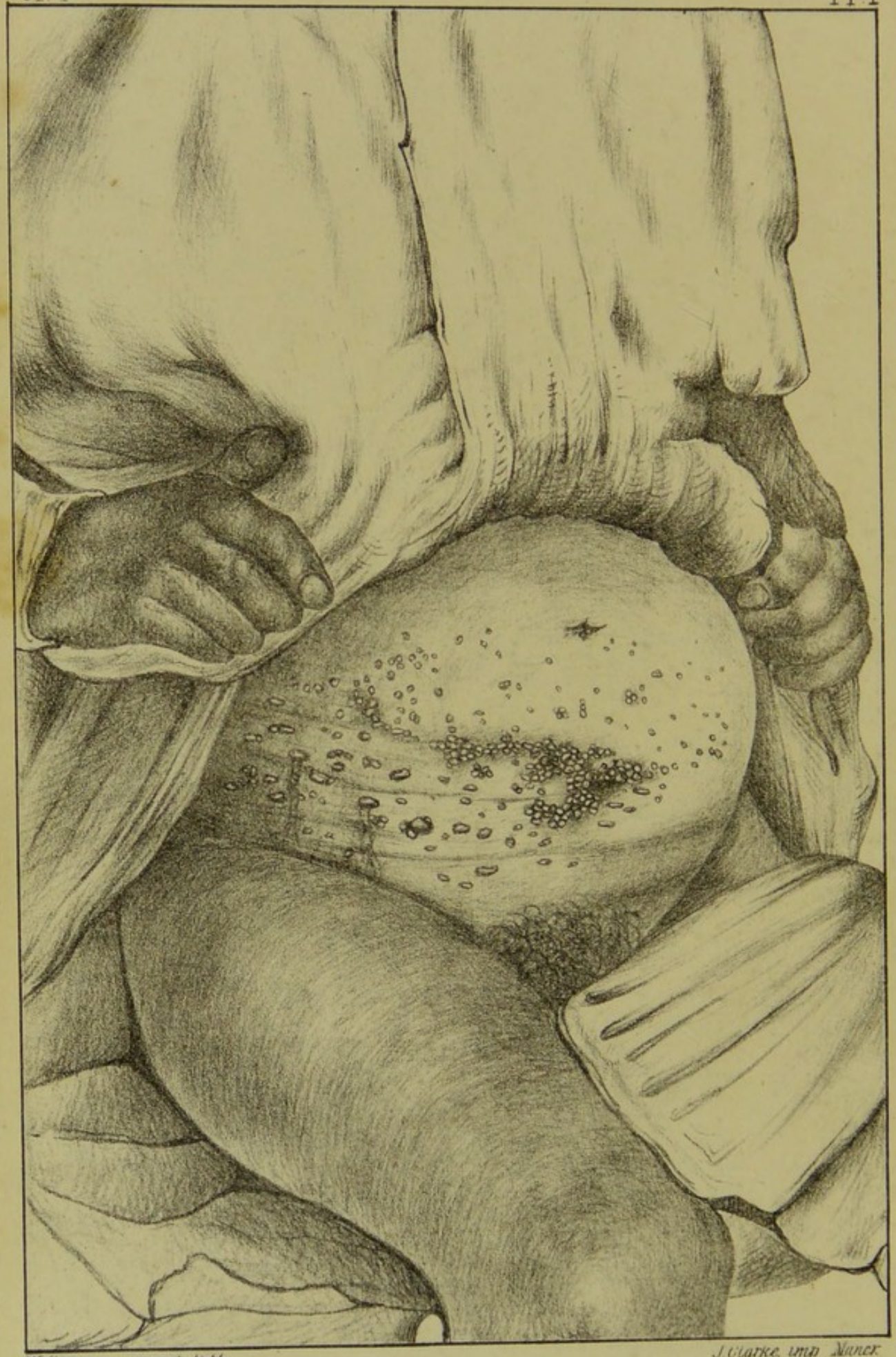
A case of disease of the lymphatics of the abdominal integuments, with occasional discharge of large quantities of a chylous fluid / by William Roberts, M.D.

PLATE

Illustrating Dr. W. Roberts's paper on Disease of the Lymphatics of the Abdomen.



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A CASE OF DISEASE

OF THE

LYMPHATICS OF THE ABDOMINAL INTEGUMENTS,

WITH

OCCASIONAL DISCHARGE OF LARGE QUANTITIES OF A CHYLOUS FLUID.

