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Clinical passed June 1919.

M. D. 1924.



Returning to Demerara from the University of Edinburgh in 1905 to start practice, one of the first things to strike me forcibly, was the large number of Filarial subjects walking about the streets, serving in shops and forming a large percentage of the population- 65%. People living in northern countries fail to realize, even in part, the enormous difference such a state of things ~~makes~~ to a country. I had not been in practice two months when three of the servants hired by my housekeeper took ill with "fever-ague." On examining these I found them all Filarial, and learned that these attacks occurred fairly regularly every six or eight weeks. Such a condition affecting more than half of the population, and chiefly the working classes, means a heavy and regular financial loss to all business and industries, far greater than is actually guessed at by those living on the spot. Everywhere I went the same conditions prevailed, and so common as not to be noticed by the inhabitants. It is amazing to see a man or woman with a huge Elephantiasis of arm or leg working like a normal human being. The thought often came to me, "Is it possible for these people ever to have normal feelings? With such a condition of Lymph-stasis and general interference with the circulation, the heart gets more work to do, the blood becomes vitiated by the presence of swarms of Microfilariae, feeding and excreting all the time; can that man ever do a normal day's work?" I think not. This applies to a large percentage of the stable working population both in town and country. The evident cases of Filariasis are plentiful enough, such cases as "Leap to the eye:" but the majority of Filarial subjects show no physical deformity at all, and carry far more living parasites in



the peripheral blood than do the disgusting cases with large swellings of leg or arm or both.

I next strated to enquire if the Government had done anything in the way of prevention, segregation or treatment. I was laughed at by the older doctors. My friend, Dr. Czzard pointing out to me that to segregate the infected cases, would mean building a special city some miles from Georgetown, and so depleting the main city as to leave it a mere suburban area. As for treatment he assured me he had failed to find any; and prevention - "Well, kill off all the mosquitos, make the city mosquito-proof and mosquito-free and then you will find your Filarial percentage steadily drop and eventually disappear." Such statements coming from one who had studied the disease from every aspect during many years with plenty of material to work on, somewhat discouraged me, and for sometime I decided to drop the subject. But month by month practicing under such conditions, youth and hope impelled me to make some efforts at least to ameliorate the condition of sufferers, and perhaps strike on a palliative if not a curative agent. These various methods of treatment will be more fully dealt with later on.

HISTORY: - A knowledge of Filariasis dates from the discovery in 1863 by Demarquay of a larval nematode m.f. Bancrofti, as it is now called- in the milky fluid taken from the tunica vaginalis. In 1866, Wücherer discovered the same larvae in the urine of cases suffering from chyluria. This was repeated by Lewis in India in 1870, who in 1872 discovered that the blood of man harboured this larval parasite which he named *Filaria Sanguines Hominis*. In 1876, Bancroft in Brisbane, Australia, discovered the adult form which was named *Filaria Bancrofti* by Cobbell.

The larval parasite *F. Bancrofti* is one of at least six such to be found in the human blood. Sir P. Manson's suggestion to name this larval form the *Micro-Filaria Bancrofti* and the others the same way, has been generally adopted e.g. *Diurna m.f. loa*.

F. Demarquaii - *m.f. Demarquaii*. *F. Ozzardi* - *m.f. Ozzardi*.

F.P. Perstans - *m.f. Perstans* *F. Magalhaesi*. *m.f. Magalhaesi*. Of all the above species only one in the present state of our knowledge is of pathological importance, viz. *Filaria Bancrofti*.

SYNONYMS:- *F. sanguinis hominis* *F. Nocturna* *F. Wucherer*.

GEOGRAPHICAL DISTRIBUTION AND PREVALENCE:- The Geographical distribution is very extensive. It is indigenous in almost every tropical and sub-tropical country, from Spain in Europe and Charleston, U.S.A., to Brisbane, Australia. In some places it is found in a large percentage of the population e.g. Cochin 30 to 40%. In Samoa and the South Sea Islands, 50 to 80%. In the Friendly islands, 32%. In Demerara 65%. Trinidad less than 10%, and in Barbados today, well under 10%. It is quite possible that some of the above percentages might easily be increased by a systematic blood examination of the people.

Demonstration of Blood Micro-Filariae:- Sir P. Manson in his book gives hints on this subject, which all students of Tropical medicine have followed. Slides accompanying this treatise will demonstrate the organism plainly. Unfortunately one needs a living subject to demonstrate the behaviour of the parasite alive in the blood at night. Of the two forms sent *m.f. Bancrofti*, *m.f. Perstans*, the differences in size and structure under the same power lens will be easily noticed *m.f. Bancrofti* is larger, has a definite sheath which extends beyond both head and tail.

Under the microscope one is struck by the differences in size of the various Micro-Filariae seen, some being nearly twice as large as others, and all from the same drop of blood. It is almost impossible to get any two of the same size. Again one notices that m.f. Perstans has no sheath, that its tail which starts to taper off from the end of the upper third of the body ends abruptly, rounded off and truncated. Further, in m.f. Perstans (living) the fang shooting in and out of the head-end can be more easily seen: there is no definite tail-spot, no hooked cephalic prepuce can be seen ^{as} in m.f. Bancrofti. Its locomotive powers are more marked than those of m.f. Bancrofti. This may well be due to the fact that it is not hampered by an enclosing sheath. In m.f. Bancrofti transverse striations are seen, not so in Perstans. In Bancrofti, there is a V.-spot as in Perstans, but in addition there is a definite tail-spot situated a short distance from the tail end. Staining with log-wood shows that m.f. Bancrofti is composed of closely packed minute cells enclosed in a transversely striated muscular-cutaneous cylinder. A six-lipped prepuce covers the head-end and sometimes a short fang as in m.f. Perstans can be seen shooting in and out. I have only dealt with two forms of Micro-Filariae viz. Bancrofti and Perstans. The others I only know of by reputation, and such facts as I have gathered by hearsay and reading; but so far as I know, no one has yet been able to demonstrate a pathological danger from any but the m.f. Bancrofti. Sir P. Manson states in his book that he has never found Filaria Perstans in West Indian negroes: as the negroes of Demerara may be included under this heading I beg to state that m.f. Perstans has been found by me and others in many cases in the blood of negroes and is by no means confined to the aboriginal

Indians. In the above description it will be noticed that I have not attempted to give measurements of the Micro-Filariae for the simple reason that both in the living slides taken from the blood, and the fixed and stained slides, one is struck all the time by the marked differences ~~in~~ sizes of the Micro-Filariae seen in the fields of observation.

PERIODICITY. - Under normal conditions of work and habit m.f. Bancrofti is rarely ever found in the peripheral blood during the day. This, however, does not apply to regular night workers, such as watchmen, men who have to keep awake all night. If the blood of these men be taken during the day m.c.f. Bancrofti will be found in goodly numbers and if taken at night rarely, if ever found. In the normal subject the m.c.f. start to swarm into the peripheral blood about 7 P.M., three hours before bedtime, increasing until about midnight, after that they gradually decrease until by 9 A.M. they have practically disappeared. This as I have said is reversed in the case of day-sleepers. It has been suggested that this nocturnal periodicity is a co-relation to the life-habit of its liberating agent - the mosquito Culex Fatigans. If this were so, how can it account for the reversal of periodicity, in the case of night watchmen, many of whom I have myself frequently examined? In Fiji, the m.c.f. Bancrofti is found in great abundance during the day and in 1906 in the Philippines Craig and Ashburn both found m.c.f. Bancrofti in large numbers during the day. This they at first considered a distinct species, but further investigation by Professor Leiper did not confirm this, as he declared he could find no difference between these and the m.c.f. Bancrofti. Bahr further showed that Indian immigrants who brought Filariae with them to Fiji

retained the periodic habits in Fiji for at least three years, but that if an Indian acquired Filarial disease in Fiji it assumed the local periodicity. Connal and Thiroux in West Africa have found a certain percentage of non-periodic cases also. Whilst on this subject I may add that Prof. Leiper when in Demerara two years ago on the Filarial Commission definitely stated that after careful examination he could find no difference between the adult *F. Bancrofti*, *F. Ozzardi* and *F. Perstans*. Reviewing these findings one is at a loss to conclude anything definite on the subject of Filarial periodicity and is forced to the conclusion that certain conditions of climate, apart from sleeping habits, definitely affect the periodicity of Filarial invasion of the peripheral blood. [I note also that Sir P. Manson states that *m.c.f. Perstans* is only found in dense forest areas or in swamps. All of the slides of *m.c.f. Perstans* accompanying this were taken from people resident in Georgetown, miles away from forest or swamp.]

