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# CASE REPORT ON TWELVE AUCHINCLOSS OR MODIFIED AUCHINCLOSS OPERATIONS FOR FILARIASIS

## PRELIMINARY REPORT

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It is too early to draw any conclusions on the results of the surgical treatment of these twelve cases we have to report. Purposely, we shall omit any comment or discussion on the result in cases operated upon by other technics during past years; likewise, we shall omit all discussion on the causation of the pathological condition called elephantiasis. We shall only mention the fact that in the majority of cases treated by operation good results are late in coming.

Dr. F. W. O'Connor, in his last visit to the School of Tropical Medicine, renewed our interest in the subject of filariasis and we have been glad to help him with the surgical treatment of his cases by applying the surgical principle devised by Dr. Hugh Auchincloss(1). Dr. W. R. Torgerson(2) has reported the results in several cases operated by him recently.

All the operations so far described for this condition have aimed at relieving the deformity and securing lymphatic drainage. Kuzutzoff, Mikulicz, Kafoni, Handley, Lanz, have described operations based on this principle. Kondoleon, of Greece, developed, in 1912, a technic whereby he attempted to drain the superficial through the deep lymphatics by leaving an open vent in the deep fascia; Opel and Rosanow described similar operations at about this same time, all based on the principles previously applied by Lanz. These procedures failed either because lymphatic circulation was not reestablished or because subsequent attacks of acute lymphangitis were

not avoided by the intervention; in most cases, perhaps, both these factors were operative in bringing about a recurrence. The Auchincloss operation aims not only at correcting the disabling deformity and providing a free communication between the superficial and deep lymphatics, but also at removing the tissue thought to harbor the adult filarial worms; by this means O'Connor hopes to avoid the occurrence of subsequent attacks of acute lymphangitis.

The radical Auchincloss operation has been performed in the severe cases with *real elephantiasis;* in the mild cases a modified technic has been used to remove the portion of subcutaneous tissue and deep fascia where fibrosis has made its onset or where calcium shadows suggestive of calcified worms have been found through the X–ray.

The proper preparation of the patient is of great importance, especially in the real elephantiasis cases in which the skin is usually covered with a thick crust of dead epithelium. For these cases we found it most effective to scrub the part with soap and water daily and then apply sterile vaseline; the last few days preceding operation sterile bandages are applied daily. A more or less prolonged period of rest in bed, with the leg elevated, will drain much of the lymph, softening the limb and reducing its size considerably.

For the major operation a general anesthetic is much to be preferred; spinal anesthesia may be used in some cases; for the modified operation regional or local anesthesia can be used advantageously.

The use of the tourniquet may be advisable in some cases to render the part ischemic by the circular turns of the elastic bandage from below; in our experience, however, an assistant, quick to catch the vessels as they are severed, allows very little loss of blood. Bleeding, in this condition, seems to have a tendency to stop by itself and comparatively few vessels require ligation; much depends, of course, on the individual blood coagulating mechanism. Not much regard can be had for the nerves, except, in the case of a leg, for the peroneal and its branches.

We have found that by suspending the leg so that the foot is about two feet above the level of the table one can move about with greater ease; this we do by tying the foot with a sterile roller bandage to an irrigator stand secured to the end of the table; foot, stand and bandage are then covered with sterile cloth; this position has the additional advantage of reducing venous congestion.

When marked fibrosis is not found near the skin it is well to leave enough fat adherent to it to minimize the danger of necrosis.

In some cases we have, so to say, peeled off more than half the circumference of the leg without untoward results. The deep fascia we have not resected to the same extent of the subcutaneous tissue having thought it convenient to leave strips across to support the musculature.

In the last cases we have preferred not to make the transverse incisions of Auchincloss. We have found that by extending the longitudinal incision above and below for a sufficient distance one can, by retraction and traction on the skin flaps, reach as far as desired and at the same time resect part of the deep fascia above the knee. For applying traction on the flaps the Moynihan double prong towel clamps or vulcellae have been found very convenient, at times necessary.

