first day, and a few patients exhibited evidence of mild bronchitis at this stage.

The febrile phenomena as indicated in the temperature chart showed no essential difference in persons with lymphangitis without elephantiasis and in persons with elephantoid fever.

Septic Complications in Lymphangitis:—Septic complications are sometimes observed in patients who have had a succession of uncomplicated attacks of lymphangitis. Considering the frequency of attacks in some persons over a period of many years, their very obvious liability to septic conditions, such as those resulting from bad teeth, injuries to the lower limbs and skin infections, it is remarkable how seldom bacterial infection manifests itself in filarial attacks. In the present studies every case which showed evidence of bacterial infection ended in pus formation. The temperature, falling for a few days after an ordinary attack of lymphangitis, began to rise again, the evening peak being always as high as or higher than that of the previous evening. At the same time the pulse became markedly increased in rate and reduced in volume. Patients became very ill and continued to get worse until pus was discovered and evacuated. Less commonly there was no remission between the acute attack of lymphangitis and evidence of sepsis; the temperature and pulse continued to rise where in previous attacks both had decreased.

Resolution of Lymphangitis:—When the temperature falls, with or without sweating, all of the local signs of lymphangitis abate. Acute pain rapidly gives place to the duller or throbbing variety. The redness, especially when localized, may grow lighter, the gloss disappear, and soon the skin becomes normal in appearance. When larger areas have been inflamed, the surface becomes dull and the color bluish (in some cases bluish black), and in others it may change to a dull brown. During these changes, if not before, the patient becomes troubled with intolerable itching, a noticeable feature of such cases being the prevalence of scratch marks on the skin during convalescence. Itching was a prominent symptom in 120 out of 134 cases. The epidermis has a fine cracked appearance and soon begins to peel. When the inflammation has been mild, peeling is powdery or furfuraceous and is hardly noticeable. After more extensive reactions large

Fig. 7. Extensive elephantiasis of both legs to hips. The feet are only slightly enlarged. This appearance is very characteristic of elephantiasis in Porto Rico where, with the onset of the condition, the patients wear tight boots and thereby prevent or modify deformity of the feet.

Grabado 7. *Elefantiasis generalizada de ambas piernas, alcanzando hasta las caderas. Los pies están apenas aumentados de volumen. Este aspecto de la elefantiasis es muy característico en Puerto Rico al comenzar la enfermedad, pues los enfermos acostumbran calzarse con zapatos altos bien ajustados para prevenir o modificar la deformidad de los pies.*

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areas of skin may peel off. Epidermal casts of the feet and toes have been reported by and observed in patients.

If the swelling is going to subside it usually does so soon after the redness disappears, but often it remains several days longer. In many cases the last sign of the attack is tenderness on pressure, itching or a vague sense of uneasiness in the vicinity of the focal spot. The patient is sometimes conscious of slight pain or tenderness on pressure at the focal spot even between the attacks.

Frequency of Attacks:—Attacks of lymphangitis tend to recur periodically. A small proportion of persons will, it is true, give histories of a single attack accompanied by all the evidences of filarial lymphangitis without any history of subsequent attacks; some describe a few attacks over a period of many years; others complain of recurrences every year or every two years. Usually however, the attacks are much more frequent—once a month or every two or three weeks.

Over a long period attacks may tend to become more frequent and more severe; conversely, after many monthly attacks these may occur only once in several years and may also be milder than they used to be.

The recurrence of attacks is easily interrupted, for example by change of climate or by the administration of various drugs intravenously. Following such interruption the patient may remain free from illness for many years before attacks recur.

Subclinical Manifestations:—Various subclinical manifestations, undoubtedly filarial, may occur between attacks of recurrent lymphangitis. Distressing itching over a small area of skin is common. Small patches of urticaria, as observed by Acton and Rao [24], lasting for a day or so, often appear, but extensive urticaria has not been seen in the absence of definite local and general disturbances. Transient rises of temperature without any definite causation are noticed, and dull aching in the groin or at a distal spot frequently occurs. Patients who cease to have recurrences of lymphangitis in temperate climates frequently have these reminders of infection.