TRANSMISSION:- It is generally admitted that the mosquito is the intermediary and Man the ultimate host of the Filarial parasite. To prove the former statement demands some trouble, some painstaking dissection, and considerable patience. One must get "fresh" mosquitos, by this I mean, mosquitos caught and brought from some far outlying district well away from Man. These are allowed to feed on a Filarial subject. This is done by getting the patient to push his bare arm into a fine wire cage containing these mosquitos: there they feed on his blood: he is then allowed to remove his arm, the cage is closed. After a few hours, daily dissections of the blood-fed mosquitos can be made and a gradual line of *Metamorphosis* observed (I may

add here that the *Culex fatigans* is the commonest Filarial mosquito in Demerara; but the parasite is also received and developed by the *Anopheles Maculipennis* and by the *Stegomyia* in this country; but a very interesting thing has been noted

by Dr. Rose, Government Bacteriologist Demerara viz. that the Filarial parasites which make the *Stegomyia* and the *Anopheles* their intermediary hosts are nothing like as active or as strong as those which are developed within the *Culex Fatigans*. This is not the conclusion drawn from one or two experiments, but from many, and seems to point to the fact that the *Culex* is the ideal and most natural host of this parasite. I believe this fact is note-worthy and has been corroborated by the findings of the Filarial Commission under Prof. Leiper) With apologies I can do no better than quote the words of Sir P. Manson for the next few paragraphs as all the dissections were done exactly on the lines laid down in his book. "Examine the stomach of a mosquito four hours after it has so fed, and one finds that the blood corpuscles have parted with their Hb to a great extent and that the blood plasma in consequence of this extra Hb let loose and of dehydration, is much thickened, but not coagulated. Now observe the m.c.f. in this plasma: most of them are actually engaged in getting rid of their sheaths: the blood plasma is viscid and helps to hold the sheath: the m.c.f. become more and more excited, they rush from the tail-end and appear to butt into the head-end of the sheath. After a time the majority break through the sheath and wriggle free. They now swim free in the plasma and at once, instead of aimless to and fro movements, they start to locomote over the fields of observation (note the strong similarity between this stage of m.c.f. Bancrofti evolution and the

normal behaviour of m.c.f. Perstans)/. Dissect the mosquito at a later period and on examining the stomach, one finds no living larvae, only the discarded sheaths. Now proceed to dissect up the thoracic muscles of the mosquito, tease them out in normal saline and we find that the m.c.f. now free of their sheaths have entered the muscles of the thorax among the fibres of which they can be seen to be moving slowly. By a series of such dissections over a period of 15 days in this climate, one can trace step by step with luck and patience the metamorphosis of the m.c.f. eventuating in the formation of a mouth and alimentary canal a peculiar trilobed caudal ~~end~~ along with a definite increase in size about $\frac{1}{16}$ th of an inch. After this the m.c.f. quit the thorax. A few pass into the abdomen: the majority however, pass forward to the pro-thorax and neck, enter the head and coil themselves in the base of the proboscis and beneath the pharynx and under surface of the cephalic ganglia."

Dr. Low has demonstrated in the London School of Tropical medicine with Filariated mosquitos sent by Dr. Bancroft of Brisbane, that the Filariae eventually find ^{their} way into the Proboscis of the mosquito, which has been confirmed by James in India, Annett, and Dottin in West Africa, Bahr in Fiji, Wise & Minnett in Demerara. As pointed out by Grassi its exact position is the interior of the labium. Apparently the Filariae seek to emerge in pairs; in all sections examined they are paired, heads abreast, close to the termination of the labium in the labella. As many as eight have been found packed together in this situation. Here they wait for a chance to enter into some warm blooded Vertebrate host. This they appear to do by

penetrating the thin membrane which unites the labella to the tip of the proboscis, and so pass on to the surface of the skin which they penetrate in the vicinity of the puncture made by the mosquito's proboscis and not in the puncture itself, as was generally supposed. This fact has been proved by Fulleborn in the dog *Filaria* (*Driofilaria inimitis* and by Bahr with *Filaria Bancrofti*) In this way like the malarial parasites they enter into the blood stream of their final host-man. It is conceivable that some of the *Filariæ* which pass into the abdomen of the mosquito may be voided into water, or escape on the death of their host into water, and so be swallowed by man. This idea is very problematical, and has to face the action of the gastric and other juices on the parasite. Once introduced into man the parasite finds its way into the Lymphatics; here it attains sexual maturity, fecundates, and pours new generation of m.c.f. into the Lymph. These appear in the circulation via the Thoracic duct and left Subclavian vein or by the Lymphatics of the upper part of the body. From these observations Sir P. Manson draws the following conclusions -

1. That Filarial periodicity is an adaptation of the habits of the parasite to the nocturnal habits of the mosquito(?).
2. That the Sheath is there to prevent the embryo (m.c.f.) from breaking through the blood vessels, thereby missing its chance of gaining access to the mosquito.

How does this apply to *Filaria Perstans*?

3. That the Cephalic armature is adapted for piercing the walls of the mosquito's stomach, and to enable the parasite to force its way through the tissues of the insect.

PARENTAL FORMS: - Both male and female are frequently found, especially in those cases of Elephantiasis of the leg, just before abscess formation, or even after the abscess has been opened and the wound cleaned out. In some cases (three in my experience) the worm worked its way through the sodden skin and could be dragged out of the leg, very much as is the case with the Guinea worm. When found they vary in length from two to five inches; are hair-like and transparent. The sexes live together, and often masses are found coiled up in dilatations of the Lymphatics. The female is larger and thicker than the male: there are two uterine tubes which occupy a large part of the body and are densely packed with eggs.

ORAL END:- is armed with a double row of minute papillae, ^{as} tapered and somewhat club-shaped.

TAIL-END:- also tapered, the tip rounded off.

VAGINA:- opens on the ventral surface 1 to 1½ inches from the head-end. The anus is just above the tip of the tail, (Ventral) The cuticle is smooth, no markings at all.

The Male is thinner and shorter than the female and has a marked disposition to curl. The cloaca gives exit to two slender unequal spicules. Prof. Leiper has demonstrated caudal papillea, two rows arranged around the anus.

The life span of *F. Bancrofti* is indefinite, this one has a fair opportunity of observing in residents who take regular yearly holidays out of the colony in England. I have especially been allowed to test two such cases, one a Sugar Estate owner, the other a merchant. For over ten years they paid yearly visits to England and the Continent, and in every case on their return, blood tests were always positive. They were especially

They were generally absent two to four months. Finally the Merchant took up permanent residence in London in 1917. Late in 1919 I met him there, got several samples of blood and demonstrated *m.c.f. Bancrofti*- after over two years residence in England.

When the parent worms die they may be evacuated in the pus of an abscess, or they may, as Wise and Minnett in the Demerara hospitals showed in several cases, cretify in the Lymphatic branches and act almost as plugs. It may be taken for granted that in other cases the bodies of the dead parasites are gradually absorbed.

MORBID ANATOMY:- Observation by all the experts in this subject tends to prove that *m.c.f.* is non-pathogenic per se; the parent worms may block the Lymphatic, especially the eggs evacuated from the female worm, as the result of a blow or an acute inflammatory condition so that up to our present state of knowledge, it is only the parent worm and the eggs that are dangerous to the host. The embryos however numerous seem to be innocuous.

F. OZZARDI:- Just a few words on this subject the cause of considerable controversy. It has been my privilege for many years to have Dr. Ozzard as a friend and I have frequently discussed the identification of this species with him. Prof. Leiper was quite emphatic in his statement that the adult specimens of *F. Ozzardi* examined by him were identical with *F. Bancrofti*. Such specimens as I have seen in Demerara showed a distinct bulbous caudal extremity with no mark cuticular thickening, such as is seen in the adult forms of *Perstans* and *Bancrofti*.

In other respects they differed very little from the two last mentioned forms, and although I was certainly prejudiced in favour of Dr. Ozzard, I cannot definitely state that they represent a distinct species. Dr. Rose at present Government Bacteriologist in Demerara agrees with Prof. Leiper, and as he has devoted plenty of time, skill and patience to the subject, I am inclined to agree with him. The Embryos are certainly different from the m.c.f. Bancrofti - they are much smaller (even smaller than Perstans) blunt tailed, have no sheath and are often associated with others which are sharp tailed and resemble the m.c.f. Demarquaii which we got from Trinidad and Dominica. They, like Perstans are actively mobile - this statement I take as genuine, as I have not examined the living m.c.f.

I can confirm what Dr. Ozzard states viz. that in all my travels into the interior of British Guiana I have never seen a single case of Elephantiasis among the Red Indians. Although I have in my employ at present a Red Indian woman who has lived a very considerable time with missionaries who had two cases of Elephantiasis in their family, who has herself a small Elephantiasis of the right leg, which I believe she acquired by direct infection from her employers. Similarly it an interesting fact that Elephantiasis is very rare on the West coast of Africa among the negroes, it attacks the other parts of the body, but very rarely, if ever, the legs.

Racial AFFINITY: - An aspect of the disease which strikes a doctor in practice very forcibly is the racial partiality to the disease. As the result of years of observation of such cases I have come to the conclusion that this disease has a definite affinity for certain races.

Europeans, with the marked exception of Portuguese, are noticeably exempt, at least from the evident results of Filariasis e.g. swellings of arms and legs etc., the Portuguese are markedly prone to contract the disease and quickly develop swellings. The East Indians, who form the bulk of the population contract the disease, show m.c.f. in the blood, but are not as prone as the Portuguese to develop Elephantiasis, the negroes show m.c.f. in the blood and develop Elephantiasis but to a less extent than the Portuguese. The Chinese seldom show m.c.f. in the blood films taken, and I have only seen three cases of Elephantiasis - leg cases - in Chinese during 18 years of practice in British Guiana; Lymph Scrotum and the other forms of swelling are not quite so rare. Among the Red Indians one gets m.c.f. Perstans, m.c.f. Ozzardi, and among those mixing with the general population, m.c.f. Bancrofti; but I have only seen one woman with Elephantiasis which I believe she contracted from her employers with whom she worked for several years. She never suffers from fever-ague and repeated blood films taken from her have been negative. This marked difference between the races can no doubt be traced to conditions of living, habits etc., but one is forced to admit that while the East Indians and negroes are constantly exposed to infection, live under the worst conditions possible, they show to a much smaller degree, the results of Filariasis, than do the Portuguese, who are the shopkeepers and merchants, are not exposed to excessive fatigue, to frequent prolonged wettings, to having to work often up to the waist in water, (as do the Negroes and East Indians) and who are educated to the use of the mosquito netting. There is evidently a very marked proneness on the part of these people to contract

and develop Filariasis with all its deformities, in the most pronounced forms. Other Europeans, if they ever do develop swellings do so rarely and only after several years of exposure.