In the suturing of the flaps we have followed the method of excising on either side the necessary strip to bring the flaps to fit well, excising only a short distance ahead of the suturing thus "fitting the new stocking to measure."

The flaps are sutured with strong silk-worm-gut retention stitches every two or three inches, and then any kind of skin suture. It is very important that the skin edges be made to close nicely; a small separation takes a long time to granulate and heal in this condition.

## REPORT OF CASES

*Case 1.* A. L., U. H. No. 379. A colored male 30 years of age. Enormous elephantiasis of left foot, leg and thigh, of ten years' duration; single initial attack of lymphangitis following removal of jigger. Marked hyperkeratosis and warty growths on foot; large indolent ulcer on dorsum of foot. Wasserman and Kahn + +. (Plates I, II, III, IV illustrate size of limb and degree of fibrosis. There were no calcium shadows suggestive of calcified filarial worms.) Radical Auchincloss operation with lateral incisions and resection of subcutaneous tissue and deep fascia around three-fourths the circumference of the leg. X-ray plates of the tissue removed showed multiple calcium shadows (Plate V). The pathological report read: "Elephantiasis of leg (clinical); chronic inflammatory reaction in corium and subcutaneous tissues with marked fibrosis; Monckeberg sclerosis of medium-sized artery of leg." (E. Koppisch.) Convalescence was uneventful with healing by first intention; very good cosmetic results; pending secondary operation.

*Case 2.* I. M., U. H. No. 386. A white woman 50 years of age, has suffered from recurrent attacks of acute lymphangitis for fourteen years; elephantiasis began ten years ago; there have been numerous ulcerations of the leg. There is moderate elephantiasis and fibrosis; the general condition is rather poor and on the affected leg are numerous scars of healed ulcers; she also has mild arthritis deformans. Modified Auchincloss operation performed, dissecting subcutaneous tissue and deep fascia for about one-half the circumference of the limb. The pathological report said in part: "There are occasional areas in

which the tissues are very dense and hyalinized. Throughout these portions are numerous, thin, elongated, tubular structures with very thin walls and a clear interior. They measure from 70 to 100 micra in length and about 5 to 7 micra in diameter. In some areas these bodies are irregular in shape and broader. The ends are either rounded or square; at times pointed. A clear space or capsule can be seen about some. There are dense areas of calcification. Van Kossa's stain confirms the presence of calcium in the form of clumps in the tissues and shows calcification of the microfilariae. The blood vessels, which are thick-walled, contain calcium in the media.'' (E. Koppisch.) Convalescence was very protracted, there was pain and swelling of the foot and ankle and the wound edges necrosed in several places; it has been impossible to reach the patient after discharged.

*Case 3.* M. R., U. H. No. 390. A white female 23 years old. Has had recurrent attacks of lymphangitis of the right leg for some three years; there is no definite periodicity in the attacks. There is no actual elephantiasis of the leg but slight enlargement, especially towards evening. X-rays showed slight fibrosis at the middle third of the leg and calcium shadows suggestive of calcified worms in the lateral aspect of the lower part of the middle third. A modified Auchincloss operation was performed removing the entire fibrotic area. Edema of the foot and ankle increased immediately after operation to a degree never attended before; the wound healed promptly by primary union. Now, six months after operation, the leg remains considerably swollen, the patient requires one hour's rest in bed at midday to be able to carry through the rest of the day and is much concerned about the rather large swelling. There have been no acute attacks but the last two she had had at one year's intervals. On two occasions she has had the premonitory symptoms of an impending attack.

