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LYMPHATIC EDEMA, ELEPHANTIASIS

OBSERVATIONS AND REMARKS, WITH REPORT OF OPERATIONS

BY

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In the preparation of this paper I shall report some of my surgical cases, but I trust not in tiresome detail. Fig. 1 leads me up to the subject I desire to present in a somewhat retrospective manner.

Case I.—Mrs. A. B., aged forty years, with a good family history, came under my observation in May, 1866. I had seen somewhat similar cases in the hospitals, but this, a private patient, gave me an opportunity for careful study. She was the mother of three children, passing through each confinement without any increase of her trouble. At about the age of twenty she noticed an enlargement of the leg, below the knee, which gradually increased and involved the thigh. No acute symptoms or traumatisms had presented at any time, nor could pressure upon vessels above be discovered, from growths within the abdomen, except as to the possibility of an attack of appendicitis (inflammation of the bowels) that she had had when a child. The etiological factors being so obscure the diagnosis of elephantiasis was made. She was a native of the interior part of New York State and had not lived elsewhere. The case remained under observation for a number of years. Careful attention was given to her general health, as much rest as possible advised, and pressure, by means of bandages, was applied from toes

up to groin. This afforded relief, but when removed the general edema would return. Aside from the weight of the limb, and the rather increased tired feeling, resulting from doing her own housework, no other marked symptoms presented. There was no ulceration at any time. Patient jokingly remarked that "if the limb grew too large she would permit an operation for amputation." The case was evidently one of lymphatic edema, possibly congenital in character. No other like conditions presented elsewhere about her system. The limb became larger later in life and gave her much weariness, but operative surgical intervention was not attempted at any time.

Since observing this patient I have seen a few cases of distinct lymphatic edema of the lower extremities, one each complicated with enlargement of the scrotum and vulva, several arm cases following removal of the breast, in the female, and one in a young woman without tumor or operation. I have had no experience in cases of cervical rib causing swelling of the arm, as reported by Osler.

The study of the pathology and treatment of these cases has been exceedingly interesting. In my professional life I have seen so many serious surgical problems solved that I have desired at this time to place on record my experience with the present treatment of such lesions.

When Case VI—hereafter to be described—presented I was anxious to investigate further as to what had been accomplished regarding pathology and treatment within a few years. I have met with a number of cases of lymphatic edema appearing early and very late in some of my operations for removal of carcinoma of the breast, and upon which I wish to comment. The study of cases of enlargement of the arm, after extirpation of the breast, the chest muscles, and thorough removal of the lymph glands, or where a less severe operation is done, is very interesting. The edema of one or both arms that presents within six months or a year after the operations will very frequently yield to

the application of bandages, from the fingers up, at times using an elastic bandage with beneficial results. In cases of neuritis that present with edema I have seen great comfort afforded by the use of the galvanic current and also the employment of the *x*-rays. Evidently these cases are, not infrequently, the result of the blocking of the lymph channels. I have been greatly impressed in noting their persistency, and with the contrast between these cases and those where, in some instances, we have been obliged to remove a portion of the axillary vein; but the edema in these latter cases was not so persistent and yielded more readily to treatment, the lymph channels, evidently not being so seriously involved. These cases have been designated by many surgical writers as elephantiasis.

Case II.—Mrs. C. D., aged seventy-two years. One sister dead—due to a recurrence of tumor of the neck, and believed to be carcinoma. Patient menstruated at thirteen; one child; at the age of fifty years had excessive flow for several months, just at time of menopause. Latter part of 1904 noticed a lump in left breast, and she came under my observation in December, 1905. Diagnosis made, a little later, of adenocarcinoma. Operation for removal, also axillary glands, February 12, 1906. Wound healed kindly. Following six months there was some edema of the left arm which yielded to bandaging and her health was excellent for over two years. Patient remarkably active and free from pain. During October, 1908, she noticed a growth in the right breast; not painful, but some retraction of the nipple, and her previous history aroused suspicion as to the possibility of its being malignant. Not improving under treatment she was admitted to the hospital November 8, 1908, and thorough operation done for complete removal of the breast, together with the axillary glands. In view of her age, and the left breast having behaved so nicely, it was thought best not to do a more severe operation. The wound healed quickly, and patient left the hospital in less

than three weeks. She made a good recovery, but in May, 1909, noticed some pain in cicatrix, right breast, and a nodule could be felt. She was admitted to the hospital June 14, 1909, and old scar tissue, together with the pectoral muscles and subclavian glands, removed. Wound healed kindly and in ten days she returned to her home, remaining well until August, 1910, when lymphatic edema of the right arm presented in a most marked manner. Soon after an enlargement could be felt just under the right clavicle, evidently involving the periosteum. Bandaging of the arm was carried out fairly successfully and reduction of the enlargement followed. *X*-ray treatment relieved pain and there was some lessening of the metastases that involved the second and third ribs. There was no ulceration at any time, but patient gradually failed; there was metastasis to the stomach, and she died June, 1911.

Mrs. D. was kept pretty thoroughly upon arsenic and iron from the time of her first operation, and the bandaging did have an excellent effect in relieving the edema.