The question naturally arises why not have all the servants and the inmates of the house or houses regularly tested? This sounds feasible, but in actual practice it is impossible. A housekeeper would be driven to change servants weekly and in the end would be forced to keep infected ones to carry on.

There is a definite relationship between Elephantiasis and exposure to damp and cold, having to stand for hours, in wet places or in water: in blows and injuries to glands or areas in the neighbourhood of glands already infected: Apart from inherited resistance an important factor is sound body nourishment. It is a notorious fact that the original Portuguese settlers stinted themselves of nourishing food so as to save money to return to Madeira or Portugal, and their descendants are not much better. The relationship between Elephantiasis and physical injuries is a very marked one and demands further notice.

Up to this point I have taken it for granted that Elephantiasis in all its forms is directly consequent on Filarial infection. This sequence is generally accepted by all the authorities I have met including Prof. Leiper, Drs. Wise, Ozzard, Minnett, Rose and others. The reasons for such a general and unquestioning acceptance are many, and I now try to enumerate a few of them

1. The Geographical position is always the same, where Filarial infection is common, there you will find Elephantiasis abounding. (Here I may mention that I have seen several cases of Elephantiasis of the leg in U.S.A. but these people had Filaria and lived in Filarial countries prior to developing

Elephantiasis) I read somewhere that there was a genuine case of Elephantiasis of the leg in a woman who had never left England: but in this case I believe careful examination would have shown a Lymph stasis of septic origin or if m.c.f. had been demonstrated, then further investigation would prove that she had at some period of her life been bitten by Filariated mosquitos carried over in baggage or trunks from an infected area. (It has been proved definitely that the period of metamorphosis in the mosquito's thorax takes two or three weeks, in a cold climate longer, so giving ample time for an infected mosquito to travel in a trunk or baggage from the affected area to England).

2. The Lymphatic Varix which has definitely been proved to be due to the m.c.f. (by the demonstration of these organisms in the fluids and by their complete absence in other similar cases e.g. Phlegmesia Alba Dolens, simple acute Lymphangitis, acute Septicaemic Lymphangitis etc.,) Nearly always associated with Elephantiasis, especially in the commencing stage of the latter, when the affected part gradually and regularly increases in size by repeated attacks of Erysipelatoid inflammations, (locally called "Rose" from the colour). With each such attack the m.c.f. in the blood seem to diminish in numbers while the swelling increases. Each attack leaves a definite increased swelling behind it. It has been often stated that chronic cases of Elephantiasis show no m.c.f. in the blood and may be regarded as non-infectious. This I have found somewhat erroneous, as I have in nearly every case of Elephantiasis been able to get m.c.f. from the blood films after frequent examinations.

3. Other Filarial lesions e.g. Lymph Scrotum are also seen associated with Elephantiasis. Chronic Lymph Scrotum simply and regularly develops into Elephantiasis of the Scrotum, often making a huge mass. One case I excised 19 years ago gave 65 lbs. of Filarial tissue; another case among the photos sent herewith shows a mass of just 50 lbs. in which the penis has entirely disappeared.

4. It is now a recognised fact that Elephantiasis of the leg generally follows excision of the groin glands. At one time removal of these glands was considered quite good practice: today that never happens except when the glands break down and form abscesses.

Sir P. Manson in his book gives two reasons for the comparative absence of m.c.f. in the blood of Elephantiasis subjects. His words tend to make one believe that m.c.f. never occur in the blood of such cases: that does not hold good in this part of the world, as I have very frequently got active m.c.f. in the blood films taken from Elephantiasis cases. His first reason seems to cover the ground viz. that the disease-producing parent Filariae have died. His other, viz, that the Lymphatics affected by the Filariae and their products get blocked and so prevent the m.c.f. from getting into the blood stream, does not cover all the ground, as that would mean blockage of all the important Lymphatics.

PROGRESS OF ELEPHANTIASIS:- As the result of 18 years observation among Filarial subjects and the many opportunities afforded me of watching the growth of Elephantiasis I believe the following to be the usual sequence. P. develops groin glands, generally in childhood. No

No particular notice is taken of these until, due to some septic infection, an inflammation; or due to a blow as from a cricket ball, the glands become inflamed, cause pain and fever, and may even pass on to an abscess formation, or to a Lymphangitis spreading down to the thigh, to the knee and often down the leg to the ankle; or the inflammation may spread up from the foot or toes as the result of a septic wound, a severe sprain or some such lesion, reached the groin glands, start inflammation there and perhaps abscess formation. Some cases go further and pass on up to the abdominal Lymphatics, or go down into the testicles and start an acute orchitis. These glands once infected remain so and act as a store house for future attacks. This phase brings home the definite conclusions made by Drs. Wise and Minnett in Demerara hospital some 12 years ago, viz. that m.c.f. infection per se is practically harmless to the host. Symptoms only appear after the introduction of Streptococcal or other mixed infection, and it is on this basis Dr. Rose has evolved his anti-Filarial Vaccine. A man may have groin glands for years without any symptoms but a septic toe, a bad corn, an ingrowing toe nail, a cut in the foot, a bruised heel etc., start the infection of the gland by mixed organisms, and then he becomes subject to frequent inflammatory attacks of these glands, which get bigger, fibrous and matted. In some cases the thigh then takes up infection along the line of Lymphatics, spreads it to the knee and on to the ankle. Inflammatory attacks follow in almost regular sequence, each leaving the part attacked a little larger, a little denser and more fibrous. Your patients will frequently tell you that these inflammatory attacks are often brought on by wearing wet

boots or keeping the feet wet for a long period, or by standing to work on a concrete floor, but they will never mention a septic toe or a septic wound in the foot. A severe wetting or having to paddle through water knee-deep e.g. (^{Fishermen} ~~firemen~~ and trench diggers on the sugar estates have often to be knee or waist deep in water for hours cleaning the canals) will often start a typical fever-ague and an attack of "Rose" (as is so called an acute Lymphangitis of the leg) but the mere mechanical wetting and lowering of resistance point definitely to a pre-existing septic infection only awaiting diminished resistance to cause an attack. An inflammatory state of the leg once started rarely ever remains stationary. The usual tendency is to recur and with each recurrence one gets, on subsidence, an increase of growth; these inflammatory relapses seem to kill off the parent worms; Fibrotic changes take place in the Lymphatic glands and trunks. Lymph stasis ensues, the surrounding tissues fail to absorb the overflowing Lymph products, traumatism is often added, and the leg is gradually increased in size as a peculiar Fibrous-fatty tissue develops, nourished by the overflowing Lymph products. The skin, with its dense Fibrous-fatty subcutaneous layer, loses its normal colour, often becomes dusky, melanotic in parts, or clear whitey yellow. The pores of the skin become enlarged, the hair is coarse or broken or disappears altogether, added to all this there is a peculiar musky odour being constantly given off. On examination one finds that the skin never shows perspiration products, is coarse like very thick pig skin, does not dent on pressure, and often one finds peculiar black dots in the skin tissue itself, quite distinct from the melanotic areas. From frequent standing or walking about this flabby fibrous mass

tends to sag often in rolls and folds around the ankles at the end of a days work, but as Fibrotic deposits accumulate the mass acquires sufficient stability to retain its place and the leg becomes uniformly enlarged with rolls and bulgings in different directions often reaching an immense size. I had such a patient in the Almshouse whose two legs weighed 140 lbs. the rest of the body being barely 35 lbs., he was literally anchored to his bed. A very good example of the rolling over and folding of the thickened tissues below the knee is given in one of the accompanying photographs. Meanwhile the patient carries on his work except when knocked over by acute attacks. Such is the usual process of the Elephantiasis of the leg, a process taking from 2 to 20 years to develop according to the subject afflicted. If a Portuguese, the process is generally appallingly rapid. If a European, it is often so slow as to be negligible, apparently he has better resistance, is better fed, takes every precaution, keeps up steady bandaging, and takes a trip north occasionally.

But in practice I have seen several quite different stages of development especially in young women. Without any history of Filaria or groin glands or any evidence of such, a simple sprain of the ankle or the results of sitting with wet boots for some time, or having to work on concrete flooring, or after an Acute Influenza, the ankle and instep start to swell. The usual treatments are applied, the pain disappears but a slight swelling remains; hardly perceptible in the morning, by evening it is quite marked. Gradually it seems to get better and is forgotten. Some months after the swelling reappears often with pain and on this occasion after treatment it may or may not disappear, but the part affected is distinctly larger than it was with the first

attack. This process may go on for months or years by which time the ankle has quite lost its contour and the instep becomes a bulgy mass of soft elastic tissue. Some cases go no further, others less fortunate start the swelling which goes up the leg to the knee and often up the thigh to the groin. In a large number of these cases no groin glands were to be found until the Lymphatics of the thigh took up the inflammation. In such a case I believe the patient starts by being infected without swellings of any kind, just like a large percentage of people in this country whose blood swarms with m.c.f., but who gives no outward sign or symptoms. Due to an ingrowing toe nail which became septic, to faulty dyes in the stocking (three such cases within 1922 & 1923) or to a septic corn, a streptococcal or other infection is added to the blood stream in which m.c.f. already are present. A local inflammation results which may or may not yield to treatment, but which in most cases becomes an ever increasing permanency. I have often thought that the strained position of the leg and foot produced by high heels and made worse by tight shoes has a good deal to do with this tendency.