*Case 4.* M. G., U. H. No. 387. A colored woman 53 years of age. For six years the patient has suffered from progressive enlargement of the left leg after an attack characterized by pain in the ankle and fever, but no redness, vomiting, etc. Eleven months before admission there occurred what seems to have been the only typical attack of acute lymphangitis. Elephantiasis progressed more rapidly after this attack. The affected leg was 1¾ inch larger than the other at the knee, 1¾ inch larger at the calf, 2¾ inches larger at the ankle and 1¼ inch larger at the instep. A radical Auchincloss operation was performed removing subcutaneous tissue and deep fascia from just below the knee to the ankle for about one-half the circumference of the leg. The edges of the wound threatened necrosis and sloughed some; there was no infection and the process gradually healed in about three months. The foot was then practically as much swollen as previously but much softer. At this time, three months after operation, she had another attack of acute lymphangitis which, however, she claims not to have been as severe as her previous one. Cosmetic results in this case have been very good.

*Case 5.* R. J., U. H. No. 396. A white male of 17 years of age. For about three years the patient has suffered from recurrent attacks of acute lymphangitis of the left leg. A little swelling always remained after the acute attacks, so that there is now some enlargement of the leg. The affected leg is 2 inches larger than the other at 11 inches from the trochanter, 1½ inch larger 20 inches from the trochanter, 1½ inch larger 28 inches from the trochanter and ½ inch larger at the instep; with rest in bed, however, the

swelling subsided so that at the time of operation the two limbs were of the same size; there remained, however, some tumefaction of the tissues due to fibrosis. There were suggestive calcium shadows in the posterior aspect at about the middle of the middle third. The modified operation was performed by incising along the posterior aspect and dissecting on either side for a distance of about three inches. The pathological report read: "Slight chronic inflammatory reaction in the tissues." (E. Koppisch.) The wound healed by first intention but a small collection of serum under the skin required incision and drainage for a few days. When discharged, 19 days after operation he still had difficulty in walking and considerable swelling immediately upon attempting to walk. Thirty four days after discharge he was readmitted with a violent attack of acute lymphangitis which lasted two days. Three months after operation there was no diminution in the size of the leg.

*Case 6.* H. S., U. H. No. 25. A white male 21 years of age. The patient was first admitted to the Hospital about two years ago for splenomegaly which proved, after operation, to be due to Banti's disease; at the time of admission he was having an attack of acute lymphangitis of the left leg; he had had two previous attacks in the course of four months. He was readmitted for operation on the leg which was quite swollen following several recent such attacks. With rest in bed the swelling subsided so that at the time of operation the affected leg was ½ inch larger than the other at the instep only. Besides the fibrosis positive calcium shadows were seen in the lateral and posterior aspects of the middle third of the leg. The subcutaneous tissue and deep fascia of this area were removed through a posterior incision. The pathological report read: "Throughout the fatty tissues run a few dense fibrous connective tissue septa. Some of the arteries have slightly thickened walls. One lympathic vessel is seen which presents a hypertrophy of its muscular coat." (E. Koppish). The wound sloughed at one point with no infection, taking a long time to heal. Much swelling appeared when patient stayed on his feet for any length of time. Two months after discharge the patient was readmitted with a very severe attack of acute lymphangitis (Plates VI and VII); the patient was discharged after three days in the hospital; measuremens of the legs at this time were exactly the same for the two legs. Twenty-three days after discharge he was readmitted with a more violent attack which had begun two days previously. The operative wound was well healed, the ankle quite swollen and red; in the inner side, just below the malleolus, there was a fluctuating swelling with was incised and drained of pus (non-hemolytic staphylococcus albus); a few days later a similar fluctuating swelling was incised at the middle third of the leg. The patient was discharged and has not been seen since (two months).

*Case 7.* M. C., U. H. No. 395. A white female 44 years of age. After a first attack of acute lymphangitis of the left leg, 26 years ago, the patient had monthly recurrent attacks for nine consecutive months. For twelve years she was free from attacks and the slight swelling which had remained gradually disappeared with return to normal. After this period of freedom the patient had a very violent attack which lasted 14 days and after which the leg remained swollen; there was another attack after 10 years and one again a month before admission, about three years after the last previous one. There is slight enlargement of the left leg which just above the knee is ½ inch

larger than the right and 1 inch larger at the ankle. X-rays showed moderate fibrosis. A modified Auchincloss operation was performed and the fibrosed tissue removed. The pathological report read: "Throughout the fatty tissue are occasional fibrous connective tissue septa in which an occasional small group of lymphocytes and plasma cells is seen. One of the sections shows a lymphatic vessel with greatly thickened walls throughout which are a few round cells." (E. Koppisch). The wound healed by first intention except at one point where the process of healing was very slow; there was no infection. Twelve days after operation the patient had an attack of acute lymphangitis which lasted two days. Later there was a small collection of fluid under the skin. The leg is still swollen and towards afternoon much more so than before operation. There have been no further attacks.