Case III.—Mrs. E. F. Operated upon May, 1889; entire removal of left breast, with lymphatic glands. About two years previously had been treated by Dr. T. Gaillard Thomas, of New York, for profuse uterine hemorrhage. No surgical intervention, and after a few months menstruation became normal and patient showed no further pelvic symptoms. She remained in very good health until about November, 1909, when she noticed a swelling of the left arm, which gradually developed into marked lymphatic edema, extending from the finger-tips to the shoulder. No evidence of any return of the disease could be noticed at this time. She had a decided arteriosclerosis and was benefited by the use of nitroglycerin. Patient gradually developed a neuritis of left shoulder and arm, and it was thought there was some enlargement of the supraclavicular glands, but the swelling of the arm did not increase. The edema of the arm and the neuritis continued, however, at

times better, then again more severe, and she was placed under the care of Dr. E. A. Bartlett, of Albany, N. Y., July 12, 1910, who has very recently, July, 1911, given me the following report of her case:

"Condition of patient upon coming under my observation: Left arm markedly edematous from shoulder to finger-tips, voluntary motion in arm and hand lost, complete anesthesia to touch, heat, and pin prick over whole of posterior aspect of arm, forearm, little finger and ring finger. Extensors over same area give no response to any form of electrical stimulation. Extensors of thumb and index and middle finger as all of the flexors respond to faradism (4 in. C.D.). Dull "booming" sensation complained of in arm and forearm and "aching" pain under left scapula; otherwise no pain. There is a tumor 1 x $\frac{3}{4}$ inch, appearing above the left clavicle and lying just back of posterior border of sternocleidomastoid muscle.

Diagnosis. Compression of brachial plexus by tumor described; tumor presumably malignant.

Treatment. Röntgen ray to tumor; high frequency current through vacuum electrode, galvanism and faradism, as from time to time indicated, to arm, forearm and hand. Medical treatment left to my colleague.

Present Condition. Tumor in neck has disappeared from above clavicle; edema slightly decreased; pain under scapula gone; pain in arm lessened and index finger and thumb can be approximated; other motion not restored.

Three months ago a tumor, 1 x $\frac{3}{4}$ inch, appeared on the right side of the neck at the upper posterior border of the sternocleidomastoid muscle which, under Röntgenization, has been reduced one-third. This tumor is also probably malignant."

This case is somewhat rare because of the very late appearance of the return of the carcinoma. The lymphatic edema of the whole arm was very marked, but yielded most decidedly to the use of bandaging and electrical treatment.

However, the patient has the evidence of carcinoma of the glands of the neck, and while being benefited by treatment the case is very serious.

Ligation of the artery for relief of lymphatic edema of the lower extremities does not present a record of entire satisfaction, as regards results. There has been a well-marked mortality list, due to gangrene following operation, and even though this last serious complication does not present, the results are not always in the line of cures.

Case IV.—For some years I was much interested in watching the case of Mr. G. H., aged fifty years, German, porter by occupation, who had been under my observation in the dispensary and hospital for a period of fifteen years, giving a history of some twenty years, during which he had noticed a gradual enlargement of the right leg, until it presented the characteristic appearance of lymphatic edema, with a tendency to ulceration, the ulcers, at times, healing, under continuous treatment by bandaging, yet the limb slowly became less useful and his symptoms more serious. He had been admitted to the Albany Hospital at various times, with marked relief following rest, elevation of the leg, and the use of bandages. December, 1907, Dr. Willis G. MacDonald and myself performed ligation of the femoral artery, in Scarpa's space, with excellent recovery. The patient did well, but there was not much diminution in size or permanent improvement. A year later the ulcers appeared in a more serious form and amputation was done through the middle third of the thigh. The patient convalesced nicely and was very much more comfortable afterward, but in this case ligation of the artery certainly did not bring the desired relief.

Case V, Fig. 2.—Mr. I. J. In many respects this case seemed quite unusual, and leads to the study of the possibility of phlebitis, believed to have produced lymphatic edema and many years after resulting in malignant growth. This patient was a native of Canada and by occupation a

FIG. 1.—Case I.

FIG. 3.—Case VI.