PATHOLOGY:- Micro-Filariæ present in the blood, an added Streptococcal infection with resulting inflammation: the compensary^{to} Lymph circulation started is generally inadequate. A rise of Lymph pressure causes Lymphatic dilatations and varices of all kinds. The contents of these enlargements when opened is found to be "chyle." In some cases the Lymphatic blockage is due to Filarial eggs whose presence instead of Embryos can only be a matter of conjecture from cases under observation. One such case I shall now describe. A groom G. C. 35 years old, a Filarial subject was kicked by a horse on the right groin, where there

were several enlarged Filarial glands. The groin became greatly inflamed and in spite of treatment gradually enlarged. At the end of three years he was carrying ^a round, contained in a leathern apron suspended from his shoulders, a huge Elephantoid mass of tissue weighing about 35 lbs. Pendulous from his right groin and often mistaken for an Elephantoid Scrotum. At my request Dr. Belmonte, a Dutch surgeon in Demerara at the time, operated on the mass, but haemorrhage and Chylous escape became so severe that the operation was never completed. A mass of tissue was removed for examination, this revealed the usual fibrous Lymphoid Hypertrophy numerous coccal organisms, several Lymphatic trunks blocked by Filarial eggs, very few m.c.f. Embryos and no parent worms. The patient recovered and continued his work as a groom. He eventually died as the result of another kick which caused the mass to slough and decay. The statement made by Sir P. Manson that a traumatism can cause the female worm to abort and to throw large numbers of these round solid eggs into the Lymphatic circulation is, I believe, correct.

Another cause of permanent blocking was shown me some years ago by Dr. Wise in the Demerara Hospital. The parent worms after death became cretified, and blocked more or less effectually the Lymphatic trunk in which they were lying. I hardly think this occurs often enough to account for the great amount of blockage that does occur. I have seen in P.M. cases where both legs were markedly enlarged, the whole Thoracic and Abdominal Lymphatics enlarged, Fibrous thickened, sacculated and distended. Such changes extending up the Thorax and into the arms on both sides. These cases generally die from Acute abscess formation in the abdomen simulating Acute typhoid fever or

Acute Peritonitis and often died before operation was performed. That such cases live for months and years with such a distention of the Lymphatic system seems almost impossible.

On dissection an Elephantoid leg gives a coarse, rough, gritty passage to the knife. Fibrous tissue enclosing Lobulated areas of a tough Gelatinoid material with varicose blood vessels and Lymphatic Varices, associated with glands enlarged and thickened. There is very little bleeding but a constant flow of this Serous Lymph with a definite musky odour. Blood vessels are distorted and often displaced, nerves also, the bones and Periosteum are not interfered with, but the muscles are generally thinned out in various stages of fatty and Fibrous degeneration. Hair Follicles are very distinct and enlarged, some are completely atrophied, others are represented by small Fibrous masses. The Papillae and glands are either hypertrophied or atrophied. The nails are rough, striated, thickened, disfigured and brittle. There is no distinct line of demarcation between healthy and diseased skins.

FILARIAL DISEASES:- Here again I can do no better than quote the list given by Drs. Wise and Minnett of Demerara.

1. Varicose groin glands, 2. Abscess, 3. Lymphangitis, 4. Lymph Scrotum, 5. Synovitis, 6. Orchitis, 7. Axillary glands, 8. Arthritis, 9. Chylura, 10. Cutaneous, and deep Lymphatic Varices, 11. Funiculitis, 12. Elephantiasis of leg, arm, vulva, scrotum, mamma, clitoris, etc, 13. Chylous, dropsy of Tunica Vaginalis, 14. Chylous Ascites, 15. Chylous Diarrhoea (very rare) 16. Various forms of Peritonitis and secondary infection by Pyogenic organisms.

ABSCESS:- In Filarial subjects abscess formation is one of the most frequent occurrences. There are hundreds of unfortunates who get these abscesses with painful frequency in almost any part of the body and in Demerara they form at least 80% of the abscesses one meets in private practice. These abscesses are due to several causes.

1. Traumatism, 2. Acute septic Lymphangitis resulting from an infected bruise or cut. 3. In connection with Typhoid, Influenza, and other fevers.

Such abscesses in the leg, arm, axillae etc., are treated by incision, cleansing out and a light swabbing out with Iodized Phenol (Martindale) I have found this very efficacious, as it seems to have a distinct preventative action on the recurrence of these abscesses. When a patient is a frequent sufferer from abscess formation, I have used with very satisfactory results the anti-streptococcal vaccine prepared by Dr. Rose, this vaccine has been extensively used by him in a large number and variety of these cases and is still being so used. As a general rule he has got fairly satisfactory results in that attacks of Lymphangitis, abscess formation, fever-ague, etc. become far less frequent.

I have myself treated 25 selected cases and can vouch for the fact that the people so vaccinated acquired a certain amount of immunity against the attacks, and in several-six at least over a period of two years- the attacks ceased altogether, although quarterly examination of their blood still gave m.c.f. The whole scheme of treatment is based on the belief that Filaria Per se is non-pathological. It is only dangerous to the host when a mixed infection is added e.g. Typhoid, Influenza, Dyptheria, Measles or by the introduction into the blood stream of a Streptococcal poison from a septic wound, aniline dyes introduced through a bruise often have as strong an effect as Streptococcal poisoning -this I have noticed in several cases especially in the post-war dyes used in cheap stockings.

When the abdominal glands inflame and form abscesses then a serious type of Peritonitis of Acute form sets in. Examination of the blood on these occasions shows a distinct diminution of m.c.f. but this is deceptive as I have noticed the same diminution in Acute fevers such as Malaria, Typhoid, Pneumonia etc. An exploratory operation in these cases is always attended with considerable risk and some doubt in the Surgeon's mind. In most cases it is the only thing to do, and that without delay.

ELEPHANTOID FEVER AND LYMPHANGITIS:-

Lymphangitis is a very common lesion in all Filarial subjects In the legs and arms it comes on as a red streak following the line of the main Lymphatic vessels leading to the glands; very tender to touch hot, glossy and angry looking, later the surrounding connective tissue becomes involved, associated with a high fever intermittent with attacks of ague - hence the original name of fever-ague given to it in Barbados. There is always intense headache, pains in the loins, vomiting and even delirium, this

may go on for several days: As a rule, it lasts two or three days and generally ends in profuse sweatings, leaving the patient cold, clammy and exhausted. Sometimes there is a general oozing of Lymphous fluid from the affected area with a distinct and unpleasant musky smell. After the profuse sweating the swelling subsides- in some cases the affected area returns to normal and the man resumes work apparently not much the worse, and this may go on for years. In other cases each attack leaves an area more and more definitely and increasingly swollen, and then the gradual development of Elephantiasis is started. These attacks are most frequent in the legs, groin glands, testicles, and arms; less frequently the abdominal Lymphatics in which last area it is always dangerous and may lead to Acute Peritonitis.

DIAGNOSIS:- In Demerara where *Filaria* is endemic, the Acute Lymphangitis with a history of prior similar attacks and the general appearance of the affected parts easily settle the Diagnosis. The Lymphatics are inflamed (glands and trunks, pains localized, the redness like an erysipelas, the prolonged pyrexial stage all point to *Filaria*; presence of m.c.f. in the blood is easily ^{demonstrated} ~~done~~ in Hospital, but in general practice one has to depend on symptoms.

TREATMENT:- Although it is stated that quinine has no effect on the fever, yet in actual practice I have many hundreds of times cut short the attacks by the following treatment:- Capsules containing Quin. Salicyl, Aspirin, Digitalis, Hydrar Sub and Brometone are given every three hours for 6 doses, followed by a saline. The much wanted Diaphoresis is hurried, relief generally comes within 12 hours and next day the patient is comfortable even if weak and clammy. People are sufficiently educated here to realize that

this does not mean a cure but it is a blessed relief, and that, they fully appreciate.

LOCAL APPLICATIONS:- I have not favoured the use of cold applications to **A**cutely inflamed Lymphatic and groin glands. I believe I will get better results by the gentle rubbing in of an ointment containing Iodex, plus Methylsalicyl, Opium and Belladonna, and the application over this, of hot linseed meal poultices, alternating with the use of warm Antiphlogistine spread like a thick plaster covered by oiled silk. In very few stages a hypo. of morphia, atropine and digitalin has a wonderful effect both on pain and on the duration of the attack. Tight bandages of leg or arm do not give good results but elevation in a comfortable position benefits most cases.

