

sulphuric and phosphoric acids and chloride of sodium amongst the inorganic constituents of the urine. I am therefore precluded from following any further the relation between our results, but I notice that the chloride of sodium in his observations moved in the same direction as the chlorine and sodium in mine—that is, was less during walking than during rest. For the ten days of rest the daily average was 235.92 grains, and for the five days of walking 65.08 grains.

Potash was eliminated more largely during walking than during rest. The daily average for the latter period was 54.25 grains, and for the former 77.26 grains. The ratio furnished by these figures is 1 to 1.424.

Lime also showed a similar deviation, although eliminated in each case to a much smaller extent. The daily average for this base during rest was 4.13 grains, and during walking 6.44 grains. The ratio given is 1 to 1.559.

Magnesia exhibited scarcely any alteration, there being a daily average elimination of 2.79 grains during rest, and 2.76 grains during walking. The ratio presented is 1 to .989.

To tabulate the urinary principles and compare the elimination during rest and walking, the relation stands as follows, expressing the amount for the former period as unity:—

	Rest.	Walking.
Urea ... ..	1 ... ..	1.743
Uric acid ... ..	1 ... ..	1.287
Chlorine ... ..	1 ... ..	.478
Sulphuric acid ... ..	1 ... ..	1.520
Phosphoric acid ... ..	1 ... ..	1.985
Soda ... ..	1 ... ..	.822
Potash ... ..	1 ... ..	1.424
Lime ... ..	1 ... ..	1.559
Magnesia ... ..	1 ... ..	.989

The theoretical deduction to be drawn from the investigation which has been conducted is, that although the elimination of urinary nitrogen is increased by muscular exercise, yet the increase is nothing nearly sufficient to give countenance to the proposition that the source of the power manifested in muscular action is due to the oxidation of muscular tissue.

There is a practical deduction likewise to be drawn, and this, I think, possesses a considerable amount of importance. For the maintenance of the body in a proper state the ingoing must be equal to the outgoing—in other words, according to the consumption and elimination of material so should be the supply that is furnished. Now, the results show that nitrogenous matter is consumed in the system in larger quantity during exercise than during rest, and we may take it, therefore, that its supply should be made to coincide. Whatever view we may adopt about the source of muscular power, it stands to reason that when there is an extra consumption of nitrogenous matter going on there should also be an extra supply in order that the proper balance may be maintained. Although it is probably true that the non-nitrogenous principles yield their latent force in part to the evolution of muscular power, yet the teaching of observation tends to show that something more than food holding a preponderance of the non-nitrogenous principles is required to sustain the body under severe exercise; and this teaching, it may be said, corresponds with the promptings of our instinctive inclination. Animal food is best adapted for replacing nitrogenous matter when an extra waste is going on, and meat and cheese, by common consent, are looked upon as more largely required by those undertaking prolonged and arduous work than by those leading a comparatively inactive life.

But besides the elimination of nitrogenous matter being increased, it is noticeable that there is also a marked increase in the mineral ingredients of the urine. All, except chlorine and soda, and associated with these magnesia, show evidence of decided augmentation, but none so much so as phosphoric acid. Indeed, no principle, whether inorganic or organic, is influenced so extensively as this latter. Mineral matter undoubtedly must be looked upon as playing an essential part in the economy of life, and an increased elimination naturally implies that an increased supply is demanded. Now it happens, as with nitrogenous matter, that nothing meets this extra demand so adequately as animal food; and again we have an argument suggesting its special serviceableness during the performance of muscular work.

To complete these communications, I will give an account of the processes of analysis applied to the urine.

(To be continued.)

## REPORT OF A CASE OF ELEPHANTIASIS SCROTI, WITH SUCCESSFUL OPERATION.

By STAFF-SURGEON GODFREY GOODMAN, R.N.

(Communicated by the DIRECTOR-GENERAL OF THE MEDICAL DEPARTMENT OF THE NAVY.)

IN August, 1874, while at Levuka, Fiji, in H.M.S. *Dido*, I was asked to see a native who was suffering from elephantiasis scroti, with a view of having the case operated on. The man, by name Domash, a native of Fiji, from the island of Gora, was about forty-five years of age, and, though thin and slight, was of healthy appearance, and had a good appetite. He had come from his own island to Levuka, to see if he could have anything done for him, as he suffered great inconvenience from the weight of the tumour, this preventing him from moving about, and causing him considerable pain in back and loins. The tumour, which was pear-shaped, extended to within about three inches of his ankles. Its greatest circumference was a little above the base, and measured about forty inches; its narrowest portion at the perineum, at which point it was about eight inches transversely, and four in an antero-posterior direction; this was when the man was standing up. The tumour itself presented a solid brawny feel to the touch, except at one or two points near its base, where a sense of fluctuation could be detected. The skin on the surface of the growth was smooth and regular, but could not be easily pinched up off the underlying areolar tissue. The penis was considerably retracted, but about two inches of the prepuce, including glans, was external to the tumour. His left leg, as high as the knee, was also the subject of this disease, and it had also commenced to attack the right ankle. The disease had existed for years, but the exact time could not be well ascertained.