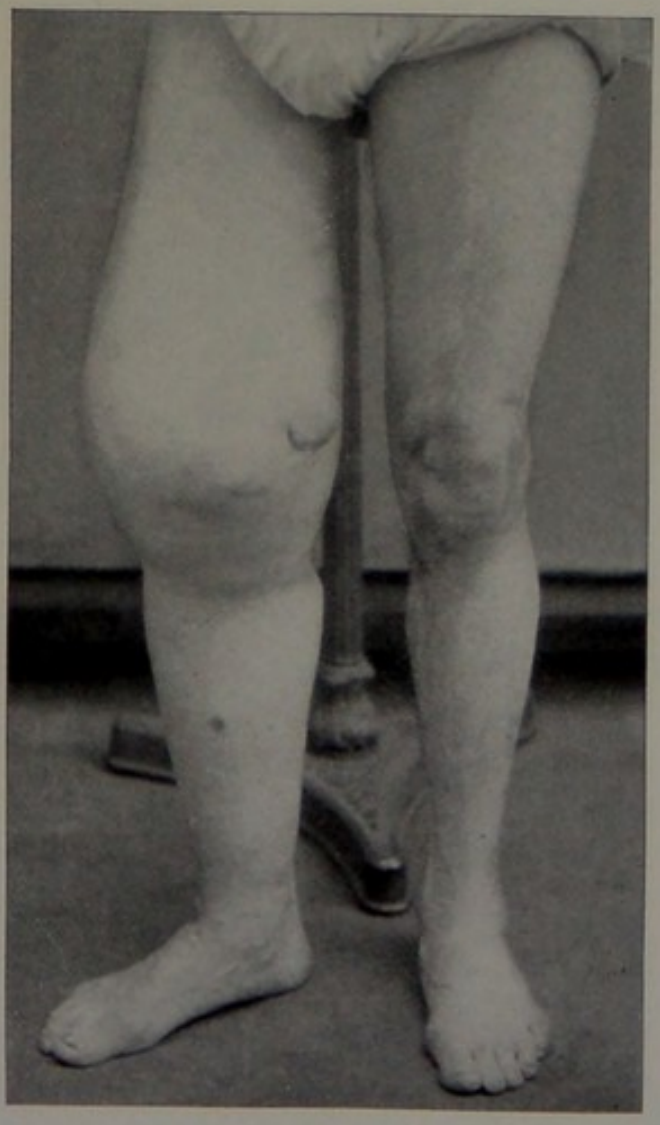

FIG. 2.—Case V.

carpenter. He served as a private during the Civil War. In the early part of his service he passed through an attack of typhoid fever, complicated with phlebitis of the right leg. Later he suffered considerable distress, after a long march, and the limb began to enlarge, increasing slowly for a period of twenty-five years, but not until about 1885 did he suffer any great pain. During this latter period he suffered from occasional sharp pain, and the limb showed a more decided tendency to enlarge about the knee. He entered my service at the Albany Hospital June 6, 1888. There was considerable edema of the leg itself. From the toes up to the upper third and from there up to the groin there was a uniform enlargement, more markedly distinct about and above the knee, and on the inner side producing a nodulated induration, at first thought to be the remains of his old venous obstruction. His thigh measured thirty inches in circumference. Bandaging from the toes up to the knee, and rest in bed reduced the size of the limb at that point very decidedly, but he could not tolerate bandaging from the knee up to the groin. The patient was unable to go on with his occupation, he was losing somewhat in flesh, more or less restless at night, and no improvement following treatment, and considering the case not proper for ligation of the femoral artery, amputation was suggested. To this he consented, after a period of palliative treatment. Operation was done in the upper third of the thigh and the patient made a good recovery. An examination of the specimen removed at the operation—although not having the benefit of an expert laboratory pathologist—showed the bone free from infection, but the growth about the knee, and extending up one-third of the thigh, seemed to be the nature of a distinct enchondroma. The patient did well and was alive ten years later.

At the present time a more reliable report could have been procured, regarding the possible malignancy of this case. Did we have here a distinct case of lymphatic

obstruction in which there was later grafted on a malignant condition?

I have had two cases, male and female, of what I believe to have been hematochyluria, associated with chylous dropsy. The male was operated upon for a supposed tubercular peritonitis and recovered. In the case of the female, at the time supposed to be one of ovarian tumor operation plainly revealed chylous dropsy, the patient dying later of peritonitis.

A more correct diagnosis could be reached at the present time by aid of careful laboratory investigation.

In reviewing this subject, and the cases, one observes that the same relative development has been made in the pathology, classification, and treatment of elephantiasis as in other lines of surgery. Much has been accomplished by writers who have had professional service in the tropics, West Indies, and South America, where this condition is met with more frequently. Here is where advances are being made from the surgical standpoint of operative intervention. No one factor has advanced the understanding of the pathology so much as the discovery of the Filaria Bancrofti and the influence the mosquito has in carrying and developing a condition of true elephantiasis.

C. W. Daniels, M.D. Camb., M.R.C.P. Lond., *British Med. Jour.*, October 31, 1908, p. 1360, writes as follows: "In most tropical countries elephantiasis—that is, chronic edema of the skin and subcutaneous connective tissues—is a common disease, and other evidences of lymphatic obstruction, such as chyluria, etc., are also fairly common. Much speculation as to the causation of this condition has taken place. Such lymphatic obstruction is not confined to the tropics. Marked typical cases occur in England, indistinguishable clinically from the elephantiasis of the tropics. Sometimes cases of Molluscum fibrosum are mistaken for it, but the true lymphatic elephantiasis does occur. Such cases are rare. I doubt if anyone here has seen a dozen,

or if 20 cases could be collected from present inmates of English hospitals. Personally, I have only seen 2. The problem, therefore, is why lymphatic obstruction sufficient to cause chronic edema—a rare disease in England—in the tropics may affect 5, 10, 15 per cent. of the population. We know it may occur from several rare causes, but why should it be so common in the tropics unless a special cause exists. It has been stated that in French-China, Laigon, and surrounding country over 50 per cent. of the inhabitants had some form of elephantiasis.