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The disease described in the following pages is so rare in these temperate climes that it must, for the present, be regarded more as a pathological curiosity than a matter of practical interest. But it not unfrequently comes to pass that exceptional freaks of nature throw great light on some of its more ordinary processes, supplying an important link in some well-known chain of sequences. So it happens with regard to some rare and obscure forms of animal and vegetable life; although insignificant in themselves they come to assume great scientific importance when they are found to fill what would otherwise be an inexplicable gap in a series, or serve to connect, in a rational manner, two approximating groups of animals or plants. It is, therefore, the duty of those who chance to encounter one of these *lusus naturæ* to observe it and place it on record, in the expectation that some future generaliser may find in it something which may assist him in framing useful practical deductions.

The case here recorded is probably closely related to another rare—but not nearly so rare—a disease, namely, chylous urine. And it is something to get any light on the pathology of that disorder. The opportunity furnished by a *post-mortem* examination in the following case has enabled me to propose

a new and, I hope, more rational theory of that strange disease than any hitherto offered.

W. Robinson, aged 45, was admitted into the Manchester Royal Infirmary, September 21st, 1868. He was born in Accrington, and never resided out of Lancashire. A clogger by trade, he worked occasionally in the mill, and enjoyed good health, with the exception of occasional indigestion, until two and a half years ago. His family history is good, and neither in that nor in the antecedents of his own life, could any circumstance be found bearing directly on the genesis of his present complaint. He is a widower and never had children.

Two and a half years ago he began to suffer from a succession of large abscesses; one appeared on the buttock, another on the right breast, a third in the left groin, and a fourth in the right iliac region, two inches from the middle line, and about midway between the horizontal level of the umbilicus and the pubes. The two last formed, opened, and refilled several times before they finally closed. These abscesses continued to trouble him for a period of six months, and brought him to a low state of health. He suffered from severe shooting pains which seemed to extend from one abscess to another; he lost his appetite and grew weak and thin, and had to go to Southport to recruit his health.

After all the abscesses had healed up he noticed a scab to remain over the site of the one situated in the right iliac region, and one night, some twenty months before admission into hospital, he picked this off, and immediately a pale watery fluid, exactly like gum-water began to exude. This escaped so quickly that in a quarter of an hour his clothes were soaked; the discharge continued during the night and the succeeding day, in gradually diminishing quantity, and then ceased. He calculated that from two to three pints of fluid escaped on this occasion. And now he noticed a number of pale transparent vesicles, no larger than pins' heads scattered in the right iliac region over and around the site of the old abscess. When he first observed them they were ten or a dozen in number, but in a few weeks they began to spread and multiply until, in a few months, they dotted the surface of the

lower part of the abdomen on both sides of the middle line, almost as low as the pubes on the one hand, and as high as the umbilicus on the other. Some of them, also, began to discharge a pale watery fluid. By and bye the vesicles and the discharge from them began to assume a thick, milky appearance, and gradually they assumed the condition in which they were found on admission.

State on admission.—The patient has dark hair and blue eyes; he is somewhat under medium stature, and rather spare. He is not confined to bed, and usually goes about with a thick towel round the abdomen to keep himself dry. P. 108, R. 24, Temp. 97·4° in axilla. Tongue nearly clean; appetite variable, bowels habitually costive.

When the abdomen is uncovered the lower part is seen to be studded with numerous vesicles filled with a milk-white fluid. These are arranged partly in irregular groups and in part singly. Some of the groups contain three or four, others eight or twelve, vesicles, closely aggregated together. Some of the vesicles are so small that they are only just visible to the naked eye, others are as large as peas, and between these extremes are others of every intermediate size. Most of them are hemispherical, but some are oblong or irregular, as if two or more had coalesced. In the smaller ones the vesicular membrane appears quite transparent, without a trace of organization, their opaque white contents shining through them like drops of rich milk; but a few of the largest ones are distinctly marked by meandering lines of delicate blood-vessels giving them a faint rose colour.

The seat of this eruption is the hypogastric region from the umbilicus to the pubes (see Plate). It extends considerably more to the right than to the left of the middle line. The eruption is thickest near the centre of the hypogastrium, and the vesicles are generally smaller and more sparse towards the confines, but this is not uniformly so; a cluster of large vesicles exists close to the umbilicus, and another still more considerable cluster is placed near the upper and rightward limit. The skin over the affected area is thick and soft and of a dull red colour. When pressed with the fingers it yields an almost spongy impression, but

it does not pit. The integument is manifestly hypertrophied, and this gives to the lower part of the belly a protuberant appearance. This dull-red tumid area is somewhat more extensive than the limits of the vesicles, and fades at the circumference into the healthy skin about an inch beyond the furthest vesicle in all directions.