After a careful examination, I determined to remove the tumour, having first explained the danger to the patient through an interpreter. He expressed himself as willing to run any risk, and was most anxious to have the operation performed without delay. It was arranged that he was to be kept some days in hospital in order to regulate his diet, and to make more accurate observations with regard to his state of health. Unfortunately, on the night of August 4th, while sleeping by the fire, the tumour came in contact with some live coals, and before he was aware of the occurrence, an extensive and deep burn was inflicted on its surface. This determined me on operating at once, and assisted by Dr. Cruickshank, and Dr. Goode, surgeon of the *Dido*, on the morning of August 5th I had the patient placed on a table under one of the beams in the ward. To this beam a light table was fastened. The tumour was carefully bandaged and enveloped in a piece of strong calico, which was sewn over it. To this the hook of the tackle was made fast, and by this means the whole was hoisted up so as to drain it of blood. The tumour was kept in this position for about half an hour. The patient was then put under chloroform. I had had previously manufactured on board by the blacksmith an iron clamp thirteen inches long, with screws six inches long, passing through the ends of the blades, by which means they could be brought forcibly together. When the patient was fully under the influence of chloroform, the clamp was applied round the neck of the tumour close to the perineum. Before this was done, the penis was drawn forcibly forwards and upwards towards the abdomen, and the blades were then screwed tightly together. The mass was then lowered down and held horizontally by an assistant. Standing on the left side of the patient, with a large scalpel I made a semilunar incision across the front of the tumour, commencing at the left side, about an inch in front of the clamp, carrying the knife about two inches forward, and terminating the incision on the opposite side, at a corresponding point to where it was commenced. This

incision was from an inch and a half to two inches deep, dividing the integument, thickened areolar tissue, &c., which formed the wall of the tumour. When these tissues were divided, the interior of the mass was found to consist of large cells containing yellowish fluid. The cell-walls were thick, and resembled those that are seen in large hydatid cysts. The testicles were found lying in the centre of this substance; the outline of their tunics could not be traced; they appeared enlarged and in a diseased state. Fearing they would act as foreign bodies, and interfere with the subsequent healing of the wound, the vessels were tied, and they were removed. A large quantity of blood flowed from the wound, but it came principally from the distal side of the venous sinuses, which were very large, and, from the brawny nature of the substance in which they were embedded, remained patulous after division. Before proceeding further, all the vessels that could be observed were at once tied. When these were secured, a long amputating knife was passed across from one angle of the first incision to the other, and the whole tumour removed with one sweep of the knife, a similar flap to the anterior being formed. The vessels in this flap were also tied, and as much as possible of the watery cysts and loose tissue between the flaps was removed with the knife. The faces of the thickened walls of the tumour, where they were divided, were painted over with strong carbolic acid, an ordinary paint-brush being used for the purpose. The surfaces between the flaps, where the loose cysts had been dissected out, were freely sponged with a strong solution of the same. The clamp was then gradually unscrewed, and, as no further bleeding took place, it was removed at once. The edges of the wound were brought together by several points of interrupted suture; these were composed of carbolic silk. The wound was covered with lint soaked in carbolic-acid lotion; this was covered with oiled silk, and the whole secured with a T bandage.

The patient was kept completely anæsthetised throughout the operation, which took about twenty-five minutes. On recovering from the effects of the chloroform, a small quantity of brandy was administered, and he was removed to bed. When asked to move, he put both hands under him to raise himself, as he was in the habit of doing, and expressed great surprise and pleasure at the ease with which he was able to do so.

The tumour, after removal, weighed 42 lb., without taking into consideration the weight of the fluids which escaped, to the extent of some pints, during the operation, and from the mass after its removal and before it was weighed.

The patient slept well that afternoon and the night after the operation, and on the following day was cheerful, and complained of little or no pain. I had now to leave Levuka, as my ship was proceeding to one of the other islands in the group.