*Case 8.* D. G., U. H. No. 400. A white woman 60 years of age. Had two attacks of acute lymphangitis of the left leg at the age of 8; several attacks in succession at 18; again at 19 and since then at irregular intervals for years at a time; as a young adult had an attack limited to the thigh, after which leg remained swollen for the first time; swelling then increased somewhat after each attack. The left leg shows some tumefaction of the tissues about the ankle and above, but measurements of the legs show that there is no difference in their size. X-ray showed fibrosis in the lower third. A modified Auchincloss operation was performed with removal of said area; there seemed to be no fibrosis at the time of operation. Pathological report read: "Throughout the fatty tissues are thin fibrous connective tissue septa in which an occasional lympathic vessel with hypertrophied wall is seen. In the neighborhood of these vessels are small groups of plasma cells and lymphocytes." (E. Koppisch). The wound healed well. The patient was seen again one month after discharged; she said that the leg was more swollen than it ever was before operation; she had had no attacks, but she had not had any for two months previous to operation.

*Case 9.* V. T., U. H. No. 426. A white male 24 years of age, has suffered from recurrent attacks of acute lymphangitis for some eight years with consequent elephantiasis, more marked of the left leg; elephantiasis also extends above the knee. X-ray showed considerable fibrosis but no calcium shadows (Plates VIII and IX). The Auchincloss technic was modified in this case by eliminating the transverse incisions and prolonging the longitudinal incision about 5 inches above the knee; the subcutaneous tissue was removed about three-fourths the circumference of the leg; strands of deep fascia were left to support the muscle; a wide strip of fascia lata was removed from the lower thigh according to Kondoleon's technic. The pathological report read in part: "In all of the sections there is extensive fibrosis of the fat and numerous microfilariae are found. In a few places is a bluish granular deposit suggesting calcium. The smaller blood vessels frequently have mantles of lymphocytes about them. In some of the arterioles the intima is thickened; the lumina are correspondingly reduced in size. In other vessels the lumen is partly obliterated by vascular fibrous tissue. None of the vessels are calcified. No distended lymphatics are seen. Diagnosis: Filariasis; elephantiasis." (Wm. C. von Glahn). The wound healed promptly by first intention (see Plates X, XI and XII). Before discharged the leg was found to be of the same size as before operation at the trochanters, below the knee, and at the calf; it was ¾ inch smaller midway between the knee and ankle and ¾ inch larger at the ankle and ½ inch larger at the instep. He has been wearing an elastic stocking and

there has been about ½ inch reduction in all the circumferences; there have been no further attacks in either leg and the patient is very well satisfied with the results.

*Case 10.* E. F. A white woman 46 years of age, has suffered from recurrent attacks of lymphangitis and progressive elephantiasis of both legs for some 23 years; the elephantiasis of the left foot and leg reach respectable proportions and there are numerous warty growths and marked hyperkeratosis of all the toes. The X-ray showed medium fibrosis and no calcium shadows (see Plates XII and XIV). The combined Auchincloss-Kondoleon technic described for case 9 was used with removal of a large amount of tissue. The pathologic report read, in part: "In various sections the connective tissue in the fat is increased and edematous. There are numerous very dense collections of lymphocytes and plasma cells in various parts of the sections as well as distended lymphatics. Some of the arteries show hypertrophy of the muscular coat and thickening of the intima. There are arterioles whose lumina are occluded and whose walls contain lymphocytes and, to a lesser extent polymorphonuclears. No microfilaria are found and there is no calcium deposition". (Wm. C. von Glahn). Convalescence was uneventful; the wound edges threatened to necrose and there was a little sloughing of the edge of the anterior flap. There have been no attacks since operation four months ago, but there had been no attacks for several months previous to operation; there has been slight reduction in the size of the leg and the warty growths on the toes have receded under medical treatment.