The skin around the larger vesicles, and groups of vesicles, is raised into soft nipple-like elevations, and has a more decidedly spongy feel than elsewhere. Slight pressure causes no pain, but the whole arc is more or less tender on deep pressure.

The total number of vesicles is about two hundred and fifty. It may be said that in their normal state they do not discharge externally. But very frequently one, two, or three vesicles are ruptured and discharge freely a fluid resembling milk.

The patient remained in the Infirmary from September, 1868, until his death in May, 1869. He continued in a stationary condition of health until about the end of March, when symptoms of pulmonary consumption set in, and increased rapidly, finally carrying him off on May 22nd. During this period he was carefully watched, not only by myself but also by Mr. Cullingworth, our able physician's assistant, and by my clinical clerk, Mr. W. A. Patchett, from whose careful diary this history has been chiefly drawn up.

In their normal state the vesicles were, as I have said, closed, and the immense majority remained throughout in this condition; but some dozen or so of the largest vesicles were, at one time or other, in a ruptured state, and discharged immense quantities of a chylous or lymphous fluid. The cause of rupture appeared to be some slight movement or violence. Sometimes the act of turning in bed sufficed to set the discharge in motion. It rarely happened that more than two or three vesicles were discharging at the same time. The quantity of this discharge, and its occurrence and arrest, were most irregular. Sometimes several pints would be discharged in a day and night, and sometimes only sufficient to moisten the cloths with which the patient girded himself. The patient was sometimes continuously wet for three and four weeks; at other times the flow would continue only a few hours or a few days. The

intervals of complete dryness were similarly uncertain, and varied from a day or a few days to two or three weeks.

The character of the discharge also varied: sometimes it was like thick milk, sometimes like skimmed milk, and sometimes perfectly pale like gum-water. Whether white or pale it was always spontaneously coagulable, and white or yellowish clots collected about the seat of discharge. The colour of the unruptured vesicles varied in correspondence with that of the discharge, from milk-white, or opalescence, to pale straw. The degree of milkiness at any particular moment was always the same in all the separate vesicles, showing that the cause of variation was not a local one particular to any vesicle, but something affecting the eruption generally, and depending presumably on the state of the blood.

The vesicles varied not only in colour but also in fulness and turgidity; and it was noticed that the whiter they were the more distended they appeared, and that when they were pale they were also more flaccid.

Two circumstances affected, though somewhat irregularly, the whiteness and fulness of the vesicles, namely, the general state of the patient's health, and the digestion and assimilation of food. On the days when the patient was out of sorts or feverish, the vesicles were paler and more flaccid, but when the appetite and sleep returned the vesicles became milky and turgid. As his health finally declined, the milky condition became less marked, and in the last week of life the vesicles became permanently pale and flaccid.

The effect of food was found to be tolerably constant in kind though not uniform in degree. The vesicles were paler in the morning before breakfast, after the prolonged fast of the night. At this period they were often quite lymphous. Soon after breakfast they began to grow fuller and whiter, and, as a rule, the milkiness increased through the day, attaining its maximum some seven or eight hours after dinner. Of course the appearance of the discharge, if there were any, followed the same rule.

The vesicles seemed to be situated in the substance of the cutis, and their surface-wall was evidently composed of something besides

epithelium. In the larger vesicles their base was raised, and consisted of soft cutaneous tissue; and capillary vessels could be seen travelling over their transparent summits. When a vesicle was gently pressed with the tip of the finger it was immediately emptied, its fluid contents escaping into the deeper parts. After the pressure was withdrawn the vesicle slowly filled again. There was no direct communication between neighbouring vesicles, and when one was ruptured and discharging the vesicles around it still appeared full and turgid. It was noticed, however, that when the discharge had been very free for some hours, all the vesicles appeared flaccid. Even when a whole cluster was compressed the neighbouring vesicles did not appear more distended. The idea conveyed by the study of the effects of pressure on different vesicles and groups of vesicles was, that each vesicle communicated with a more deeply situated reservoir of anastomosing channels. When a vesicle was pricked the flow from it immediately began, and it continued at a steady rate for hours together. On one occasion the rate of flow from a punctured vesicle was tested, and found to be equivalent to eight ounces per hour!