"The discovery of the adult worm of F. Bancrofti living in the lymphatics naturally suggested a plausible hypothesis to account for this difference in frequency. It was early observed that filaria were common in the tropics and unknown in temperate climates, as elephantiasis is, or nearly so. In most cases of elephantiasis no filaria embryos were to be found—in fact, that it was the people who gave no direct evidence of filariasis who had lymphatic obstruction. So that, *prima facie*, it might be argued that the presence of filaria in the lymphatics prevented lymphatic obstruction. This would be a very narrow view. The wider one is that there is some connection between filariasis and elephantiasis. How close the connection is can be shown by more detailed examination as regards place, race, and sex incidence.

"One of the earliest statistical tables, as regards different races living in the same country, was that of Dr. Grieve among lunatics in British Guiana. He showed (May 15, 1883) that out of 400 inmates of the asylum, 0.5 of the Indian, 5.8 negroes, and 23.4 per cent. colored (mixed Europeans and negroes) were affected, and that 3.9 of the males had the condition as against 7.4 females."

On p. 1361 the same author continues as follows: "I do not think it necessary that all cases of elephantiasis need be assumed to be produced in the same manner by filaria; in some it may be hemorrhage, in others, perhaps common

ones, it is merely that the lymphatics, distended and altered by the filaria, are more liable to inflammation. Bacteria introduced may thrive and cause directly acute lymphangitis, may possibly cause death of the worm, and so cause indirectly lymphangitis."

Sir Patrick Manson and Dr. Louis W. Sambon (London), p. 1364, have given us some very excellent views on the pathology of the subject. The latter says: "There was no reason why Filaria Bancrofti should not prosper in certain parts of Europe. They knew that innumerable species of filariæ lived in the mammals, birds, and reptiles of Europe; some also in man, as, for instance, Filaria labialis, Filaria conjunctivæ, and other ill-determined species. All these filariæ were fostered and transmitted by anthropoid intermediary hosts, which might be flies, mosquitoes, or ticks, according to the species. Filaria immitis, the 'cruel filaria' of dogs, like F. Bancrofti, had a very wide distribution in tropical and subtropical countries, but it was also found in Northern Europe (France, Germany, Denmark, and England). Like Filaria Bancrofti, it was propagated by mosquitoes. If F. immitis could develop in Europe, there was no reason why F. Bancrofti should not be able to thrive equally as well."

One gathers the impression from this that there are many cases of elephantiasis in which the work of the mosquito and Filaria Bancrofti is not to be detected. We have yet before us the coming in contact with non-filarial cases that are developed as the result of serious neglected appendicitis, scarlet fever, edema following cirrhotic liver and kidneys, traumatisms, such as operations connected with the inguinal and pelvic regions, cicatrices resulting from burns and abscesses, injuries to the leg, typhoid fever, and results following phlebitis—any pathological change that may produce lymphatic dilatation and obstruction.

We have, then, the two conditions in which to make our diagnosis and to observe carefully the etiological factors,

i. e., the cases of non-filarial or lymphatic edema, and true elephantiasis. In making his diagnosis the surgeon of today is greatly aided by the results of careful laboratory investigations.

The gross macroscopic appearances, the objective symptoms, cannot be considered safely accurate to always form a correct diagnosis.

Statistics show that elephantiasis is more common in men than in women.

Rose and Carless, seventh edition: "Elephantiasis is a hypertrophic condition of the subcutaneous tissues and skin resulting from chronic lymphatic obstruction."

Two chief varieties are described: (1) E. arabum, due to a development in the lymphatics of living parasites, viz., the Filaria sanguinis hominis; (2) the non-filarial type, which may arise from many causes, such as the deposit of tuberculosis or cancerous material in lymphatic glands; the obliteration of lymphatic channels in operations for removing such glands; recurring attacks of lymphangitis in cases of chronic eczema or ulcer, leading to a gradually increasing obliteration of lymphatics.

Three chief phenomena manifest themselves as the outcome of such obstruction—viz., (*a*) *solid or lymphatic edema*, a condition in which the subcutaneous tissues become firm, infiltrated, and brawny, but the fluid cannot be expressed from them, as in an ordinary edema, and hence the part does not pit on pressure; (*b*) hyperplasis follows, affecting not only the subcutaneous tissues, which are greatly thickened, but also the skin, which becomes coarse and wart-like in appearance; (*c*) the warty stage is usually preceded by a development of vesicles (dilated lymphatics) in the papillæ, and from these when ruptured a considerable flow of lymph (lymphorrhea) may follow. If sepsis intervenes, chronic ulceration and recurrent lymphangitis may follow.

Elephantiasis arabum (syn. Barbadoes leg) requires but little notice here, as it is seldom seen in this country, being

mainly limited to the tropics, especially the West Indies and South America.