*Case 11.* M. L. R., U. H. No. 489. A white female 40 years of age, dates her present illness fourteen years back when she had an attack of acute lymphangitis of the right leg; attacks repeated themselves every two weeks at first, then monthly, every three months, every eight months, each time less severe; the last attack occurred 3 years ago but a certain amount of swelling has remained which has increased since the attacks stopped 3 years ago; there is pain in the leg, especially towards evening, heaviness, distressing discomfort in leg. The affected leg is 1 inch larger than the other above the knee, ½ inch larger below the knee, 2½ inches larger midway between knee and ankle, 2½ inches larger at the ankle and ¾ inch larger at the instep. There is reason to believe that she subjects to operation more because of esthetics than because of any legitimate subjective symptoms. The X-ray demonstrated moderate fibrosis and no calcium shadows. The combined Auchincloss-Kondoleon technic was used in removing subcutaneous tissue and deep fascia of over ½ the circumference of the limb to just below the knee. The pathologic report was in part as follows: "The muscle wall of some of the lymphatics is slightly thickened. Throughout the subcutaneous fatty tissue are broad fibrous connective tissue bands in which are dilated lymphatics with somewhat thickened walls. About the lymphatics are occasional groups of round cells. In one of the sections are a few tubular structures which stain with hematoxylin, and which are somewhat suggestive of microfilariae, but it is observed that the ends of some of these structures are not tapering. One lymphatic is found, the walls of which are enormously thickened. Diagnosis: Elephantiasis of leg, slight; (filarial?)." (E. Koppisch.) The wound threatened to necrose at one point but this was averted. The patient was discharged 32 days after operation with a reduction in the size of the leg of 1 inch

midway between knee and ankle and ¾ inch at the ankle; it was ¾ inch larger at the instep; it is two weeks since the patient was discharged and she has not been heard of since.

*Case 12.* C. B., U. H. No. 486. A colored female 40 years old, has suffered from attacks of acute lymphangitis for 15 years; attacks have occurred at long intervals, going as long as six years without any; they have never occurred at intervals shorter than one year; she was having one at the time of admission and the previous one had been over one year before. There is, however, enormous elephantiasis of the left leg, from ankle to thigh, most marked at the calf where the elephantoid tissue had grown to large proportions. (See Plates XV and XVI.) The X-ray showed marked fibrosis and one suggestive calcium shadow. The combined Auchincloss-Kondoleon technic was used with removal of the elephantoid tumor and some of the subcutaneous tissue medial and lateral to it together with the deep fascia. On suturing the skin it was found that the flaps were too short below so that there was a gap of about two inches between the skin edges. The pathological report read in part: "Throughout the subcutaneous fatty tissue are broad bands of fibrous tissue which are quite variable in density. There are areas in the fibrous tissue which are very loose and edematous and which are extremely rich in minute lymph and blood capillaries. These areas suggest a recently organized granulation tissue. Many of the medium-sized arteries show marked thickening of the muscle wall with more or less constriction of the lumen. An occasional structure suggesting a calcified microfilaria is seen. At one point is a group of small arteries, the walls of which are greatly broadened and the lumina markedly narrowed. In one of these vessels the lumen has been completely obliterated and the walls have been in great part replaced by hyalinized fibrous tissue. Diagnosis: Elephantiasis." (E. Koppisch). The patient is still in the hospital, five weeks after operation; the wound has healed completely except at the point where the edges did not meet; this area is granulating slowly; cosmetic results have been excellent in this case. (See Plates XVII and XVIII.)

ACKNOWLEDGMENT

We wish to express our appreciation to Dr. G. Ruiz Cestero, of the University Hospital, for his assistance in the preparation of the illustrations.