The characters of the discharge, whether it was milky or opalescent, were always essentially the same. After standing a few minutes it set into a tremulous jelly. In a few hours there was a separation into clot and serum. It coagulated with heat and with nitric acid, but not with acetic acid. When shaken with an equal bulk of ether the white appearance was removed and the fluip became transparent and yellowish like blood-serum. These reactions prove that it contained fibrin, albumen, and fat, and that it differed essentially from true milk in not containing casein. The reaction was always alkaline. The varying degree of milkiness was, of course, due to the varying quantity of fatty matter. Under the microscope myriads of fine fat molecules were seen sometimes mixed with larger oil globules; in addition to these pale corpuscles, identical in structure with the white corpuscles of the blood or chyle, were always present, but not in large numbers. No other organic forms were ever seen except the transparent fibrillæ of coagulated fibrin.

The fluid is thus seen to be similar in character to chyle when

milky, and to lymph or liquor sanguinis when pale. It is also identical with the admixture which takes place in cases of chylous urine. A case of chylous urine happened to be in the hospital at the very time the present case was under observation, and neither chemically (excepting proper urinary ingredients) nor microscopically could any distinction be made between them. Still more significant of this alliance was the fact to be noted presently, that on two separate days this man did actually pass chylous urine.

The condition of the *urine* was carefully noted during the progress of the case. It was generally found to be remarkably scanty in quantity and of high specific gravity. When the discharge was abundant the quantity of urine ranged from 13 to 18 oz. in the twenty-four hours. When the eruption was dry the urine was somewhat more abundant and varied from 18 to 25 ozs.—on one occasion it reached 34 ozs. and on another 40 ozs., which was the largest flow chronicled during his long sojourn in the Infirmary. The sp. gr. varied from 1025 to 1032; it frequently deposited lithates, but did not contain either albumen or sugar. The scantiness of the urine was partly due to the voluntary abstention of the patient from drink. He believed that drinking always increased the flow of the discharge: and he endured constant and severe thirst in order to check this loss.

On December 2nd the urine was voided milky on two occasions. It presented all the ordinary characters of chylous urine. Again, on January 15th, the patient passed three ounces of chylous urine, and on the following day fat was found in the urine with the microscope, though not in sufficient quantity to produce a milkiness of the secretion. During these two days the eruption was dry. With these exceptions the urine continued of normal composition throughout, and free from albumen.

A large number of observations on the *temperature* of the body were made. Until the end of March the temperature never transcended the normal limits. When the discharge was running freely it fell to 97·6° and 97°. When the eruption was dry it ranged from 98° to 98·6°; but when, towards the end of March, tuberculous symptoms began to show themselves, the temperature rose to 99, 100, and even 102 degrees.

The patient's weight was 120 lbs. on admission in October; he steadily grew heavier until the end of December, when he weighed 128 lbs. From this date until the middle of March, his weight remained stationary at about 126 lbs.; then it began to decline. On April 27th he weighed only 112 lbs., after which he was not weighed.

The only general symptoms referrible to the disease on the abdomen, and the discharge, were attacks of chilliness and shivering, with a sense of great weakness. These occurred repeatedly when the discharge was copious and long continued. He also complained occasionally of aching pains in the abdomen and of indifferent sleep; but as a rule, he was in a state of fairly comfortable health until the tuberculous symptoms broke out.

The eruption withered slowly as the pulmonary disease advanced, the vesicles became persistently pale and flaccid; the discharge became watery and scanty, and finally ceased some five days before death. The state of the eruption the day before death is thus described by Mr. Patchett. "The vesicles have lost their character of vesicles altogether, they seem converted into small furfuraceous scales of different colours, some being of a reddish-yellow, others of a raspberry colour; the small vesicles scattered over each flank look exactly like flea-bites."

The urine was reduced to six and eight ounces per day in the last week, and the symptoms assumed the so-called typhoid character—low muttering delirium, indifference, picking at the bed-clothes, and finally coma. Death occurred on May 22nd.

Autopsy twenty-one hours after death. — Both lungs were studded with grey granulations intermixed with larger masses of grey and yellow tubercle, some of which were softened. Two small vomicæ were found in the left apex, and one in the right. Tuberculous ulcers were also found in the small and large intestines. The bronchial and mesenteric glands were enlarged. The liver weighed sixty-four ounces, and the spleen nine ounces; both organs were healthy. The kidneys and bladder were healthy. The integument of the hypogastrium was much thickened and spongy, contrasting strongly with the emaciated integument over

the thorax. The lining membrane of the bladder was minutely examined, and appeared smooth, glistening, and healthy throughout. No enlargement or unnatural condition of the thoracic duct or of the lymphatic vessels or glands could be detected. A considerable piece of the abdominal wall, embracing a portion involved by the disease and a portion extending beyond into the healthy skin, was cut out for further examination.