Early in my practice 1906-1910 I used injections of Sodium Cacodylate $\frac{1}{2}$ grain to 7 grains as a preventative, if not a curative agent. In the Thesis I wrote at the time I was rather too enthusiastic on my results of this, Fibrolysin, and of 606, which latter I started to use from 1911. All the same after this lapse of years I have met, treated and examined many of those old cases and they have been quite enthusiastic over the benefit received at the time and definitely declared to me that the attacks were less frequent and severe ever since. This seems optimistic, but it is true. I can quote many such cases, men who have lived in this Colony ever since, who to-day will state definitely that they hardly ever get any attack of Lymphangitis and if so, at rare intervals, when at one time these attacks were monthly terrors. I have been given permission to quote one outstanding case viz. that of Mr. J. Fernandez, manager of Messrs Smith Bros. & Co. He was a martyr to repeated disabling

attacks of Lymphangitis "rose". In 1910 I gave him a series of Sodium Cacodylate injections over a period of four months repeated after an interval of three months. In 1912 I gave him a series of 606 injections six in all. Since 1912 he has never had an attack of Lymphangitis and today 1924, he declares himself free from Filariasis. This savours rather much of the quack medicine adverts. one reads, but it is true and I can only conclude that in his case the parent worm died, the Embryos followed suit later, no reinfection occurred and that gradually his system cleared itself of their débris , but he continued living in a Filaria infected country, in a house with Filarial subjects, under the same old conditions and that he has not been reinfected, seems too good to be true. There are still in the Colony many similar cases. Speaking on the subject to doctors in Barbados they assure me that Filariasis is most distinctly on the decrease, that certainly there are not one third the number of cases there were twenty years ago and that the name "Barbados leg" adopted 100 years ago will have to be dropped or changed to "Guiana leg". This is a very pleasing fact and I can vouch that during my stay in the Island I have marked a very perceptible decrease in the number of cases as compared with those fifteen years ago.

Of course improved sanitation, the elimination of mosquito-breeding places, the fact that housekeepers refuse to employ Filaria infected cases, that Elephantiasis cases are forced to realize that they are a curse and a menace to their neighbours and are not the fate-stricken and-to-be-pitied subjects of Divine displeasure as was formerly believed has had a lot to do with this result. I have actually known people to employ a

glaring case of disease in spite of my strong advice to the contrary. I think that idea of false pity has died out to-day. Since 1919 I have experimented freely with Colloidal Antimony & Arsenic with Silver- Salvarsan and just recently during the last five months with Bayer 205. It is a fact that patients when under treatment by the Arsenical compounds show marked improvement for various periods, some for months, others for years and others again no difference at all. At one time I had great hopes in Colloidal Antimony but have given up its use during the last two years. Of course a critic might well say that this improvement under Salvarsan may be due to the fact that the injection annuls both Syphilis and Malaria, and so improves the condition of the subject, taking it for granted that most subjects are specific or of specific origin. Granted, yet after years of this treatment I feel convinced that Arsenic in this form has a definite controlling action on the frequency and virulence of the attacks of Acute Filarial Lymphangitis- both of Lymphatics and glands. This I have seen in far too many cases to be moved from that belief, which more or less empiric as it is, is still based on repeated clinical observation.

VARICOSE GROIN GLANDS:- Perhaps the commonest of Filarial lesions and frequently associated with Lymph Scrotum, Chyluria, and Chylous, Dropsy of the Tunica Vaginalis.

SYMPTOMS:- In some cases the patient is unaware of the presence of these Groin Glands until they assume a fair size, e.g. Walnut. But, as a rule from the time the gland is the size of a large pea he knows it and what it means - the public of today are well educated in these matters. After a long walk he feels a dragging in the leg, and if continued, a distinct pain traceable to the

glands. Thus he will tell you that for years these glands have not bothered him and it is only quite recently since starting exercises and long walks that the pain has become noticeable. Sometimes an attack of Acute Lymphangitis will start the glands up and leave them permanently enlarged (often also as the result of trauma). On palpation one gets either a tough doughy mass attached to the subjacent tissues or a hard fibrous nodule. The local name "Waxen Kernel" is given to this Kernel-like hard mass. When the mass is large, soft, doughy, an aspirator needle thrust deep into the mass will draw off an ounce or two of Chylous fluid, white or pink, generally the latter. This fluid coagulates rapidly and contains living m.c.f. or ova.

DIAGNOSIS FROM HERNIA:- Sometimes a little difficult but as a general rule there are so many plainly visible symptoms of Filariasis that the Diagnosis is made easy:-

1. The soft doughy mass is not tympanitic : If firmly pressed it will slowly disappear in part: None of the sudden complete disappearance of a Hernia with gurgling.
2. The impulse on coughing is slight, generally absent.
3. When the patient lies down a part of the swelling may slowly disappear on his arising no amount of pressure will prevent it from slowly returning.
4. When Femoral glands are present linking up with Inguinal glands one can hardly associate such a condition with Hernia. I have never had to resort to acu-puncture, as the diagnosis has never been sufficiently doubtful. Except in very rare cases chronic swellings (fibrous or doughy) of cord testes of scrotum in the tropics may be regarded as Filarial. Two other similar lesions viz. (1) Gonorrhoeal infection of the groin glands

with balanitis Orchitis and general inflammation of the Scrotum- such a case I treated in 1922 in a young Russian seaman.

(2) Bubonic groin swellings from Chancroid infection . Both these lesions bear the hall mark and carry with them as a rule typical concomitant signs and symptoms. This recalls an incident in Cairo in 1917 when a R.A.M.C. Officer approached me at about 12.30 one morning to visit with him his ward and help confirm a Diagnosis of Bubonic plague in three B.W.I. privates (one from Jamaica and two from Trinidad) They had severe fever with Rigors, Acute vomiting and headaches, severe pains in the groins, hips and legs. The moment I saw them I was able able to quiet his fears - they were acute cases of Filarial groin glands.

MORBID ANATOMY:- Groin glands on dissection when not in a state of abscess formation, but just quiescent, consist of bunches of Varicose Lymphatics and may form part of a Varicose Lymphatic mass communicating with similar masses in the pelvis and abdomen.

TREATMENT:- Unless they become very large or give rise to frequent attacks of acute inflammation they are best left alone. Three years ago the Dutch Surgeons in Surinam made it a routine practice to excise these glands. As I refused to do the operation many of my patients journeyed to Surinam to be operated on, the results were in most cases disastrous as an increasing Elephantiasis of either leg or scrotum or both, resulted within a year. A few cases proved successful but as a general rule removal of these glands must be avoided.

I have never attempted Lymphatic Anamastomosis operation as suggested and tried by Sir R. Godlee. The statement of Azema that these glands tend to diminish after forty is open to criticism,

I have treated many hundred such during the last twenty years and have never seen any diminution in size; in fact the increase is more usual. Axillary glands are rare, most frequently found in women and generally associated with Filarial infection of the Mammae. The Epitrochlear glands are sometimes infected, thickened enlarged and may lead to a false diagnosis of syphilis, Excision of these, generally also results in swelling of the hand and forearm.

Cutaneous and DEEPER LYMPHATIC VARICES:- I have on several occasions both in practice and in the General Hospital, Georgetown, seen Cutaneous Varices on the surface of the abdomen, legs and arms. In these Varices one is often able to obtain good specimens of parent Filariae and the lesion closely resembles that of the ~~Gu~~ Guinea Worm (which latter are found both here and in Surinam). The Lymphatic trunks often remain thickened and hard in sections made after Acute Lymphangitis: here again one will often find the parent worms on dissection.

LYMPH SCROTUM:- The Scrotum is enlarged, wrinkled, the skin is thickened and somewhat silky to touch: it contains Lymphatic Varices which when opened give out a fluid, blood-stained (pink) or yellowish or milky, composed of Lymph or Chyle which rapidly coagulates. These fluids contain as a rule m.c.f. and the condition is usually associated with enlarged Inguinal and Femoral glands. This Lesion may be accepted as the initial stage of Elephantiasis of the Scrotum, and it is at this stage that the Surgeon is well advised to force on the patient the urgent necessity for radical removal of the Scrotal tissues. Here he has a better chance of cutting well away from filarial skin tissues before the disease has spread too far up the Pubis and Abdomen .

In Elephantiasis of the Scrotum it is almost impossible as a rule to differentiate between healthy and filarial skin areas, hence the frequent almost regular recurrence of growth after operation. Several of these cases operated on between 1906 and 1914 have up to to-day retained a decent small size, others I regret to say have grown again although at the time of operation I felt sure that I had cut well beyond the diseased skin area.

TREATMENT:- Apart from surgery, especially in those who refuse operation, one has to fall back on palliative measures e.g. cleanliness, the parts are frequently washed, powdered (borated talc and zinc stearate) and well suspended, I have seen fairly good results from painting with Ichthyol, Iodex, Belladonna in semi-fluid form also Tr. Ferri Perchlor painted on twice daily, also Empl. Ammoniacy cum Hydrargyro in strips, the testicles being well strapped and the strapping renewed every five days until relieved. In several cases the tissues shrink for months and the organ assumes a nearly normal size. As in other Filarial Lesions I have tried 1-6 c.c. Fibrolysin; Sodium Cacodylate $\frac{1}{2}$ to 7 grains; Salfarsan; Colloidal Antimony injected with intervals of four months for two or three series, in some cases I have seen very good results but the treatment is more or less empiric and I don't think I can lay much stress on it clinically. Still in practice one is often driven into a corner and as these injections often give good general results I think they are well worth a trial. Bayer 205 I have used for the past five months and can make no definite statement as yet.