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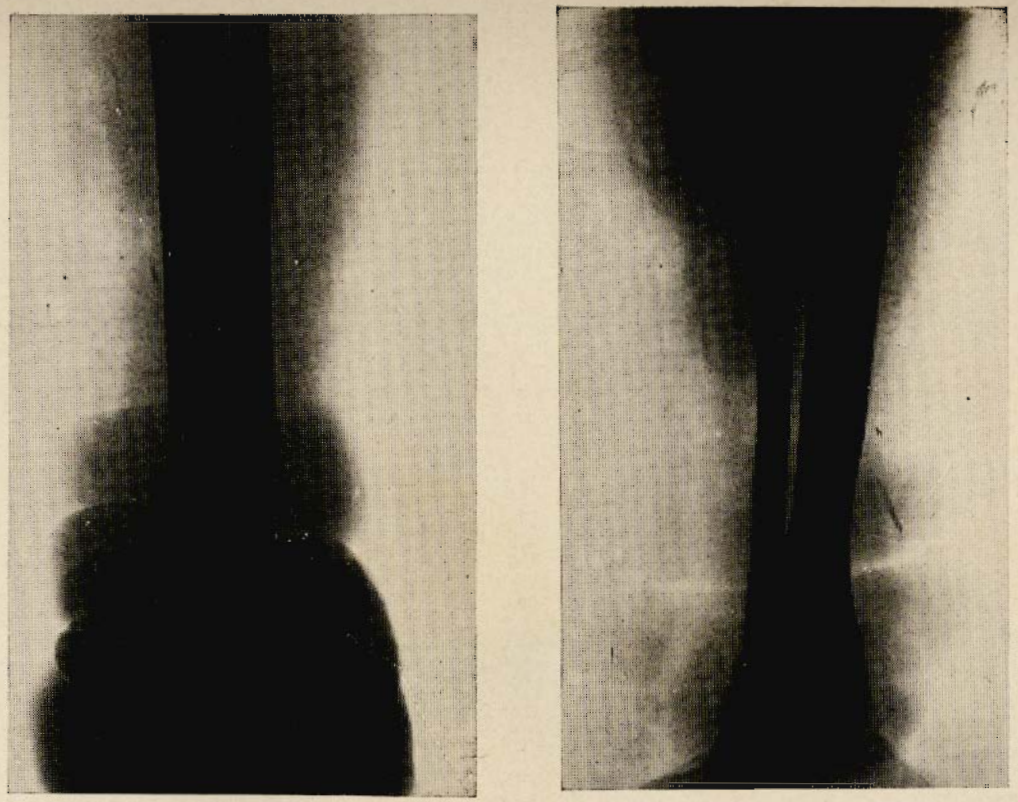
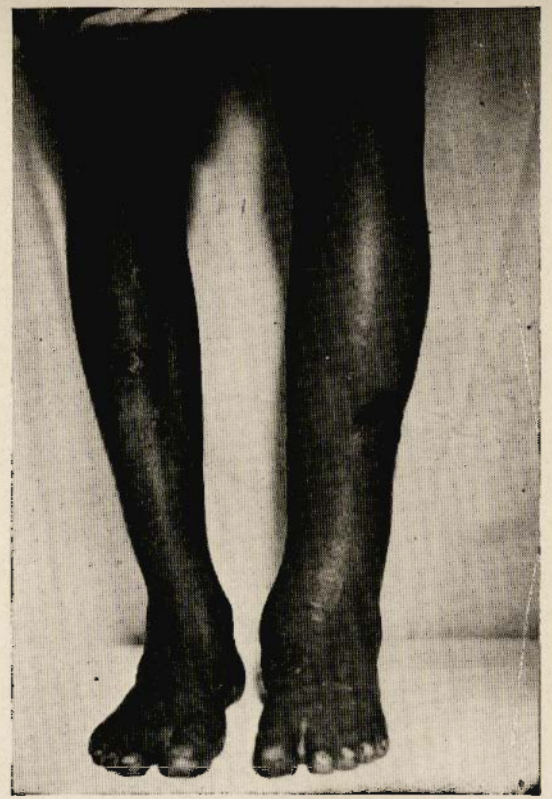
(2) Torgerson, W. R.: (1931) Report on the Auchincloss Operation for Elephantiasis. P. R. Jour. Pub. Health and Trop. Med., **6**: 411.