Elephantoid Fever.—There is a growing tendency to discontinue the use of the term, elephantoid fever. It is employed here only to state that the inflammatory reaction

associated with elephantiasis is identical in every respect with that of filarial lymphangitis except that after each recurrence the affected area remains permanently larger than it was before the attack. Very often these attacks follow a sequence of recurrences of lymphangitis, after one of which the limb remains enlarged instead of returning to the normal size.

FUNICULITIS AND EPIDIDYMITIS.—The limphatics of the external genitalia are frequently inflamed in filariasis. We have not been able to ascertain whether the testicle itself is often affected, though histological studies suggest that it may be; but the lymphatics of the spermatic cord and epididymis are always involved in the local inflammatory attacks which are similar in severity and duration to those which affect the limbs. Not uncommonly the onset is associated with pain in the kidney region, especially on the side involved, the inguinal glands become enlarged and painful, the lymphatics of the skin seem to be affected as well as the deeper lymphatics, the entire scrotum becomes enlarged and oedematous, and the skin appears red and shiny. The epididymis and the cord become extremely tender, with areas of special pain, such as occur in the limbs and which can usually be located by palpation of cord and epididymis or by pressure over the iliac fossa of the affected side. Nausea and vomiting are apt to be especially severe. Hydrocele is a common sequel of the first attack and is found in most cases after several attacks.

ADENITIS.—Adenitis is a common symptom and occurs either with lymphangitis or as a definite clinical entity. It may be acute or chronic.

Acute adenitis without accompanying lymphangitis was present in a few young persons in Puerto Rico. Swelling, pain and redness were limited to the immediate vicinity of the superficial subinguinal glands. The course of the attacks and their duration were similar to those of filarial lymphangitis. Often acute adenitis was accompanied by a slight lymphangitis spreading down the inner side of the thigh.

Subacute adenitis was occasionally observed. Without any definite attacks of either adenitis or lymphangitis and without constitutional symptoms, the patients complained of

continued throbbing pain or a sense of discomfort in the area of enlarged superficial lymphatic glands.

Chronic adenitis is a very common filarial condition. After a few attacks of acute lymphangitis or adenitis or without any attack whatever the glands become permanently enlarged. They are as a rule hard in consistency, and though the skin can be removed freely over them they are usually adherent to each other and to the deeper structures. Those most commonly involved are the superficial subinguinals and the superficial inguinals. Many children without other evidence of filariasis have an enlarged femoral gland. This probably represents the earliest clinical manifestation of filariasis and is analogous to the enlargement of the epitrochlear gland in newcomers to the endemic filarial centers of the western Pacific.

In many persons the superficial subinguinal gland is the only gland palpable. After a number of recurrences of adenitis and lymphangitis the inguinal glands also become enlarged. As the glands increase in size they tend to produce swellings in the femoral region; palpation of these tumors gives the impression of fat surrounding hard adherent glands. Many complain that at times, without definite attacks of adenitis, they experience dragging pain or throbbing in such areas.

Filarial Fever.—Filarial fever without definite localizing symptoms was not encountered. Constitutional disturbances lasting for a few days and similar to those seen with filarial lymphangitis were observed in a few patients complaining of low abdominal pain suggesting adenitis or lymphangitis in the iliac regions.