Examination of the skin in the diseased area.—On making a vertical section through the skin and subjacent parts it was at once perceived that the disease involved essentially the cutis vera and the subcutaneous tissue. The tendinous, muscular, and peritoneal strata were in every respect perfectly normal. The skin was immensely thickened and formed, with the subcutaneous tissue, to which it was structurally united, a thick pad or layer of tissue varying from half an inch to an inch thick. When fresh, the cut surface had a pale rose and somewhat fleshy or glandular appearance. This tissue was traversed by short channels or lacunæ, varying from the width of a crow-quill to that of a hair. By making numerous thin sections vertically and horizontally and examining them with a lens and the microscope, these lacunæ could be seen to communicate freely with each other by small smooth orifices. The vesicles evidently constituted the surface boundaries of the more superficial lacunæ. The lining membrane of the lacunæ and of the vesicles was smooth and glistening; and, when gently scraped with a knife it yielded a small quantity of a whitish debris, which, under the microscope, resolved itself into spheroidal and nucleated cells resembling those which were found in the discharge during life.

Here are evidently the elements of a glandular structure—a membrane lined with spherical nucleated cells. But the analogy is rather with the ductless follicles of Peyer's patches and still more with the ganglia of the lymphatic chains than with glands engaged in the regular work of secretion and possessing excretory ducts. The new structure had no connection with the normal glands of the skin. The funnel-shaped orifices of the sweat-glands could be seen opening independently on the surface in the hollows between the vesicles, and the hair follicles presented their normal appearance.

The chief interest of the case lies in the light which it throws on the pathology of chylous urine. It can scarcely be doubted that the case was generically identical with that curious disorder. The absolute similarity of the discharge with the fibro-albuminous and fatty elements added to the urine in chylous urine, the sudden appearance and cessation of the discharge, the capricious terms of the duration of the discharge in the two disorders, and the actual occurrence of chylous urine on two occasions in the case of Robinson, scarcely leaves any room for doubt on this point. Had the disease in this case, instead of occupying the subcutaneous tissue of the abdomen, been developed in the submucous tissue of any part of the urinary passages, it is evident that the conditions for the production of an ordinary case of chylous urine would have existed. It is even almost certain that some small part of the urinary membrane—probably that of the front of the bladder—was actually invaded by the disease which affected the abdomen, but no anatomical traces of such extension could be detected at the autopsy, owing probably to the fact that in the last few weeks of life the morbid process had retrograded, and had consequently left no appreciable marks on the surface of the bladder.

In the way of *treatment*, the means tried were the internal administration of styptics of various sorts, especially of tannic acid, which was pushed to large doses. Locally, compression was attempted by means of long wide strips of adhesive plaster, but without any good effect. The discharge moistened and loosened the plaster, and the soft yielding nature of the abdominal wall rendered impossible any effective compression by bandages or belts. Attempts were also made to varnish the surface with a solution of india-rubber in benzole, and with collodion, but every device proved unavailing.

The rarity of this disorder is so great, that only one other exactly similar case, so far as I know, has been recorded as having occurred in Great Britain. This is the case published by Dr. A. B. Buchanan, of Glasgow, in the 46th vol. of the 'Medico-Chirurgical Transactions.' In this case, a woman, 46 years of age, had an excoriated patch of skin, about the size of the palm of the hand, on the inner and posterior aspect of the left thigh, which discharged at