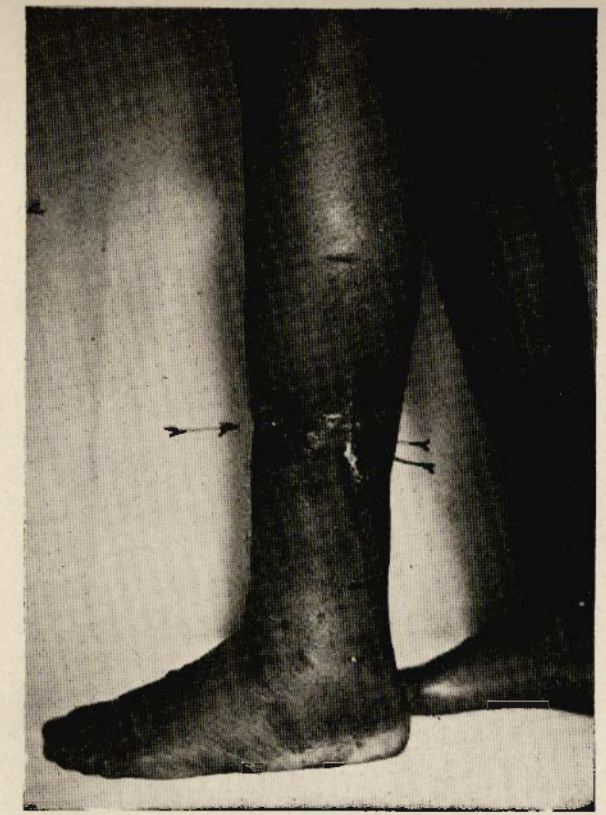
PLATES I AND II.—A. L., CASE 1. ILLUSTRATE RELATIVE SIZE OF LIMB AND DEGREE OF FIBROSIS.



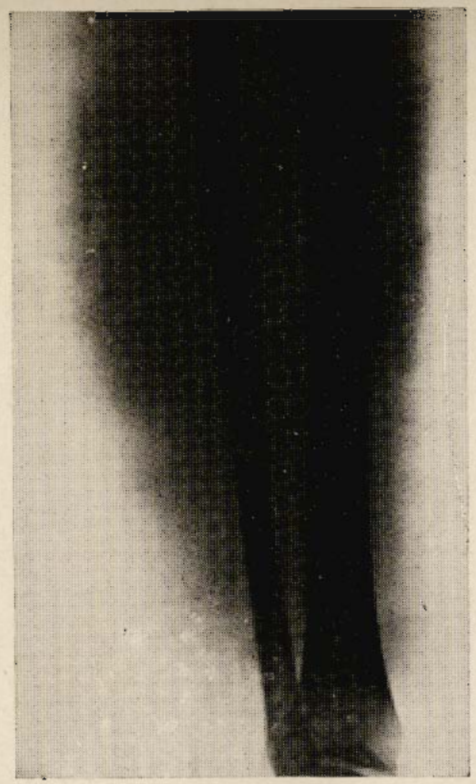
PLATES III AND IV.—A. L., CASE 1. ILLUSTRATE RELATIVE SIZE OF LIMB AND DEGREE OF FIBROSIS