Abscess.—Of 505 persons with clinical signs of filariasis, fifty-four (17 males and 37 females), or 10.7 per cent, reported having had one or more abscesses at some time in connection with this condition. In ten, the time of the formation of the abscess in relation to the history of attacks was not definitely determined; amongst the remaining forty-four the abscess formed with the first attack in twenty-seven and with subsequent attacks in seventeen cases; in thirty-eight, there was only one abscess throughout the history, while in sixteen the abscesses were multiple in the same or different situations. The greatest number recorded in any one indi-

vidual was in a woman who had had one in the breast and seven in the axilla at different times, none being associated with pregnancy or lactation. The sites of the various abscesses reported were as follows:

Shoulder	1	
Axilla	8	
Breast	2	
Upper arm	1	
Groin	9	(Superficial subinguinals and inguinals)
Scrotum	1	
Hunter's canal	2	
Knee (inside)	1	
Knee (below)	3	(Neighborhood)
Anterior tibial	15	(Neighborhood)
Ankle	30	(Neighborhood)
Foot (dorsum)	5	
Foot (sole)	1	
Calf (back)	2	
Buttock	1	
Back	1	
	83	

Fifty of the eighty-three abscesses occurred between the ankle and the knee, which is the area least protected from the bite of the mosquito, especially in the female. In connection with the distribution of focal spots in lymphangitis, the frequency of abscess in the region of the ankle and the anterior tibial region is striking.

Septic abscesses also occurred in filarial subjects. For instance, one followed penetration of a rusty nail; one boy, after repeated attacks of lymphangitis of the scrotum and leg, got a bruise on the shoulder promptly followed by an abscess in this situation, although he had never had an abscess in the areas affected by filariasis.

Amongst abscesses associated with filariasis two varieties were observed. With one kind a swelling, often painless, appears locally after an attack of lymphangitis when the temperature has fallen and the redness is disappearing. It increases in size, without pain, and bursts spontaneously or is incised. The discharge does not suggest pus; it is clearer, very tenacious, slightly blood stained and without odor; microscopically, lymphocytes rather than polymorphonuclear leucocytes predominate and a few eosinophils may be seen; bacteria are not usually found. Discharge from such absces-