The *treatment* is extremely unsatisfactory. In the non-filarial variety elevation of the limb and elastic pressure are often the only remedies available; but when the condition is due to lymphatic obstruction in the groin, it may be possible to find the dilated lymph trunks and implant them into a tributary of the internal saphena vein (lymphangioplasty), so as to relieve the limb of its engorgement with lymph, a process facilitated by elevation of the limb and the use of elastic bandages. It has also been suggested to construct artificial lymphatics by introducing a carefully sterilized silk thread through the subcutaneous tissues of the thickened area, leaving it buried therein, and carrying it up into normal tissues. This has acted very satisfactorily in draining away the fluid from the elephantoid arms, sometimes seen in the last stages of a cancerous breast. Finally, when a limb is involved, amputation may be desirable.

In the filarial variety, if one can localize the situation of the parent filariæ, as has been possible in a few cases, they should be excised, but even then the lymphatic obstruction may persist. Mr. R. J. Godlee has treated several cases where the leg was affected by lymphangioplasty, and the results have been encouraging.

The *Practice of Surgery*, Spencer and Gask, pp. 293 and 294:

"*Elephantiasis* is a name which has been applied in the past to various affections, arising from different conditions in which the skin and subcutaneous tissues of the extremities undergo marked enlargement, and the surface becomes nodular and rugous, more or less like the hide of an elephant.

"*Elephantiasis* is the term now especially applied to the disease called elephantiasis arabum, and known to be the result of filariasis.

"Acquired elephantiasis, non-filarial in origin, may be

due to involvement of lymphatic trunks by inflammation, pelvic, appendicular, etc., or to the pressure of tumors or scars, especially from burns, or to infiltrating malignant disease (Fig. 122), or it may be due to the wounding or the excision of main lymphatics."

Musser and Kelly, 1910, vol. ii, pp. 807 and 808:

Filaria Bancrofti: The mature Filaria Bancrofti (Filaria nocturna; Filaria sanguinis hominis) inhabits the lymph spaces, especially of the scrotum, vulva, and lower extremities, causing in those parts the well-known affection, elephantiasis. It may produce inflammation of the genito-urinary tract, with chyluria and hematuria; chylous ascites may also be caused by it. The sexually mature filariæ are viviparous, and the larvæ quickly pass from the lymph streams into the blood. The disease is transmitted by mosquitoes (culex, anopheles). Formerly it was believed that the mosquitoes did not transmit it directly, but that the filarial larvæ became liberated on the death of the insect and were then ingested with the drinking water, but recent studies have shown that infection is through the sting of living mosquitoes harboring the larvæ.

Elephantiasis and hematochyluria are common in tropical countries; sporadic cases are met with in the southern part of the United States, and occasionally in the large cities of the North.

Treatment (hematochyluria). Drugs are of very little value in the treatment of filarial hematochyluria. The disease lasts many years, with intermissions. Methylene blue (1 gr. several times a day), sandalwood oil, and ichthyol have been used with but indifferent results. Wherry and McDill (*Jour. Infec. Dis.*, June 24, 1910) have employed the *x*-rays after thorough cinchonization of the patient; the same treatment was used with fair success by Wellman and Adelung (*Jour. Amer. Med. Assoc.*, April 23, 1910). The latter gave enormous quantities of quinine; the first day 15 grs., second day 60 grs., third day 70 grs. The next

day 70 grs., then 60, 50, 60, 30, 50, 50, 50, 30, then for five days 15 grs. daily. The quinine was administered in 5 gr. capsules, usually one or two at a dose. Five *x*-ray treatments were given, two before the quinine was started and three after its administration had been begun. The duration of the exposure was one minute, forty-five seconds, thirty seconds. Under the treatment the hematuria ceased, and the embryos greatly diminished in the circulating blood, but did not entirely disappear.

Elephantiasis. In the acute attacks rest and sedative lotions are indicated. Castelanni (*Brit. Med. Jour.*, October 21, 1908) injects daily for a period of three or four months, with occasional intermissions, from 2 to 4 c.c. of fibrolysin (thiosinamin) into the gluteal muscles and wraps the leg firmly with flannel bandages.

Case VI, Figs. 3, 4, and 5.—Mrs. K. L., aged thirty-eight years, U. S., H. W., admitted to Albany Hospital May 4, 1911; discharged May 29, 1911.

Diagnosis. Elephantiasis, right leg, non-filarial.

Treatment. Operation; wedge-shaped pieces removed.

Personal History. Patient married at eighteen; mother of two boys, alive and well. Complains of "enlarged leg."

Family History. Excellent; no history of tuberculosis, cancer, rheumatism, heart or kidney trouble.

Past History. Patient had measles and mumps; never had typhoid fever, pneumonia, or suffered any traumatism; menstruated at fifteen; painful and regular; normal in amount and lasting three to five days. Bowels constipated; appetite good; weighs about 140 pounds, 125 when married.

Present Trouble. Began about fourteen years ago with sharp pains in limb above knee. Somewhat swollen at the time, but did not begin to enlarge very much until five years ago. Patient thinks it began to enlarge all over, not any particular region enlarging more than others. Does all of her own housework, which tires her considerably, and she becomes very nervous.