CHYLURIA:- One of the most sudden and alarming Symptoms of Filariasis

PATHOLOGY One of the Lymphatic Varices in the walls of the bladder or of some part of the Urinary tract, ruptures and as

the result of backward pressure caused by Filarial obstruction in the Lymphatics of the Urinary system or in the Thoracic duct, the chyle or Lymph in the Varix escapes into the bladder and appears in the Urine.

SYMPTOMS Often an escape of chyle or lymph in the urine is not preceded by any symptoms, but sometimes it is ushered in by severe loin and girdle pain, rigors at times, but rarely, if ever, fever, sometimes coagula form in the bladder and urinary tract causing retention which may give rise to very serious symptoms and in one case which I had in 1909 we were forced to cut down into the bladder clear out the coagulated fibrinous masses collected there, flood out the Ureters and the Urethra. The Urine appears milky, pink or both, the pink colouration due to the presence of red blood corpuscles, the result of rupture of small blood vessels into the dilated Lymphatics.

Chylous Urine In a glass if allowed to stand for about an hour it coagulates, gradually contracts, and after a few hours a clot red or pinkish floats on the surface of the milky fluid. Later the whole fluid separates into three layers:-

1. A cream-like pellicle.
 2. A thick intermediate stratum white or reddish in which the contracted coagulum floats.
 3. At the bottom a thin reddish sediment with numerous blood clots
- 1 (a) The upper cream-like layer contains a large amount of fatty material. The granules aggregating into large oil globules.
- 2 (a) The middle layer contains a large amount of granular fatty material with smaller oil globules than 1(a).
- 3 (a) The sediment contains R.B.Cs, Lymphocytes, granular fatty matter, epithelial cells, urinary salts and sometimes m. c. fs -

these last are also seen in the fibrin of the coagulum. Ether or Xylol will dissolve away the fatty matter and leave the Urine clear. Boiling gives a heavy albuminous precipitate.

THE COURSE OF CHYLURIA:- The onset of the disease is often like the disappearance - sudden. The patient who has been passing Chylous Urine for weeks or months awakens one morning and finds that it has disappeared. Relapses are the rule.

RETENTION OF URINE frequently occurs and may be serious. I have in some cases tried Lavage of the bladder with a weak solution of Ether. In one case already described no treatment availed and we were driven to operate and open the bladder.

GENERAL EFFECTS:- As a rule the mental effect is worse than the physical, at the same time a patient with Chyluria is not allowed to work and if the disease persists for weeks or months only to do the lightest work possible, and to avoid much standing.

EXCITING CAUSES:- Hard to trace as a rule, in men, it has often been blamed on to a gonorrhoea affecting the bladder. In women pregnancy and the after results of child birth. Another cause is supposed to be due to working in trenches up to the waist in water for hours at a time - a daily task on all sugar estates.

TREATMENT:- I have apart from the routine practice of absolute rest, elevation of the pelvis as in a hammock or in a chaise longue and the avoidance of fatty foods, tried very many drugs, both to be taken by mouth and for bladder lavage, with varying and doubtful success. Apart from the many local remedies including Mangroveroot decoctions, Greenhart seed decoctions, a variety of "teas" made from local herbs and trees I have, following the advice of others tried internally - Ac. Gallic. Ac Benzoic, Tr. Ferri Perchlor. Ergot

Adrenalin chloride, Ichthyol, Urotropin etc., on account of the eccentric nature of the Lesion many remedies have gained a more or less false reputation.

I have got good results and cessation of flow within 24 hours of a single intravenous injection of Salvarsan, I have also got a similar result from a continuous lavage of the bladder with various silver salts (Cargentos, Silvol, Collosol Silver) with the help of Adrenalin Chloride in some cases, in others, Hazeline. Methylene Blue with Urotropin and Buchu in capsule form also gave good results. But there is no remedy which can definitely lay claim to a cure and when the pathology of the disease is noted, the reason becomes clear. In the case in which we had to open the bladder, frequent lavage with a weak Silver Solution and normal saline, and in the interval loosely packing the bladder with Boric gauze soaked sometimes in Hazeline and at others with a weak solution of Adrenalin Chloride and Argyrol proved successful. This case operated on fifteen years ago has never had a recurrence and is to-day living in Montreal, Canada, the father of a family.

FILARIAL ORCHITIS: is fairly common and generally more painful than dangerous, it is often associated with inflammation of the groin glands and Spermatic cord and is frequently found with a mixed Gonococcal infection, the one fatal case I met in practice occurred in one of my cousins, a lad of twenty-three who had never shown or felt any sign or symptom of Filaria. He became suddenly ill with Acute Orchitis and a high fever (105°F) when I saw him one hour after the initial attack he was in acute agony and semi-delirious; the case puzzled me and on the urgent request of his relatives I gave a small Hypo. of Morphia, Hyoscine, Digitalin, and applied a soothing ointment and hot antiphlogistine.

He got a temporary relief for about five hours then relapsed, I returned and applied hot poultices and elevation of the hips and legs but refrained from a second injection although it was urgently requested. He died three hours after, with all the symptoms of Peritonitis. The diagnosis was made in a P.M. demanded by his wife on the suspicion that he had been poisoned by a dishonest servant, discharged the previous week for stealing. When the abdomen was opened there was disclosed a huge mass of Iliac and abdominal Lymphatic Varices in a highly inflamed condition; the kidneys were greatly congested and surrounded by Lymphatic Varices. Yet he never had a visible groin gland nor any symptom of Filarial infection.

FILARIAL SYNOVITIS:- I have never been able to find m.c.f. in the fluid taken from the inflamed knee-joint in several cases of definitely Filarial subjects. No case of Filarial Hip-joint Synovitis has ever come under my notice nor have I heard of any.

ELEPHANTIASIS. - is certainly one of the commonest signs of Filariasis in an endemic district. In Demerara, a hundred years ago it was quite rare: Today it is fairly common, not less than 10% of the population showing it in one way or the other. In Barbados (whence the name "Barbados Leg") it was very common fifty years ago: Today it is almost rare. Elephantiasis seems to have died out to a large extent and such people as have Filaria just show it as a simple acute Lymphangitis, which attacks them at intervals of months or even years. It would seem that the Negro slave brought it to Barbados a hundred and fifty years ago and spread it with Filaria among the Whites and better classes. But greatly improved hygienic and preventative measures and the naturally healthy climate and soil, and surroundings in the Island have all helped to reduce this

condition to a negligible quantity. I have spent the last three months in Barbados resting after a nervous breakdown, and have discussed this subject with several of the resident doctors and have travelled over the Island frequently; personally, I have only seen fourteen cases and most of those in the small Almshouses: Only three in public I have seen on the streets, one of which is a very pronounced case of a white man, a club secretary. It is a remarkable fact that Elephantiasis is a rare form of disease in West Africa whence the majority of the slaves who brought it to Barbados over a hundred years ago came. Can this predilection of the disease for the lower limbs be the result of change of climate, habit and occupation?

In Demerara unfortunately, this is not the case: The streets, Houses, Offices, Almshouse and Hospitals abound with Elephantiasis subjects, this is a regrettable fact and I believe local conditions have a great deal to do with it. The land is low-lying, the coast lands being below the sea level, the city, Georgetown is flat, four feet below sea level and has to depend entirely on trenches and an ebbing tide for drainage. Until recently, these trenches bred millions of mosquitos in spite of a sturdy fight put up by Drs. Wise & Minnett 1908-1913. They did a lot towards better sanitary conditions and the Filarial Commission two years ago, helped the good work: but it will be a very difficult, if not an impossible task to clear out all the mosquito breeding places in such an area. Water is collected from the roofs in large vats, and unless perfectly screened these act as ideal breeding places, grass grows right down to the water line of the trenches, water collects in little bays and side pools, backwaters where mosquitos breed freely, empty tin cans and débris strew the backyards in spite of lively

sanitary squads. Most people ignorantly employ Filariated servants even as nurses for their children and here one can see what is considered an anomaly in most places - White men, women, and even children with Elephantiasis in various stages of development. Sir Rupert Boyce fifteen years ago deplored this condition and among other suggestions, he put forward one for the cutting down of thousands of trees including cocoanut palms which are supposed to adorn the City. Banana, Plantain, and cocoanut trees all act as perfect breeding places for the mosquito: the huge fronds of the Banana and plantain make at their junction with the main stalk an open cup which stores the rain water and acts as an ideal breeding place for mosquitos. Nearly every "Nigger Yard" and even better class houses encourage the growth of these trees. Sir Rupert Boyce was considered a rude iconoclast and his advice was followed in a very half-hearted way by the Town Council and a few citizens. Today this city, well laid out, with an efficient sanitary department, is so filled with trees of all kinds as to appear a huge garden, but is in reality a series of shudders for those who see beyond a passing beauty in these trees. The Botanic gardens to the Windward of the town is one of the finest in the world, but is also a huge mosquito breeding ground; strenuous efforts have been and are being made to eliminate this curse, but the natural conditions of the land, being under sea level and the necessity for trenches, and the craving of the people for trees (both for the shade as well as for their fruit) together make a perfect sanitary condition as distant as the Millenium. For years I have done all a man can do to point these things out both in public lectures and in private talks with my friends, but they think me a crank, listen patiently to me and go away with a smile.

The chances of eliminating Filariasis from a fairly large City (66,000) like this, are very remote and the amount of Filariasis in the City is on the increase.