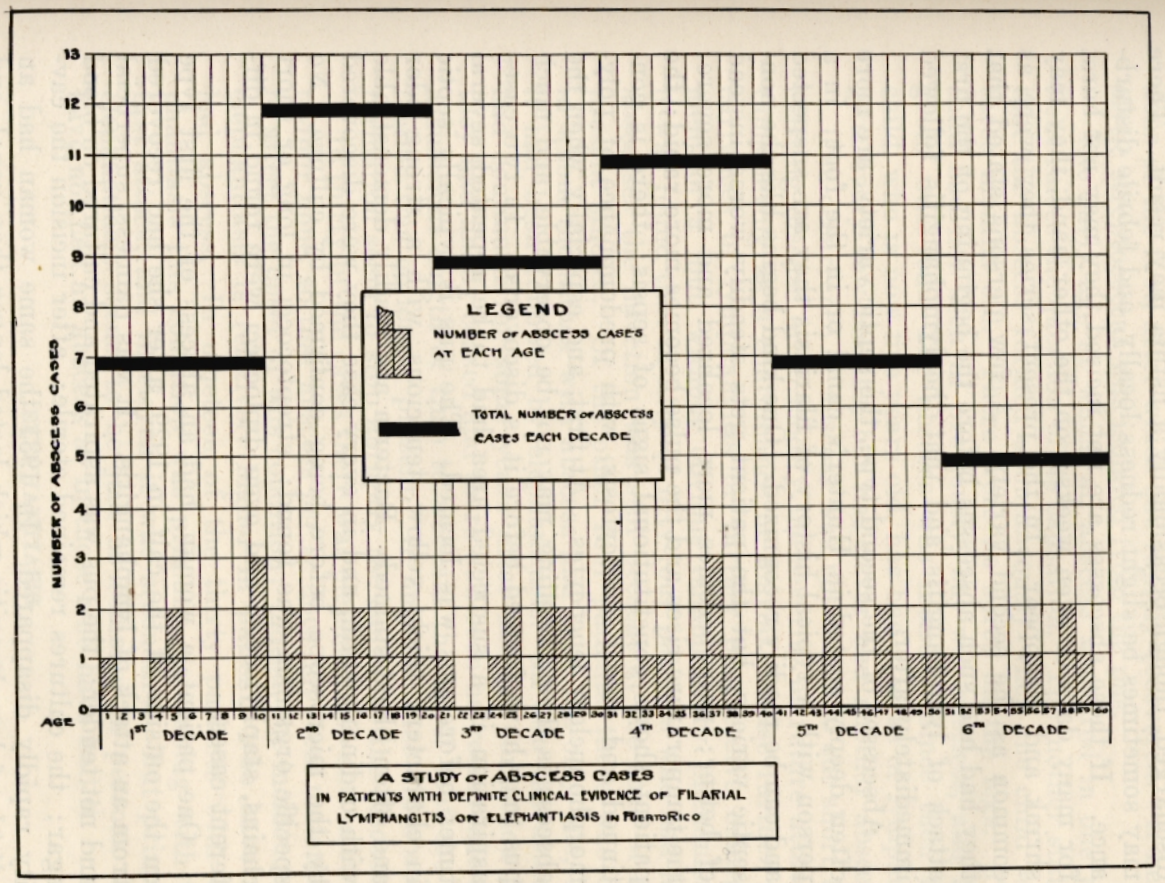

Chart X:—A study of abscess cases.
Gráfica X:—Estudio de los casos que presentan abscesos.

ses was cultured in two cases; the culture remained sterile after twelve days on blood agar. These abscesses are generally superficial and heal rapidly when the contents are discharged, though occasionally a fistula may result. There may sometimes be slight redness locally, and febrile disturbance. If these abscesses are not incised they may not burst for many days or even weeks; on the other hand, they may shrink and disappear. In the present series they were as common as the second variety. A few persons stated that they had had such abscesses before the beginning of the first attack of lymphangitis and that the lymphangitis followed immediately after.

Abscesses of the second type, the septic variety, are more often deeply seated in Hunter's canal or in the foot; in a person with a typical history of filariasis they are suspected and can be readily recognized. One kind begins like the nonseptic variety, but the patient gets steadily worse instead of better; pain becomes more localized and more severe; the temperature rises and the pulse becomes more rapid; the patient shows constitutional signs of sepsis; there is continued and rising leucocytosis, with predominance of polymorphonuclear leucocytes. At first, and especially when the abscess is deep, swelling may not be observable, and much pus may have formed before it is discovered. In two cases aspiration in a suspected area had to be repeated several times before pus was located. The pus is typically septic in character: thick, yellow, tenacious, with a strong odor and often blood stained. Bacteria are readily demonstrable with ordinary stain, and in every case they were discovered by the microscope before being confirmed by culture. No specific organism was found; streptococci in long or short chains, staphylococci and even diplococci were found in different cases.

One patient, a woman, had an abscess of the first type on the outside of the calf in 1929, after she had recovered from an attack of lymphangitis. It was painless, superficial and not tender; the pus was aspirated and cultured on blood agar; the cultures remained sterile; after incision the cavity rapidly disappared. In 1931 the same woman had an attack of lymphangitis which lasted longer than usual, and she became very ill. Blood studies and the general condition suggested pus. Local examination indicated that this

was in the foot, but deep aspiration failed to reveal any. As she became worse, exploration was made and more than an ounce of thick yellow pus was found between the dorsal tendons of the foot, after which she rapidly recovered. A hemolytic streptococcus was isolated from the pus.

The early age at which an abscess appeared in one patient raises the question of its causation. The mother stated that the abscess formed spontaneously when the child was three months old. There were no sores on the legs. The child had not been ill previously, but was restless, and the groin was red. The abscess was incised. Since then the child, who is now five years old, has had attacks of lymphangitis every few months, but has never had another abscess.

The occurrence of abscess was not found to cut short the existing disease or to modify the severity of future attacks. Considering as a continuance of filarial disease further recurrences of lymphangitis or further progressive enlargement of a limb without obvious inflammatory phenomena, it was found that in fifty of fifty-four patients who had had abscesses the infection was still present at the time of the present studies. Of the other four patients, there was one in whom the attack with abscess had been the only one, but it had been followed by elephantiasis. In two the attacks had continued for some years after abscess formation but they had finally ceased and there had been no recurrence for a sufficient length of time to warrant the belief that the infection was no longer present. In only one case did abscess formation seem to stop abruptly the course of the disease.