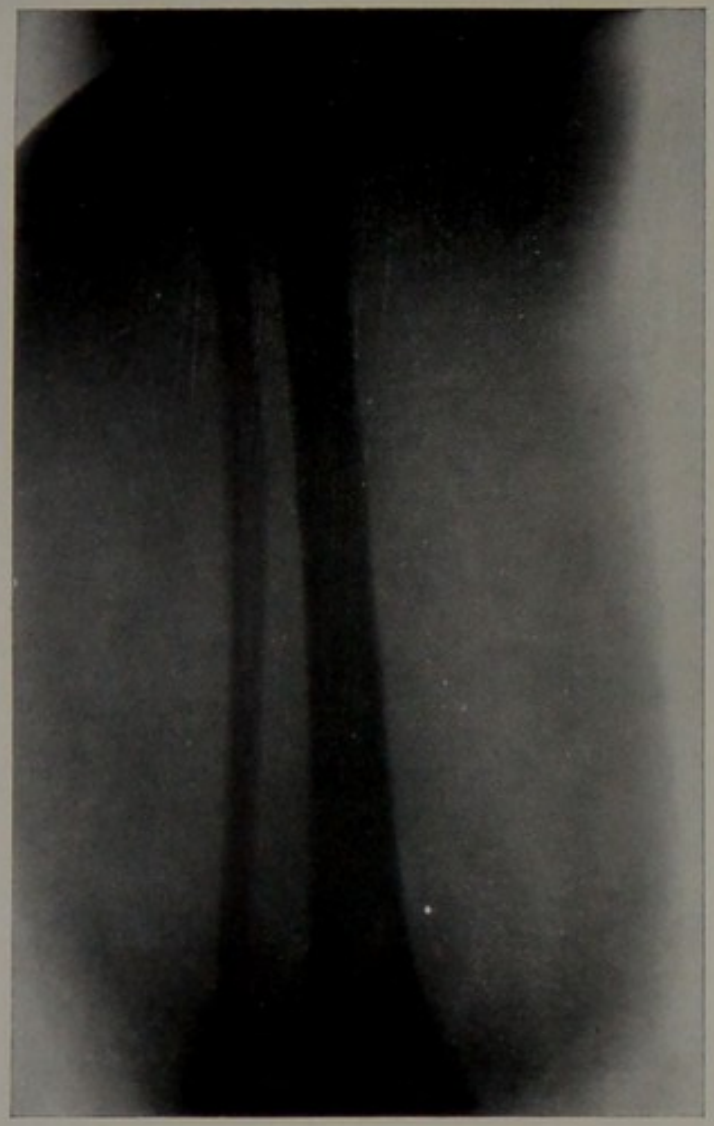

FIG. 4.—Case VI.

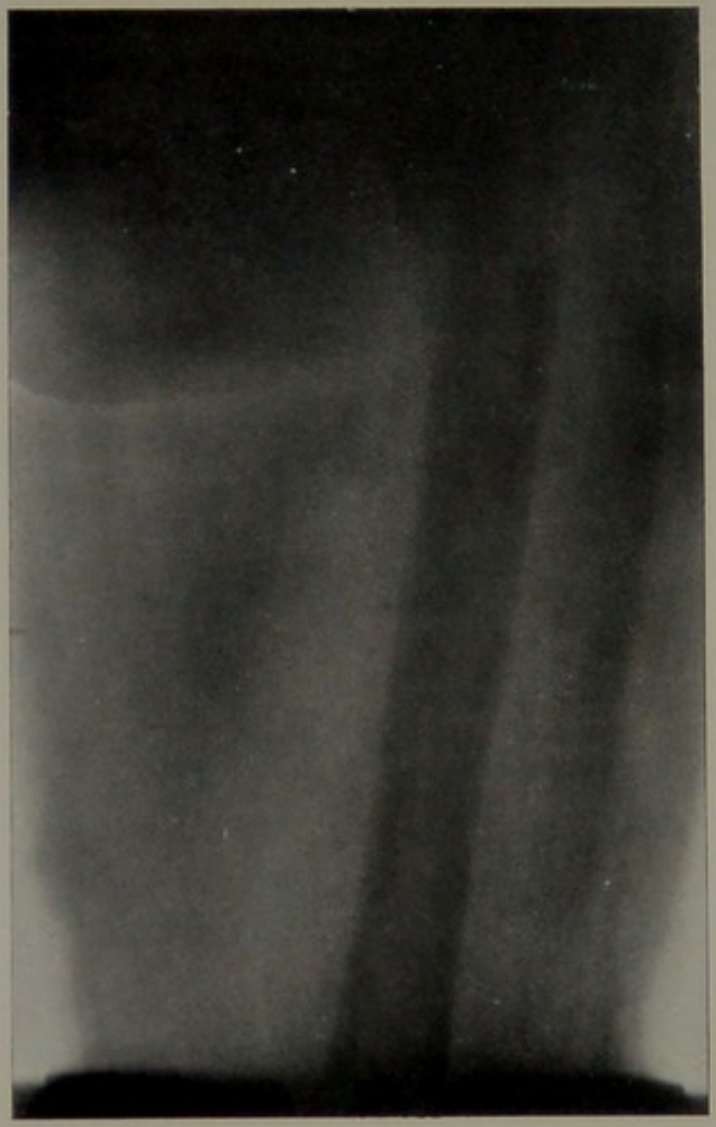

FIG. 5.—Case VI.