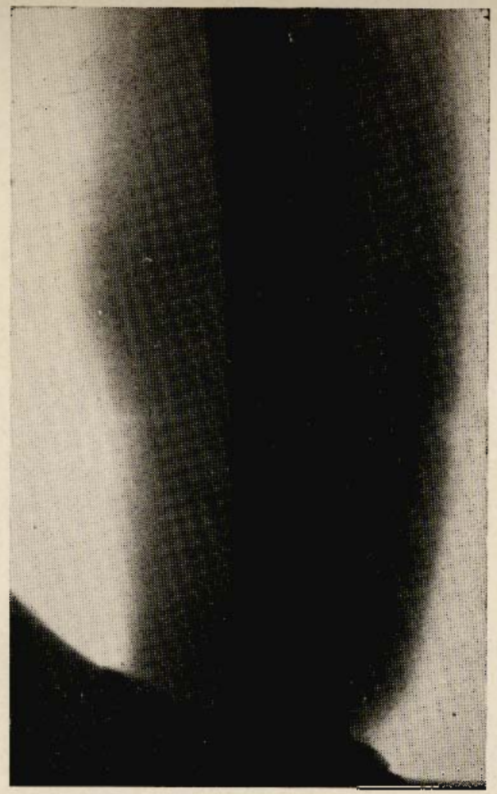
PLATE V.—SAME CASE, X-RAY PLATE OF THE TISSUE REMOVED AT OPERATION SHOWING CALCIUM SHADOWS.





PLATES VI AND VII.—H.S., CASE 6. PHOTOGRAPHS TAKEN DURING THE ATTACK OF ACUTE LYMPHANGITIS WHICH OCCURRED THREE MONTHS AFTER OPERATION. THE EXTENT OF THE INCISION FOR THE MODIFIED AUCHINCLOSS TECHNIC IS SHOWN IN THE LATERAL VIEW. THE SINGLE ARROW POINTS TO THE SCAR OF AN OLD HEALED ULCER; THE DOUBLE ARROW TO THE AREA THAT SLOUGHED AFTER OPERATION. AFTER THREE DAYS IN BED THERE WAS NO DIFFERENCE IN THE SIZE OF THE TWO LEGS.

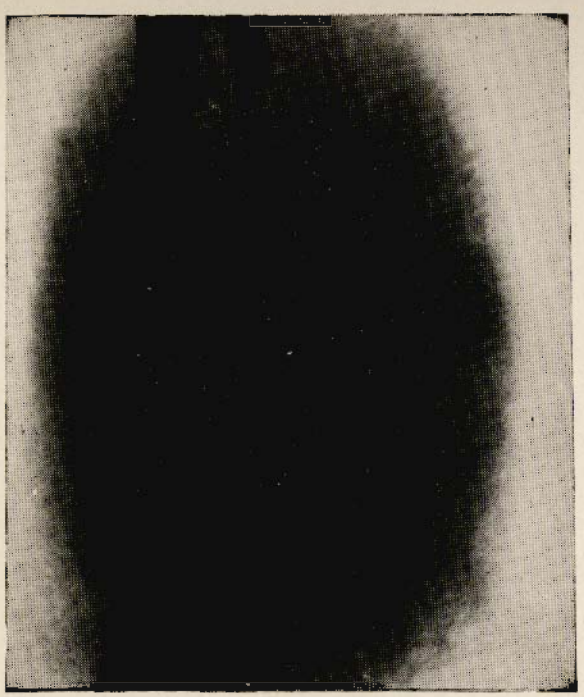




PLATES VIII AND IX.—V. T., CASE 9. ILLUSTRATE RELATIVE SIZE OF LEG AND DEGREE OF FIBROSIS



PLATES X, XI AND XII.—SHOWING THE SAME CASE AFTER OPERATION. THE EXTENT OF THE INCISION FOR THE COMBINED AUCHINCLOSS-KONDOLEON TECHNIC IS SHOWN.



PLATES XIII AND XIV.—E. F., CASE 10. SHOWING RELATIVE SIZE OF LIMB AND DEGREE OF FIBROSIS

PLATES XV AND XVI.—C.B., CASE 12. PHOTOGRAPH TAKEN BEFORE OPERATION SHOWING DEGREE OF ELEPHANTIASIS.

PLATES XVII AND XVIII.—SAME CASE SEVEN WEEKS AFTER OPERATION.