In thirty of the cases there was elephantiasis and in twenty-four none, so that abscess *per se* does not seem materially to affect the onset of this condition; indeed, the incidence of elephantiasis is relatively higher in patients who have not had abscess. In nineteen of the thirty patients with elephantiasis this condition was primary, developing with the first attack, and in eleven it was secondary. But primary elephantiasis seems to be just as common in persons who have not had an abscess as in those who have had it.

ELEPHANTIASIS

By elephantiasis is understood the enlargement of limbs or appendages due to hypertrophy of the skin and subcutaneous tissues resulting from lymphatic stasis and obstruc-

tion. The condition is common in Puerto Rico, and in the present studies three hundred and one cases were seen.

It has recently been described as being (*a*) primary, that is, occurring without an attack of filarial lymphangitis or with the first attack of that condition or, (*b*) secondary, developing subsequent to several attacks of lymphangitis.

Many writers have described cases of what here is considered primary elephantiasis. Hendy [14] (1784) writing of glandular disease in the Barbadoes says:

> When the concomitant fever abates after duration which varies in different patients it leaves a local swelling or inflammation which continues for a few days afterward. *Swelling indeed seldom entirely subsides, particularly when it happens that the lower extremities are affected.*

Both Low [25] and Anderson [16] have pointed out the frequency of this kind of elephantiasis in some of the Caribbean Islands. Permanent enlargement of a limb is often observed in a person who is unaware of the existence of this condition and who states that there is nothing the matter with him; and in a number of patients with lymphangitis who deny that they have elephantiasis, the affected limb is not infrequently found to be permanently and appreciably larger than the other. Of those patients who were found to have permanent filarial enlargement, this condition was primary in origin in 242 and secondary in fifty-nine. It is true that in a small proportion of the former persons the enlargement was slight, but it was always quite clear to the eye and was invariably confirmed by measurements. It was found that in Puerto Rico elephantiasis much more commonly precedes or accompanies the first attack of lymphangitis than otherwise. Many persons were seen in the first attack of lymphangitis, after which permanent enlargement remained. It is not possible to say whether the enlargement had existed before the inflammation had set in.

There is a type of swelling which was not seen in these patients, but which requires consideration. They not infrequently declare that between the inflammatory reaction both legs remain normal during the day, but in the evening the affected limb swells perceptibly, returning to the normal size after the night's rest. Others report that swelling which seems to be permanent while they are up and erect, disappears completely after a few days in the recumbent position,

but reappears shortly after they get up again. Still others state that a limb subject to lymphangitis may swell without lymphangitis after undue exertion. In some instances swelling may last long after an attack and then subside. It is possible that these more or less temporary types of swelling indicate very early stages in the development of more permanent filarial enlargement of elephantiasis.

Primary Elephantiasis:—Elephantiasis may become manifest in a variety of ways: (1) It may develop without any other sign of filariasis, and the limb may acquire enormous dimensions associated with trophic changes, without any constitutional symptoms or local evidence of lymphangitis. (2) It may develop as in (1), and lymphangitis may subsequently complicate the condition. (3) Occasionally cases are encountered in which elephantiasis is associated with very mild local signs and no constitutional symptoms.

Permanent enlargement may become established with the first attack of lymphangitis. This is probably the commonest kind of primary elephantiasis. Since many persons have definite enlargement without being conscious of the fact, it is probable that in many such cases the swelling had been in progress before inflammatory signs manifested themselves. Not infrequently when both legs are elephantoid there may be attacks of inflammation in one leg and not in the other.

Secondary Elephantiasis or Permanent Filarial Enlargement:—In fifty-nine of the 301 cases of elephantiasis studied, permanent enlargement was noticed by the patient only after attacks of lymphangitis. After lymphangitis and elephantiasis have been present the inflammation may cease to recur for a long period, but the enlargement may continue to develop. After the complete cessation of attacks of lymphangitis a limb which has begun to be elephantoid may continue to enlarge.

