the conditions of nephritis reproduced, no pyrexia followed, but rather a lowering of the temperature. He also found that, when nephrectomy was performed on animals in a feverish state, the fever sank.

The temperature of chronic Bright's disease, whether nephritic or granular, is usually low, and often subnormal; and so it is not surprising that the state of blood which lowers the temperature in this form of disease should reduce the high temperatures of pyrexial phthisis. We may conclude, therefore, that the lowering of the temperature in cases of phthisis associated with albuminuria is due—partly, at least—to the retention within the blood of the constituents of the urine. This gives rise to uræmia, which is not sufficiently intense to cause coma.

Prognosis.—A careful study of our cases will disclose a very unfavourable outlook for the complication of albuminuria with phthisis. The patients died generally within a few months of the appearance of the first symptoms—one after a few weeks; and the longest case lasted but three months. Private patients, however, appear to live longer, and I know of some cases where life has been prolonged even for years. In the discussion on Dr. Sparks and Dr. Bruce's paper read before the Royal Medical and Chirurgical Society on January 14th, 1879, on the Effect of Diet and Rest in Chronic Nephritis, Dr. Quain cited a case of phthisis of fifteen years' standing, with albuminuria of five years' duration; and one of extreme albuminuria and extensive chronic phthisis, with but little influence on the general health. In one of my patients, who has had phthisis for fifteen years, and a considerable-sized cavity for ten years, albuminuria supervened six years ago, and he still survives, although in a very precarious condition. Another patient, of twelve years' duration, has had slight albuminuria for one year, and is still able to travel, though living the life of an invalid. These are the longest cases I can recall; and they must be regarded as the exception, and not the rule. Many others whom I have seen have sunk a few months after the albuminuria set in; so that this symptom must, in all cases of phthisis, be regarded as of very serious import.

The treatment of these cases, and the results of various dietetic experiments, are reserved for another communication.

ELECTROLYSIS IN THE TREATMENT OF DRACUNCULUS.

By ALEXANDER S. FAULKNER, M.R.C.S. Eng., I.M.D.,
Civil Surgeon, Aden.

O. L., a Hindu goldsmith from Kattyawar, aged 28, was admitted into the Civil Hospital, Aden, on July 25th last, suffering from the effects of the presence of four Guinea-worms in different parts of his body.

The patient, though a slight man, was fairly nourished, and his general constitution and functions did not seem much impaired. The different positions of the several worms were as follows. About the upper third of the outer aspect of the right leg, a worm had protruded about three inches; on the lower third of the outer side of the left thigh, another had also protruded to the extent of about two inches; on the dorsum of the left foot, he had a fistulous open-

¹ "Uræmi: Intoxication," *American Journal of Medical Sciences*, 1861.