times a large quantity of milky fluid, possessing exactly the same chemical characters as that in the case of Robinson—it coagulated spontaneously, it contained fibrin, fat, and albumen—but no casein. The discharge flowed partly from the excoriated surface and partly from broken vesicles in the neighbourhood of this patch. The central patch was congested of a deep red colour when the patient was standing; while when she was lying prone the colour was paler, though still indicating a great amount of local hyperæmia. The patch, moreover, stood out irregularly in relief, exactly like the raised map of a mountainous district. This area was thickly covered with vesicles, from the size of a pin's head upwards, some of them being even as large as those met with in herpes zoster. The same were also visible in some numbers on the surrounding skin, even where it was no longer infiltrated or congested: they were, however, both smaller and more sparsely disseminated the further they lay from the centre. The white contents shone clearly through the thin epidermic pellicle that confined them, imparting to the vesicles the appearance of pearly drops of fluid. Some vesicles were entire and perfectly dry on the surface, but from the excoriations resulting from their rupture, even when they were simply opened with the point of a lancet, a thin constant stream of milky fluid oozed forth and ran down the leg. This discharge was considerably affected by the position of the patient. It continued to flow for a long time from an excoriated point, even when she was lying on her face; but it was both more copious and more persistent when she was erect and moving about. About an hour after she retired to rest it commonly ceased to run, so that the leg in the morning was quite dry. The flux recommenced about an hour after the patient rose in the morning, and increased in profusion as the day wore on. In the after part of the day her garments were usually drenched, and on placing a basin underneath the thigh to receive the fluid that ran from it, somewhat over five ounces were collected in an hour. The discharge sometimes ceased for days and even two or three weeks in dry weather, but in moist weather the intervals of dryness were always very brief. The affected thigh was considerably swollen, and the superficial veins of the thigh and leg were varicose. Neither the inguinal nor any

other lymphatic glands within reach were enlarged. The nature of the food of the patient was not found to affect the quantity nor the quality of the discharge. The urine was throughout normal in composition, but it was less in quantity when the discharge was profuse. The patient, who was a married woman with six healthy children, stated that twenty-one years ago, two or three months after her second confinement, she had a shivering fit, and shortly afterwards she noticed "a lump" on the back of her left thigh. The swelling was attended with no uneasiness, but it did not subside until the period of the third pregnancy, when it went away or at least diminished for several months: again reappearing, however, after another shivering fit about a fortnight after delivery. Every year, for the last twenty years, she has also suffered from at least one attack of inflammation (phlebitis?) in the affected limb. About fifteen years ago, between her third and fourth pregnancies, a few vesicles made their appearance after an inflammation of this kind somewhere near the centre of the "lump." The surface at this point was itchy, and a brownish fluid exuded from the vesicles on scratching, which continued to be secreted at remote intervals, and in small quantities, for about a year. Another inflammation having supervened, the vesicular area extended, the discharge became more frequent and profuse, and began to assume a whitish appearance. From this period the affected area gradually increased, and the discharge more abundant and milky, until for the last six years it assumed almost the appearance presented when the case came under notice.

The catamenia were regular, and the discharge was in no wise affected by the menstrual periods. The general health continued fair, but considerable exhaustion followed when the discharge was abundant and long continued. The case was still in progress when reported. The only treatment that seemed to restrain the discharge was the pressure of an elastic stocking reaching to the top of the thigh.

Dr. Buchanan, in his paper, cites at length three other cases occurring long ago in France and Germany, of evidently identical nature. In two of them, one a man and the other a woman, the seat of the disease was in the thigh; in the third, a woman, the dis-

charge exuded from the skin of the right side of the abdomen beneath the ribs.

A still more similar case to that described in this paper is recorded by Dr. Fetzer,* of Stuttgart. A girl of sixteen, who had not menstruated, but otherwise healthy, noticed a few warty projections on the abdomen, to which, however, she paid no attention. Six months after, she showed these to Dr. Fetzer, who then found a band of brownish streaks, three finger-breadths wide, extending across the left half of the abdomen. This band commenced an inch below the navel, and ran upwards and outwards between the false ribs and the crest of the ilium, fading gradually towards the spine. On this band, in the front of the abdomen, there were about eighteen warty elevations of the skin, varying from the size of the male to that of the female nipple. These were soft and painless to the touch, and on pressure could be made to sink into the skin, rising again as soon as the pressure was removed. About a year after they were first observed two of the elevations gave way after a walk, and discharged about a quarter of a pound of a milky fluid, which coagulated spontaneously and had all the character of chyle. Three days later the discharge returned and continued for three days without interruption. On the next day Dr. Fetzer cut off one of the elevations with a pair of scissors. It was found to consist of thin but perfect cutaneous tissue. Into the opening thus made a probe could be introduced for the space of an inch upwards and to the left. The flow of discharge through this opening could only be stopped by the application of nitrate of silver, but not by compression. The patient felt faint after the discharge. In this case the discharge was milky during fasting as well as after eating. It was also noticed that the clot reddened perceptibly on exposure to the air, a circumstance that was also noticed in one of Dr. Carter's cases, to be presently described. Fetzer regarded the elevations as varicose bulgings from a bundle of subjacent lymphatics. Both the microscopic and chemical examination of the fluid confirmed the opinion that it was identical with chyle.