Much emphasis is laid on the fact that with repeated attacks of lymphangitis, the affected region becomes steadily larger. While this is true in many cases, two other types, both of which are also common, require mentioning.

After the initial enlargement, despite frequent subsequent attacks, the limb may not become appreciably larger. The elephantiasis may, however, reach enormous proportions in a comparatively short time, with little or no relation to the accompanying local inflammatory or febrile phenomena.

Hendy describes the condition of a negro boy aged fourteen in the Barbadoes, in whom, after only three years of infection, the calf of the affected limb measured 25 inches, while the foot measured 18 inches. The process is also well shown in Fig. 8.

In view of the foregoing clinical observations supported by histological study, the opinion is now advanced that elephantiasis is the result of occlusion of many of the lymphatics by the death and subsequent degeneration of parent filariae either by calcification or disintegration and absorption. With calcification the process may be subacute or chronic and may not be manifested clinically before permanent enlargement appears. When sufficient obstruction takes place other worms imprisoned in the afferent lymphatics and collaterals must sooner or later die, and the absorption of their products may produce the clinical signs of acute inflammation.

The clinical manifestations of elephantiasis have analogies in other obstructive phenomena of filariasis. Chyluria may develop and run its course without any febrile phenomena. Hydrocele, in endemic areas of filariasis, now proved to be filarial in most cases, develops more often than not without obvious inflammation. Glandular enlargements, lymphangiovarix, fistula and cystic disease of glandular areas may develop without any constitutional derangement. Thus obstruction of the lymphatics by the dead filariae seems to be the primary factor in all these filarial manifestations. This does not mean that the acute reactions which take place do not play an important secondary part. That they do is clear, and there is evidence that recurrent attacks of inflammation may intensify and accelerate the obstructive processes.

When we take the following facts into consideration, we are surely unjustified in believing that elephantiasis is due to the inflammatory attacks *per se*: There can be frequent attacks of lymphangitis without any elephantiasis; it can develop without any lymphangitis, or with the first attack of lymphangitis; elephantiasis can develop asymmetrically in two legs affected with lymphangitis of equal severity and frequency; it may develop only after many years of recurrent lymphangitis; it may remain stationary after the first attack or any single attack of lymphangitis and may not increase with subsequent attacks over a period of many years;

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Fig. 8. Elephantiasis.

Grabado 8. *Elefantiasis.*

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it can, in some cases, achieve enormous dimensions in a few years, while in others enlargements occur gradually over a great number of years. It, therefore, seems more logical to conclude that its actual cause is simply the obstruction which gives rise to death, degeneration and absorption of the worms resulting in occlusion of lymphatic vessels.

HYDROCELE.—A visit to any clinic in San Juan, Aguadilla, Ponce, or elsewhere in Puerto Rico, shows that hydrocele is exceptionally prevalent in the Island. Observations on the incidence of lymphangitis and elephantiasis of the limbs would suggest that women are more liable to filarial infection than men, but if hydrocele is accepted as due to infection by the parasite then there is a preponderance of infection in men over women. As the symptoms associated with the development of hydrocele are similar to those associated with lymphangitis and the development of elephantiasis in Puerto Rico, it was thought that a comparative study might throw further light on symptomatology.

The examination of material from the spermatic cord and epididymis in a few cases indicated that the parent filariae are very frequently found in these tissues, and it seemed that careful studies of large quantities of material from this region might clear up many points in the pathology of filarial disease and the biology of the parasites.

It was decided to examine as many large groups of men as possible, especially from representative towns of the Island. In San Juan, 472 prisoners were examined. Of them, sixty-two, or 13.1 per cent, had hydrocele; of these, twenty had hydrocele on the right side, twenty-four on the left and fifteen on both sides; the youngest was sixteen years old and the oldest was sixty-eight.