Measurements. Around foot, nine and one-half inches; around ankle, eighteen and one-half inches; below knee, fifteen inches; around knee, sixteen inches; above knee, seventeen and one-half inches; middle thigh, twenty-one and one-half inches; top of thigh, twenty-three and one-half inches.

This case was carefully studied by Dr. Ordway, of the Bender Hygienic Laboratory, and his assistants. Several examinations of the blood were made, at various times during the night, but no Filaria Bancrofti found.

Operation. Extirpation of three portions of wedge-shaped pieces of tissue, one over anterior aspect of lower third of leg, transversely, just above ankle, and two over posterior lateral aspect, each wedge corresponding to points of greatest redundancy. Very slight bleeding. Tissue blanched and edematous in appearance, with apparent partial thrombosis of bloodvessels. Slight bleeding points tied with cumol catgut ligatures. Two rubber tubes inserted for drainage.

The report on the surgical specimen from Bender Laboratory, received May 8, 1911, from the Albany Hospital, in the case of Mrs. K. L., is as follows:

Gross Examination. The specimens consist of two large elliptical masses of thickened skin and subjacent fat and fibrous tissue; these measure respectively 25 cm. by 4.5 cm., and 23 cm. by 4 cm., and the combined weight is 450 grams.

The skin is rough and furrowed, and has, in general, a "puckered" or shrivelled appearance, as if it had contracted after stretching. From its under surface dense fibrous strands invade the subjacent fat. The entire subcutaneous tissue, including the fat and fibrous tissue, is pale and has a general homogeneous, glassy, or "mucoid" appearance. The fat is of very light yellow color.

Fragments are removed from various portions of these specimens, fixed in 10 per cent. formalin and Zenker's fluid.

embedded in celloidin and paraffin and stained by the hematoxylin and eosin and eosin-methylene blue methods.

Microscopic Examination. The subcutaneous lymphatics are abundant and markedly dilated and all the tissue elements are widely separated by edema.

The epidermis is, in places, slightly atrophic and shows moderate keratosis. At the junction of the epidermis and subjacent tissue the former has a toothed or comb-like appearance as if drawn away from the latter. The cells of the sweat glands are swollen and the cytoplasm is pale and granular.

The subcutaneous fibrous tissue shows marked separation of the collagen fibrils by edema.

The intrinsic smooth muscle fibers of the skin are separated and swollen. The subcutaneous fat appears small in amount as the vacuoles are encroached upon by the swelling and fibrillation of the connective tissue between the fat globules.

There are scattered ill-defined foci of lymphocytes and plasma cells, with occasional polymorphonuclear leukocytes and tissue mast cells. In places these accumulations of cells are distinctly perivascular.

The smaller bloodvessels and capillaries stand out prominently in contrast to the loose (edematous) connective tissue surrounding them, in a way similar to those in the umbilical cord and chorionic villi. The coats of the arteries are thickened, the muscle fibers are swollen and separated; between them are "vacuole-like" spaces. The adventitia is fibrillated and the intima is irregularly thickened. In places the endothelium is shrunken and shows a varying degree of degeneration. The bloodvessels contain but few corpuscles.

The lymphatics are abundant and markedly dilated and occasionally there is a break in the continuity of the wall as if it had ruptured. Many of them are empty, others contain pinkish-granular (edema) and spicule-like material (fibrin), and in still others are lymphoid cells in varying numbers.

This patient made an excellent recovery; however, on the fifth day she had a rise in temperature, and there developed a marked inflammation of the internal saphenous vein which yielded to treatment, causing no serious complications. The absolute rest, elevation of leg, and operation resulted in the limb being nearly the size of the other when she left the hospital. Since then the few reports regarding her case have been favorable. Her case was a typical one in appearance, careful laboratory examination showing it to be non-filarial, and the operation illustrates (more than any other point in the study of these cases) the comfort that comes to the operating surgeon, and the importance of having careful bacteriological and pathological tests made by competent experts.

The diagnosis then having been made, the treatment of today would consist in a thorough examination, regarding the possibilities of any organ presenting a pathological condition, or outside etiological factors producing lymphatic changes. Proper attention should be paid to all the functions of the body; the surroundings of the patient; relieving the patient of any malnutrition or imperfect assimilation of food; the use of hot baths, elevation of the limb; the application of bandages; absolute rest, so far as possible; employment of the *x*-rays, with cinchonization, and various forms of electricity; Castelanni's treatment by means of thiosinamin (fibrolysin); the operation of lymphangioplasty; sterilized silk thread, subcutaneously employed, and the destruction of the fly and mosquito elements that may be present. In the various surgical operations one must pay special attention to the technique, and avoid infection. The veins as well as the arteries should be carefully ligated, and, as in the case of Mrs. K. L., thorough drainage must be provided. The danger of hemorrhage must also be carefully considered.