* 'Archiv für Physiol. Heilk.,' vol. viii, p. 128.

Dr. Carter, of Bombay,* has recorded two cases, of which the following short abstracts may be read with interest:

1. This was a Parsee youth in whom the inguinal glands were greatly enlarged, soft and doughy to the touch, but not painful. On the cutaneous surface of the thigh, a few inches below Poupart's ligament, was a small, hardly perceptible pimple, from which there occasionally issued a milky fluid, and sometimes so copiously, that in the course of the day a pint has been collected. Pressure just above the spot caused the flow to cease. The discharge commenced six months before; it lasted two or three days and then ceased, pressure having been applied; it reappeared after an interval of a month, and again stopped after a few days. The discharge reappeared a third time, when the patient came under the observation of Dr. Carter. Before the discharge came on the glands in the groin became tumid and rather painful. The fluid collected from this man's thigh presented in perfection the characters of chyle. It coagulated in about five minutes, it separated a few hours afterwards into clot and serum, the latter being milky in appearance. At a later period the whole became again fluid. Under the microscope blood-corpuscles and chyle-corpuscles were found. In this man the urine never became chylous.

2. This was an adult Hindoo who became a hospital out-patient under Dr. Carter's care on August 23rd, 1859, on account of an affection of the scrotum. The skin of this part was corrugated in a peculiar way, thickened, and studded with numerous small tubercles, which were soft to the touch, and when punctured freely discharged a chylous fluid. The inguinal glands on both sides were much enlarged, soft and doughy to the touch, and they diminished in size under pressure.

The scrotum began to enlarge four months before, and after a time the peculiar corrugation of the skin appeared. The milky discharge occurred occasionally, and spontaneously, and intermitted. It did not issue from one spot, but from several. *When it ceased, and also sometimes during its continuance the urine became chylous.* The tumefaction of the inguinal glands seemed to alternate with the appearance of chyle in the urine. The parts

* 'Med.-Chir. Trans.,' vol. xlv, p. 189.

also became tumefied two or three hours after a full meal, and then subsided.

The urine, when chylous, coagulated spontaneously, and the coagulum reddened sensibly when exposed to the air. This reddening was, however, more decided in the coagulum from the scrotal discharge, which changed in a few minutes to blood-red. Under the microscope the urine was found to contain, besides blood-corpuscles, nucleated granular cells, exactly resembling chyle-corpuscles.*

Pathology.—It may be confidently assumed that the disease on the abdomen in my case, on the thigh in Dr. Buchanan's case, and that of Fetzer, and on the scrotum in Dr. Carter's case, was pathologically identical with that which causes chylous urine. The reasons for this conclusion have already been enumerated. It may also be regarded as proved that chylous urine is neither a disease of the blood nor of the kidneys. The blood has been repeatedly examined in these cases, and no peculiarity has been found in it; and it would be quite impossible that the albumen and fibrine found in chylous urine could come from the kidneys without causing casts of the uriniferous tubes to appear in the urine, and no such casts have ever been seen in chylous urine.†

Looking to the absolute identity of the discharge in these cases with chyle and lymph, it is very difficult to avoid the impression that the structures which produce this discharge are anatomically related to the lacteal and lymphatic tissues; and among the theories framed to explain chylous urine, the most reasonable hitherto put forward is that which supposes the existence of a leak or fault in

* Two other apparently similar cases, affecting the scrotum, are reported from Canton in the 'Edin. Med. Journ.' for July, 1860, but the notes are so defective that the nature of the disease cannot be identified with any certainty.

Demarquay ('Mém. de la Soc. de Chirurgie,' t. iii, p. 139) describes a case in a youth of seventeen, born in Brazil, which much resembled that of Dr. Buchanan. There was a patch of elevated skin on the inner and lower part of the thigh, covered with little elevations, one of which occasionally discharged chyle. Another vesicular patch was situated on the front of the thigh. The whole limb was thicker than its fellow. The disease was supposed to be due to varicose lymphatics.

† See the author's article on "Chylous Urine" in his work on 'Urinary and Renal Disorders,' p. 268.

some part of the lymphatic or lacteal system, which permits the regurgitation of chyle and lymph on the surface of the urinary passages. Dr. Carter—basing his views mainly on the study of his own cases—applies this theory in the following manner:—"We may suppose that distension of the delicate lymphatics and lacteals in the lumbar region is at length followed by exudation of their contents at one or more points; or rupture taking place, a fistulous orifice remains, which gives free exit to the chyle or lymph at times of recurring distension; or an abnormal reservoir (receptaculum) may be formed, which periodically discharges its contents into the pelvis of the kidney, ureter, or bladder. The cases before related evince that such a condition of the lymphatic vessels, accompanied with enlargement and increased functions of the corresponding glands, does occur, that the flow of chyle may be reversed or regurgitation may occur, and with this state the urine may be chylous."