At the Municipal Hospital in San Juan seventy men patients were examined irrespective of the condition for which they were admitted to the hospital. Of these, twenty-four, or 34.3 per cent, had hydrocele, five having been admitted for radical cure of hydrocele, and nineteen for some other condition, some of the latter being unaware that they had hydrocele. In eight cases the hydrocele was bilateral, in ten it was on the right side, and in eight on the left side.

At the Presbyterian Hospital, of ten males examined, four had hydrocele; in three, right-sided; in one, bilateral, in the last, multilocular on the left side.

Since lymphangitis and elephantiasis frequently become manifest in the second decade, it is interesting to note that hydrocele is apt to develop at about the same period.

Of 359 boys at a charity school in Santurce, eleven had hydrocele; in seven, hydrocele was on the right side; in four, bilateral. One boy of fourteen and two of fifteen had already suffered from attacks of epididymitis. The superintendent stated that one boy had to be sent home because his frequent attacks incapacitated him for his work; in the other cases the hydrocele had developed passively. In the course of the examinations it was found that in twenty-seven boys one testicle or the other had not descended completely.

In the general series of 499 cases studied for filarial manifestations of the limbs there were 360 females and 139 males. Amongst the latter, forty-nine, or 35.3 per cent had hydrocele of one or both sides of the scrotum. If these figures are compared with those for the prison group it is clear that in Puerto Rico hydrocele is much more common in those with evidences of filariasis in other parts of the body than in those without. In addition to the forty-nine cases mentioned, twenty-five were studied for hydrocele alone, and it will be convenient for appreciation of the clinical picture if these two groups are considered as one of seventy-four cases. In twenty-one of these the development of hydrocele was associated with symptoms of inflammation, in fifty-three it was not. In twenty-two cases the hydrocele was on the right side, in twenty-three on the left, in twenty-nine cases bilateral. In those cases complicated by attacks of lymphangitis or elephantiasis of the lower limbs, unilateral hydrocele was more common on the side of the affected limb than on the other. Symptoms in many of these cases occurred simultaneously with, and as a complication of, the inflammatory attack in the leg of the same side.

The hydroceles were generally simple; in two cases they were multilocular. In one case there was, in addition to the vaginal hydrocele, an encysted hydrocele of the cord. In one case the hydrocele fluid was chylous, while hematocele was present in another. In thirty the hydrocele fluid was available for study but in only three were microfilariae found, the fluid having been withdrawn in the daytime. On three different occasions in one of these cases ova were found

with the microfilariae when the hydrocele was tapped. In only one case was there pus in the hydrocele, and the opening made in this case led to a permanent lymph fistula.

When inflammatory symptoms occur with hydrocele the attacks are similar in general character, frequency and duration to attacks of filarial lymphangitis of the limbs. The focal points of primary and most severe pain also show variation as in the limbs; they are commonly in the region of the epididymis, but they are also observed in the spermatic cord or the upper part of the scrotum.

Slight degrees of elephantiasis of the scrotum are not uncommon in Puerto Rico, but in the present studies only three cases were observed. Large elephantoid growths in this area, such as are seen in West Africa and Polynesia, appear to be very rare. This is especially interesting in view of Dumont's account of gigantic growths in 1876. The older clinicians of Puerto Rico are of the opinion that true elephantiasis of the scrotum is rarer in the Island than it was some decades ago and that it does not reach the dimensions once observed by them. It may be that the liberation of the slaves in the nineteenth century led to better economic conditions with the resulting use of more clothing and greater protection of these parts.

Clinical Signs Associated with the Development of Hydrocele.—Hydrocele is frequently associated with local and constitutional signs of inflammatory reaction. Usually the course of the attack is similar to that observed in attacks of lymphangitis in the limb, and, as in these attacks, the symptoms in the scrotum may be very mild and may become milder with subsequent attacks. Also, as seen in primary elephantiasis, constitutional and local inflammatory signs may be absent when swelling first appears, but may develop subsequently. In a large percentage of cases hydrocele may develop without any local or general symptoms and even become well marked without the patient's being conscious of it.