(As a strange contrast, I may mention that malaria in the City is very much less today than it was twenty years ago, and is generally of the mild subtertian type - the old cases of malignant tertian have disappeared)

People have got so accustomed to seeing the awful effects of Filariasis that they accept them as part of the troubles of life & just go on to their business. I was considered an eccentric when in 1910 at a Public meeting I suggested the possibility of collecting the vagrants, beggars, ne'er-do-wells and loafers about the City who showed Filaria in their blood, and the segregation of these in a large area twenty miles away, just as has been done with the lepers. The place to be run on a working commercial basis, each inmate to be given work of various kinds and to be taught industries suited to their capacity. A Wit, a high Government Official, in his response suggested that I had just read Moore's Utopia, and the laugh was turned on me.

As a contrast to these local conditions compare Barbados, infested fifty years ago with Elephantiasis and Filariasis generally, the naturally healthy condition of the land (chalk soil) its natural drainage and the surrounding country areas along with sanitary measures, and the all-healthy, healthgiving blue sea around the Island, proved too great a combination, and Filariasis although endemic is by no means the menace it was years ago: to the casual observer it is an almost negligible factor in the health of the place. Trenches are absent, because unnecessary, and although Bridgetown itself still breeds lots of mosquitos, the surrounding Country places

are so eminently wind swept and health-giving that I believe that especially among the better classes in these days of motor cars and sea side residences, any mischief done by the mosquito is quickly eliminated by the sea and sea air. In any case Elephantiasis is rapidly disappearing from the Island and such Lymphangitis as occurs is generally a two days' illness of no special danger. I hold no brief for Barbados, but these facts are startlingly evident to me after many years practice in Demerara.

In Trinidad and Tobago the disease is still less prevalent although the same class of slaves were imported. Local conditions seemed against its taking a hold.

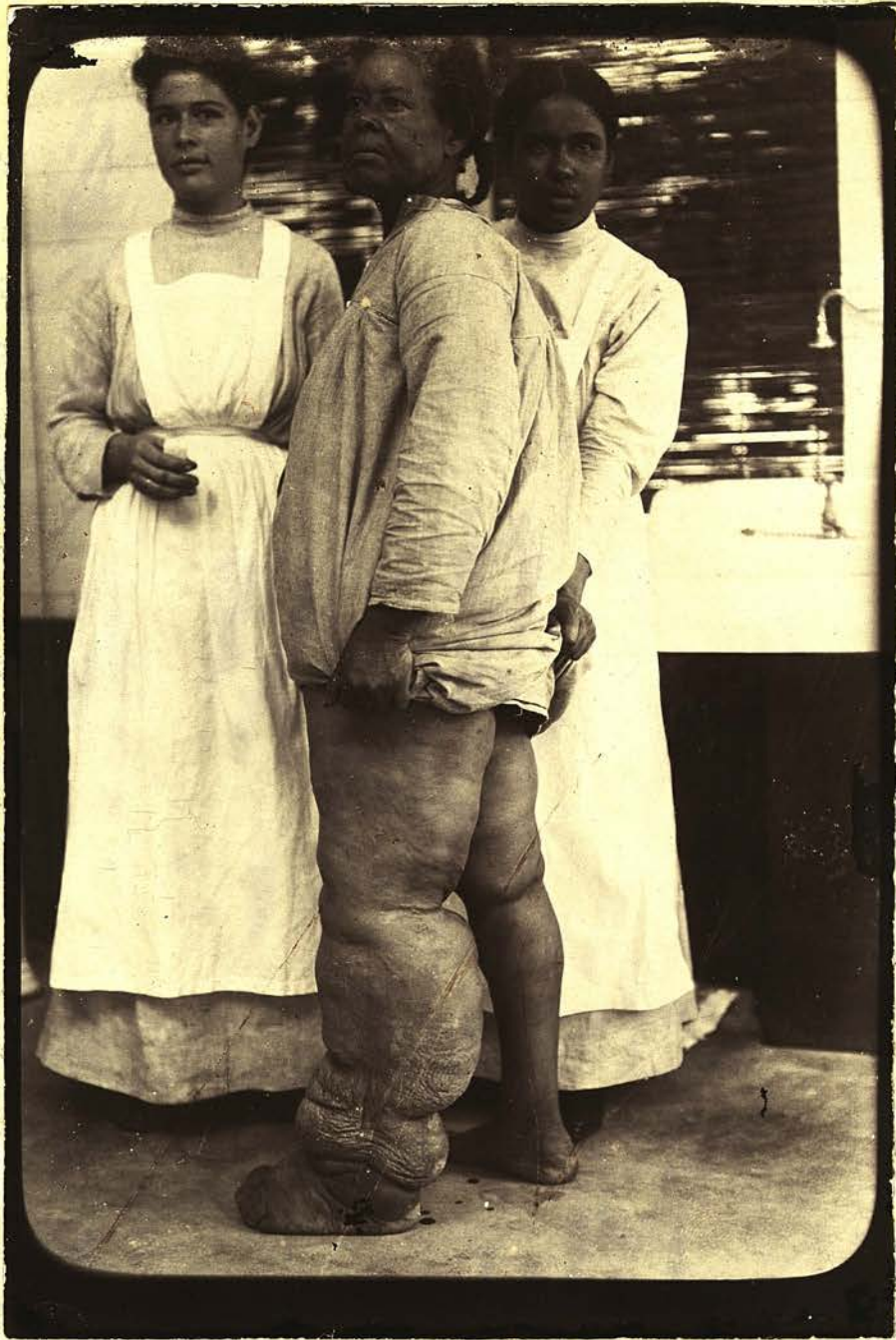
In Grenada, St. Vincent, Dominica and the other Islands one but very rarely sees a case and several of these were natives of Barbados originally.

In Dutch Guiana the condition is very prevalent in its most aggravated forms.

In French Guiana adjacent to Dutch Guiana the condition is very much rarer, here one must take into consideration the fact that the slaves originally imported by the French came from Madagascar.

PARTS AFFECTED- The vast majority of cases of Elephantiasis occur in the leg. Perhaps the instep, the foot or both, the ankle, the knee and up to the hip, naturally a great variety of cases occur, the arms are very rarely attacked, the Mammae, Vulva, Scalp still more rare, the Clitoris is very rare, and accompanying is a photo of a very pronounced case, the mass of the Clitoris in this case weighs ~~four~~ pounds.

As stated before, the disease commences as an acute



Taken on Dutch Guiana. The woman at a
general "help" in spite of the huge mass of the
left thigh & leg.

Lymphangitis with fever, dermatitis and cellulitis. If in the leg, the inflammation always follows the Lymphatic trunk on the inner aspect. As a rule each attack leaves the part somewhat enlarged and permanent thickening gradually results. Such attacks recur twice a month, monthly or three or four times a year, leaving its mark every time, thus in the course of years a firm, permanent, elastic swelling is left and the part becomes hypertrophied and unsightly. The clinical characters of the swelling

I have already described with the changes resulting in enormous Hypertrophy of the skin, the changes in the hairs and hair follicles and nails. Folds of thickened skin form in rolls around the ankle and less frequently the knee joint, and the instep is often a huge rough convex mass. In the more advanced cases there is no definite line of demarcation between healthy and Filariaed skin, and this tends to annul successful results of operations, for unless the incision be made well into healthy skin area the growth returns.

Elephantoid tissues are dense, firm, hard, rough, do not pit on pressure and cannot be easily pushed up from subjacent tissues. True Elephantiasis is permanent although surgical interference can and does greatly reduce the actual bulk yet the condition remains a subdued or reduced Elephantiasis.

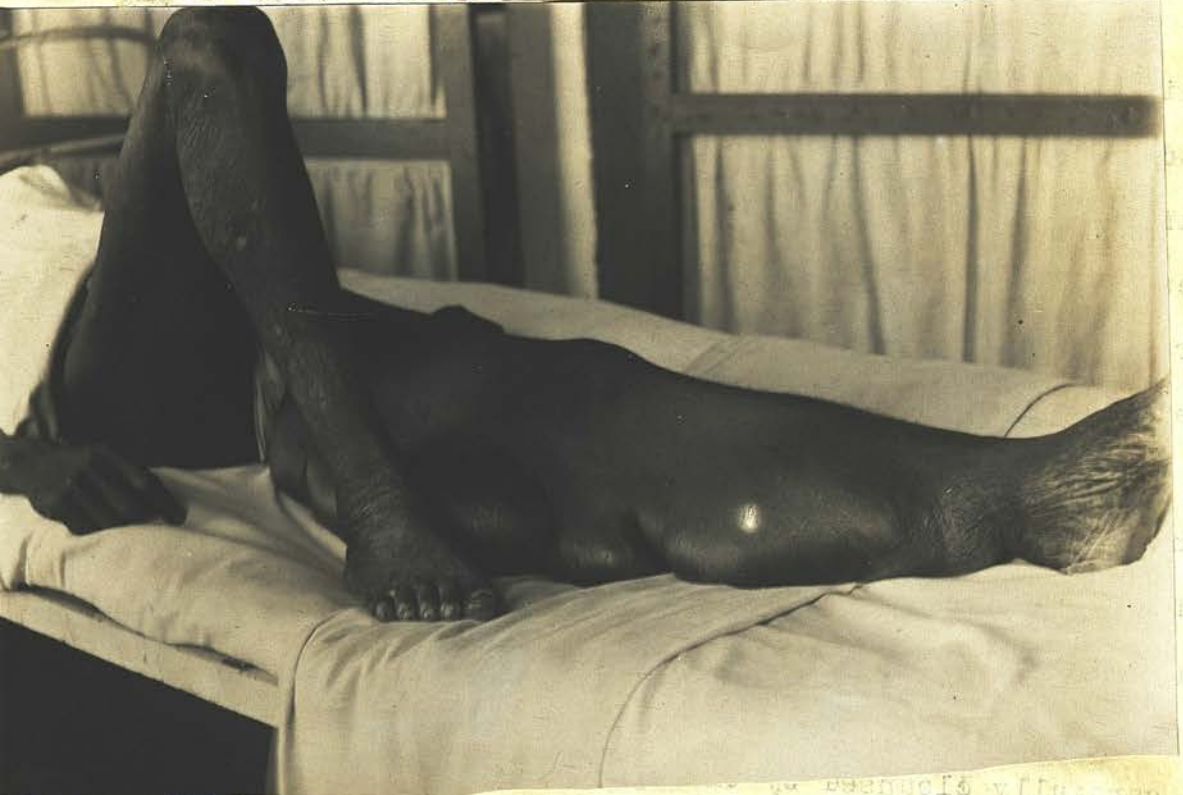
ELEPHANTIASIS OF THE LEG:- As a rule the disease remains below the knee but a few cases extend up the thigh to the hip, and often assume enormous proportions e.g. in the case I quoted where the two legs and thighs together weighed 140 lbs. A very exaggerated case will be seen in one of the photos accompanying. These are very unlike fatty growths, are heavy, solid and weigh far more than one would suppose at first sight.