A somewhat different view was suggested to me by the examination of the skin of the abdomen in the case of Robinson. When the preparation was fresh the thick, soft layer, into which the skin and subcutaneous tissue were converted, had very much the pale flesh-colour and general appearance of lymphatic gland tissue; and the short communicating lacunæ traversing it in all directions suggested a structure not dissimilar to an immense exaggeration of the lymphatic plexus. I found it impossible to resist the idea that this was really the true pathological solution of the case, and that a similar solution applied to cases of chylous urine.

It is well known that the skin with the subcutaneous tissue, and the mucous membranes with the submucous tissue, are exceedingly rich in lymphatics, which form a close network of communicating channels in these situations. It is further known that the cells lining the lymphatic channels, especially those of the lymphatic glands, perform a glandular function, and impress important changes on the lymph passing through those channels.

Now let it be supposed that at some spot the lymphatic network becomes immensely hypertrophied; that its channels become varicose (as it were); that the contained cells assume by degrees the property and function of the cells lining the lacteal ducts and

lacteal glands; that the more superficial of these varicose enlargements project above the surface of the skin or of the urinary mucous membrane, as the case may be; and, lastly, let some of these superficial enlargements become ruptured and discharge their contents externally or into the urinary passages, and the conditions are presented for the production of chylous urine or of such a case as that of Robinson or of those related by Dr. Buchanan and Dr. Carter.

It is always satisfactory in studying any rare disease to be able to refer it by analogy to some pre-existing well-known category, and the view just presented of the pathology of chylous urine and the allied disorder on the skin finds its exact analogy in those hypertrophies of the blood-vessels which constitute venous nævi, erectile tumours, and aneurisms by anastomosis,—all of which are exaggerations or hypertrophies of the normal arterial or venous plexuses.

It rarely or never happens that any tissue suffers morbid hypertrophy without some degree of modification of its normal structure and the hypertrophied lymphatic tissue which I have suggested as the true cause of chylous urine and the allied condition in the skin is undoubtedly modified by the morbid impulses which generate it. Not only is the anatomical structure considerably altered from the normal type of lymphatic tissue, but the function of the cells also suffers a modification. The cells which, in the normal state, elaborate lymph, in the morbid state come to produce chyle, or a fluid intermediate between lymph and chyle. These modifications are, however, strictly within the limits which we generally find in other morbid hypertrophies.

It may be remarked that, both in my case and in that of Dr. Buchanan, as well as in one of Dr. Carter's, the discharge and the contents of the vesicles were *pale* in the earlier periods of the disease and that they only gradually, and at a later stage, assumed a *milky* character. This is significant. It appears to indicate that the deviation from the normal type commenced in the parietal structures, and that afterwards the functions of the cells became modified.

It is no objection to the theory here proposed that the contents

of the vesicles and the discharge from them varied greatly in its degree of milkiness. Every secretion varies in character more or less at different parts of the day, as exercise or rest, food or fasting, &c., vary the condition of its elaboration. I will only instance the urine, with which I may claim a more intimate knowledge. The urine is immensely influenced both in its composition and quantity by the various events of the day, and the influence of food is particularly great on it. The composition of the discharge in Robinson's case was always essentially the same, though it varied in appearance greatly according to the smaller or larger proportion of fat in it, but it always contained the same characteristic elements, namely, albumen, fibrine, and fat.

Closely allied to the above cases are certain forms of varicose disease of the lymphatics of the penis and elsewhere, and also certain forms of elephantiasis of the leg and scrotum. Carswell* figures a case of a young man with enormous varicose dilatation of the thoracic duct and the lumbar and pelvic lymphatics, together with those of the groins, where they formed two tumours, one on each side, which had been mistaken for hernial tumours. These latter had existed from boyhood.

In the 2nd vol. of the 'Transactions of the Clinical Society' three cases of what may be called lymphatic elephantiasis of the leg are described, in each of which a chylous fluid was at times discharged from vesicles or excoriated surfaces on some part of the enlarged and indurated extremity.

* 'Pathol. Anat.,' art. "Hypertrophy," pl. iv, fig. 4.