Chyluria.—While chyluria often begins without warning, in some cases there may be any of the prodromal signs associated with lymphangitis. The commonest is pain or aching in the kidney region, and when the chyluria comes from only one ureter the position of prodromal pain may indicate the

side affected. Chyluria may be ushered in by all the febrile phenomena associated with lymphangitis including abdominal pain, especially in the lower quadrants. These symptoms usually pass off in two or three days, but the chyluria persists.

FISTULA.—Only eight cases of fistula were seen in the course of these studies, which suggests that the condition is far from common. It seems to be generally associated with small lymphatic varices. In one case, in which there were recurring attacks of lymphangitis, the fistula formed between the attacks; in another it resulted from operative procedure; while in still another it developed as the result of the patient's scratching the area. The opening was always small and simple, the edges being clear cut and not raised. The fluid, when obtainable, was lymph and contained lymphocytes, but in no case microfilariae. Relief of the clinical phenomena was noticeable in one only of the eight cases. In two it was associated with lymphatic glands; in six it lay in the lower part of the limb far removed from them.

Exudation of lymph, without fistula formation, occurred in some cases as the result of scratching during convalescence or between attacks.

VARICOSE LYMPHATIC VESSELS.—This condition was not encountered in Puerto Rico, although it doubtless occurs there as it does in other Caribbean Islands.

ADENOVARIX.—Adenovarix, known also as varicose glands and lymphadenocele, is described in various textbooks as being very common in filarial countries. In describing the symptomatology, Bahr states that the swelling of the glands slowly subsides when the patient is in the recumbent position and slowly returns when the erect position is resumed. Byam and Archibald state that on palpation the swellings give the impression of coiled rubber tubes which collapse on firm pressure or on prolonged dorsal decubitus. Stitt also mentions the reduction of the swelling on lying down. All of these writers refer to the withdrawal, on puncture, of fluid that may or may not contain microfilariae. Such definite accounts of this condition are given that there is no question of its being a certain and important clinical entity which is frequently observed in some countries. Nevertheless in these studies the condition was not observed; a considerable number of persons had either single enlarged glands in the groin

or masses of such in this situation, but in no case was adenovarix found. These glands were invariably hard and firm. On light pressure there seemed to be a fat covering, but firmer manipulation revealed the presence of compact glands within. Furthermore, prolonged pressure did not affect the size of the mass and it did not diminish in the recumbent position. Histological studies in many cases showed that although there was dilatation and hypertrophy of lymph vessels in and around the glands, the vessel changes were never such as to be detected clinically. In brief, while enlarged glands were very frequently found in Puerto Rico, the varicose condition, so common elsewhere, was rare. One case of true varicose groin glands was seen in New York in one who came from another island in the Caribbean.

COMMENT.—In the foregoing description of clinical filariasis it should be noted that with all the obstructive phenomena of this infection we find a sequence of analogous conditions. Whether we are considering elephantiasis, hydrocele, chyluria, chronically enlarged glands, varicose lymphatic vessels, adenovarix or fistula we find that:

1. These conditions may develop without any constitutional signs or local inflammation.
2. Inflammatory reaction may occur after they have developed.
3. They may first appear in association with local inflammation and febrile disturbances.
4. They may appear only after recurrent attacks of inflammation.
5. They may continue after a cessation of all inflammatory recurrences.
6. They may continue during long intermissions in the inflammatory recurrences.
7. They may cease to progress after cessation of inflammation.

In conditions which are associated with a number of parasites located in various positions in the tissues it is not surprising that, while in all cases there are similarities in the clinical picture, great variations occur. In any particular filarial infection one finds mild and severe manifestations with rare and frequent recurrences, but the final results will depend on the number and position of the parasites. It should be obvious then that each case requires careful individual study, and that the efficacy of therapeutic or surgical measures depends on locating the active center of the disease.