This case progressed very favourably. I was subsequently informed by Dr. Cruickshank, under whose care the patient was left, that there was little or no suppuration, and that nearly all the wound healed by first intention. When healed, the stump was about the size of a small drinking basin. The man returned to his island about the middle of September, with the wound quite healed, and expressing himself well pleased with the result of the operation.

## ON THE PROBABLE RELATIONSHIP OF SYPHILIS, SCROFULA, TUBERCLE, CANCER, AND OTHER ALLIED MORBID CONDITIONS.\*

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CONSIDERING the extent and importance of the subject, it will be anticipated that what I have to say must of necessity be of a very fragmentary nature. And although it is impossible to prove the connexion, of which there is a certain amount of evidence, it is a subject pregnant with material for thought, speculation, and, it may be, discovery.

Without attempting in the slightest degree to dogmatise,

I would venture to suggest that syphilis has a substantial share in the production of these morbid conditions. Whatever may be the actual relationship, it is quite certain that, to say the least, they have many points of resemblance. If we study their pathology carefully, I think it may be fairly stated that, in all, some portion of the lymphatic system is greatly at fault. And here it will be well to consider briefly the arrangement and distribution of this system. It includes the lymphatic glands, follicles, vessels, capillaries, and "serous canaliculi" described by Recklinghausen. These lymphatics pervade the whole body, being more numerous in those localities where there is the largest quantity of nutritive fluid circulating, consequently where there is the greatest functional activity. They are especially abundant in—(a) the mucous membranes, particularly about the lips, mouth, nose, glans penis, anus, and vagina; (b) the visceral layer of serous membranes; (c) the lungs and liver; (d) the ductless glands, comprising the spleen, thyroid, thymus, and supra-renal capsules; (e) the vessels of the brain and cord, which are surrounded by lymphatic sheaths.

In the first place we will compare *syphilis* and *scrofula*. Without enumerating the various conditions found in either state, do they not attack almost identically the same portions of the body? Hydrocephalus often appears with hereditary syphilis. Sometimes hydrocephalus attacks one member of a family and syphilis another. Rosen mentions a case of hereditary syphilis in a girl, eleven years old, who had suppuration of glands and caries of bones. Many foreign authorities of high standing in the profession do not hesitate to pronounce many scrofulous diseases in children as the result of syphilis in the parents—e.g., Hey, Hufeland, Mahon, Bertin, &c.; and it is very probable that observations in this direction are conducted with greater facility abroad than in this country. Baumés relates instances in which syphilis in the parents was followed by hydrocephalus, caries about the knee joint, phthisis, and glandular swellings in different members of the family. Syphilitic parents have been known to produce children some of whom were syphilitic, others scrofulous, others healthy.

In both diseases, whatever be the explanation, there is a tendency to phthisis, although much stronger in scrofula. From comparatively recent investigations made on animals by Drs. Burdon-Sanderson and Wilson Fox, it appears that a "something," indistinguishable histologically from what is generally understood as "tubercle," can be produced artificially by irritation of the lymphatics. And so in syphilis, when there has been undoubted irritation of the lymphatics, it is not uncommon to meet with a very similar condition in various parts of the body.

Glandular enlargement used to be considered pathognomonic of scrofula (before so much attention was bestowed on lymphadenoma); and yet Dr. Wilks says, "In the lymphatic glands, especially those of the neck, we have now long been in the habit of looking for signs of constitutional syphilis." Mr. Hutchinson says, "Syphilis, in all its stages, produces special and wholly peculiar lesions; and although these may *easily* be mistaken for struma, they have in reality nothing whatever to do with that state of constitution." I believe they may *very easily* be mistaken, and in some cases the diagnosis is decided by the result of our inquiries into the history of the patient. If there is any suspicion of syphilis, we have to do with a syphilitic affection; if not, a scrofulous one. It must be remembered that although pemphigus is peculiarly a syphilitic disease when occurring in infancy, it certainly does not always present the colour which usually belongs to syphilitic eruptions.

Another mark of syphilitic eruptions which does not always hold good is, that they do not itch. I have now under my care two indubitable cases of syphilis in which there is great itching present. Dr. Wilks relates the case of a boy whom he considered scrofulous; but after some time he treated him with mercurial inunction and iodide of potassium, and because he rapidly recovered the case was regarded as syphilitic. Here it was quite certain that the lesion would answer to the description of either disease, the diagnosis being ultimately settled by that most fallacious of all tests, treatment. It cannot be said that the connexion between syphilis, lupus, keratitis, and scrofula can be altogether ignored at present, until we have more numerous and reliable statistics regarding the history of such cases.

Although Mr. Hutchinson and others see in syphilis a

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