All therapeutic agents failing surgical intervention becomes proper, such as ligation of arteries, incisions that may

result in a lymphorrhea, longitudinal incision, especially of the arm, in case of tense, lymphatic edema is of service, and, finally, the operation of Rogers', of India, for removal of wedge-shaped, elliptical portions of the hypertrophied tissue.

This, to the writer, promises better results than more serious surgical intervention, in the way of removal of all the tissue, as has been done by some surgeons in India, but the results do not seem to have been very favorable.

DISCUSSION

Dr. Rudolph Matas, of New Orleans, La.—Responding to the call of the reader of the paper to relate our Southern experience, I will say that elephantiasis is one of the tropical types of disease which is always interesting to Southern practitioners, though the filarial or strictly tropical type is practically unknown among us in Louisiana, on the Gulf Coast and South Atlantic States. We occasionally see manifestations of filariasis such as chyloceles and chyluria, but not the typical lymphatic elephantiasis which is so peculiar to the tropics and East Indies. The Filaria immitis, or dog filaria, is extremely common in the canine species in the South, but the human filaria is very rare and is usually imported from the West Indian Islands, south of us. None of the observers in Charleston or Mobile, where the first observations in American filariasis were made known by Guiteras, de Saussure, W. Mastin, and others, refer, to my knowledge, at least, to the elephantiasic type of filarial parasitism.

We have a great many opportunities for the observations of tropical and semitropical diseases in New Orleans, and now that a school of tropical medicine and hygiene has been established in connection with the Tulane University, we are always on the lookout for parasitic elephantiasis. We have our share of non-parasitic elephantiasis both among the negroes and the whites, but these are sporadic cases due to connective-tissue hypertrophy following mechanical obstructions in the lymphatic and venous tracts of the lower extremities, following ulcers of the legs and other causes of a surgical character. There is,

however, a peculiar type of elephantiasis which deserves attention, though it is not peculiar to our Southern Country. It is a specific elephantiasis form of disease which is associated with recurrent erysipelatous attacks, but differing from typical erysipelas in the fact that the eruption never extends above Poupart's ligament and is always followed by a permanent hard doughy edema of the extremity which increases steadily with every erysipelatous attack. It is to this type that the name of elephantiasis streptogenes has been applied by Unna, of Hamburg. It is to this type that the name elephantiasis nostras (Unna) should be applied. The streptococcus, which is the pathogenic organism, closely resembles the Fehleisen coccus, but evidently must differ from this. The attacks are initiated by a red rash which beginning at the toes and foot rapidly spreads up the limb to the thigh. The eruption is accompanied by chills and high fever which may remain at 104° or over for several days, rarely lasting more than a week or ten days, the patient recovering with the disappearance of the eruption. The limb enlarges with each attack. At first the attacks occur at long intervals, perhaps twice or three times a year, then once a month, rarely oftener, each time the limb grows larger, until in the course of time a distinct elephantoid state is fully established. It is a recurrent infection of a latent type, the organisms probably remaining dormant in the tissues after each attack; natural immunity is not easily acquired and once the erysipelatous habit is established the disease will remain permanently grafted to the body.

I recall a lady who came on a visit from Washington to New Orleans several years ago and who sent for me during one of these attacks. She had a marked elephantiasis of the entire lower extremity up to her thigh. She did not have a typical Barbadoes leg which always suggests a monstrosity, but her leg was large enough to be an unsightly deformity. Within a few days the erysipelatous attack subsided and with the hope of preventing further attacks, I suggested a systematic trial of a polyvalent antistreptococcic serum, to be given in doses of 10 c.c. at least three times weekly hoping that the polyvalence of the serum might cover the particular streptococcus which causes the disease. She subsequently wrote me that after applying sixteen injections, she enjoyed a long interval of peace. After another attack she took sixteen more injections, after which the attacks grew much less frequent and much milder.

When the attacks occur the temperature seldom rises high and the swelling has not increased. The disease appears to have been attenuated so much since she began the antistreptococcal injections and she has grown so much more confident in her ultimate recovery, that she has married.

In dealing with hard lymph edema such as is observed in the upper extremity after the extirpation of axillary glands for cancer of the breast, Sampson Hadley's suggestion to create new lymph channels is worthy of consideration. In a recent case of hard, permanent edema of the lower lid, resulting from an injury in the neighborhood of the eye, the huge edema of the lid gradually subsided after the introduction of sterile threads into single incisions which crossed the borderline of the edematous patch and the normal skin. It is now several months since this proceeding was tried, and the edema has practically subsided. This is only one of several applications of what appears to me to be a very valuable suggestion.

Dr. Vander Veer (closing).—In my paper I referred to the method of treatment by the introduction of silk threads, and much that I omitted in reading is referred to there. I am glad Dr. Matas elaborated the erysipeloid form of infection.