This photo was not taken to order as I wanted
 both legs taken together in the chair, to show
 the contrast. a Patagonian. The legs are
 anomaly as it has increased a size but of the
 the present it has not lost contour.

TROPHIC CHANGES - In the majority of cases of long standing, definite Trophic changes occur, apart from the coarsening of the skin the brittleness and thickening of the hairs, the skin itself throws out excrescences, large and small, like the eyes of a potato, they generally start at the toes and extend upwards to the knee: Are lighter in colour than the skin from which they spring, like huge rounded warts surrounded by deep trenches or striations in the thickened skin, some carry coarse hairs, others do not, and they generally keep oozing a Lymph-like fluid with a definite musky odour; sometimes the skin around these out-growths acquires a dark tinge like patches of Chloasma; when the condition is advanced in both feet the patient's legs as he sits down present very markedly the appearance of the fore-legs of an elephant.

TREATMENT:- The usual routine is rest, elevation, massage, porous elastic bandaging: on account of the debility and anaemia, good foods and tonics are always indicated, a form of iron which I have found particularly useful is Colloidal ferro-malt along with arsenic and strychnine. As G.M.O. of the Almshouse for seven years I had plenty of material to work on and a free hand to experiment; the institution has room for over seven hundred inmates and here are collected from all the Hospitals throughout the Colony the incurables and hopelessly slow cases, typically pauper Elephantiasis subjects. On the advice of a Surinam surgeon who claimed very fine results, I selected six cases of Elephantiasis of the leg in which the heart and other organs were fairly normal, and operated on them as follows:- The six cases were put in a special room and given calomel, quinine and a special diet for three days followed by salines, rest in bed with elevation of the legs which were carefully cleansed by the application of boracic fomentations



containing a small percentage of salicylic acid, and every aseptic precaution preserved so insuring clean skin throughout; before operating I gave each of them a Hypo. of Morph. Sulph. Hyoscine, and digitalin; the legs were elevated so as to drain them as much as possible.

OPERATION - Each patient was chloroformed and a double tourniquet applied above the knee; longitudinal strips of tissue including Hypertrophied skin and some of the subjacent gelatinoid matter were resected, each strip being about four inches broad; one from the knee to the Metatarsal junction in front of the *foot* and on the instep: Two others similarly on both sides of the leg from the knee to the ankle. The subjacent tissues were cleared away as much as possible, the Lymphatic and venous flow being controlled wherever possible and the opposing raw areas of skin were brought together with strong sutures - wire and horsehair. Drainage, which was excessive, was established by Setons and drainage tubes, every aseptic and antiseptic precaution was used. With two of the cases I used normal saline immersion of the leg operated on, but I do not think this gave any better results. These cases took an abnormally long time to heal as Filarial tissues are deficient in healing properties. At the end of six weeks they were allowed to stand and walk about on crutches, the least exertion at first caused the healing wounds to bleed or pour out Lymph, and the tendency for the wounds to go septic was very marked, this I attributed to the greatly lowered resistance of the tissues and to their tendency to be always sodden and damp. They proved difficult in the after treatment as the wounds were always breaking out into a haemorrhage or a Lymph flow, but eventually all six cases were healed and discharged from the Hospital, one man, a Portuguese gardener,



and died from the hospital, one man, a Portuguese, died.

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who had been literally chained to his bed by this huge leg which weighed well over 60 lbs. was one of the six. For over six years he worked for me as gardener and with his trousers down to the ankle one could not tell that there had been anything wrong with the leg, frequent testings of his blood were negative and so I kept him on; he died in 1916 when I was on duty in France, of Cerebral Embolism, possibly Filarial. Since my return in 1919 I have tried to get into touch with the others I operated on but have failed to do so. A series of photos taken of these legs in various stages were lost among the others I posted in 1915 with my first Thesis.

I foolishly and rashly on one occasion attempted the radical operation as advocated by Charles - the complete resection of all Elephantoid tissues except the sole of the foot to be followed by extensive skin grafting, I managed to get three of the patient's friends to consent to give skin for the grafts, and with hotheaded enthusiasm and with the full consent of the man and his family, I did the operation. I made a clean resection of all the elephantoid tissues from the leg, carefully avoiding to the best of my ability, injury to the main blood vessels, Lymphatic trunks, nerves, tendons, periosteum and the flattened out muscles. After all the tissues had been carefully cleared away, the skin grafting was started; with the help of Dr. Hewand, a Dutch surgeon, who very kindly assisted me, we got the limb quite clean of elephantoid tissues and then started to plant the skin grafts; these failed miserably, not more than 20% proving successful, chiefly because I feel convinced that all the tissues were so vitiated and toxinated by the disease that no amount of careful coaxing could get the grafts to "take" and grow as we would wish.



The result was that for four awful months I had the unfortunate man on my hands with this huge ulcerous area to heal, the limb was never of much use to him afterwards as the least injury meant a nasty bruise, quickly followed by ulceration. He eventually died of Filarial peritonitis, partly due I am afraid to the wholesale cutting away of Lymphatic Varices, so throwing a bigger pressure on to the abdominal trunk, and partly, to slow septic absorption from the raw area.

I have read with interest Handley's operation of Lymph-angioplasty but have never attempted it.

Lang's operation for deep Lymphatic drainage promises well in theory, in actual practice I have only attempted it once with doubtful success.

Kondolens' operation seems easier attended with less risk and might well be worth a trial. It may sound callous the way I describe this wholesale butchery of the human leg, but a man with a huge elephantoid swelling is willing enough to take any reasonable risk to get rid of it and even a drastic operation, like complete resection is justifiable under such circumstances. I have often been earnestly requested to amputate, but refrained from doing so because I always feared interference with the abdominal Lymphatic circulation.

ELEPHANTIASIS OF THE SCROTUM:- One of the common results of Filariasis and at the same time the most disabling and revolting, often the result of ignorance or delayed operation, fear of operation or sheer indifferent callousness. Most commonly seen in Portuguese, less often in Blacks and East Indians, never in Red Indians or Chinese, but fairly often in Europeans, these tumors vary in weight

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HYDROTHORAX IN THE EXTREMES: - One of the common results of

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and size from two pounds to the largest I have seen sixty-five pounds, one such weighed 224 lbs. (Manson). At one time these huge elephantoid growths were a source of livelihood, their wretched owners exhibiting themselves for money to tourists and others. That has been stopped of late. The afflicted man has to make an apron of perforated canvas, the base of which is attached by straps to his waist, the distant ends of the apron having leather straps which pass around the shoulders. It is easy to imagine the misery of such a life-long burden, but some men get quite accustomed to the handicap and won't hear of operative interference; these generally end up by getting the mass badly bruised, septicaemia sets in followed by death - a merciful release. The case I quoted which weighed 65 pounds nearly brought me into a law suit for damages. The ungrateful wretch actually arranged with a hedge-lawyer to sue me for damages on the plea that I had removed his means of livelihood. The case was quashed before it entered Court, but it caused me a considerable deal of worry, expense and jokes at my expense. The man went to U.S.A. to some relatives and five years after, wrote me a letter of thanks which he begged me to publish - needless to say, I didn't do it.

OPERATION. PRELIMINARY - The patient is put to bed for a week and undergoes a cleaning out course of Calomel, Phenolphthalein, Jalapine, followed by sulphate of soda or other saline, light nourishment, spoon diet is given along with bracing tonics of Easton's syrup with strophanthus or digitalis. During the rest in bed the mass is suspended from the man's body by a devised system of canvas bag, pulleys and cord, so as to allow free drainage of blood and fluids; the morning of the operation an enema is given and a catheter

passed to test for stricture and prostatitis etc., as after operation retention of Urine might prove troublesome.

OPERATION - The whole area after being thoroughly sterilized is mapped out with a marking pencil and the line of operation clearly defined, making sure that it passes well beyond the Filariated skin area as the success of the operation largely depends on this point. Filarial skin so merges into healthy skin as to leave no clear line of demarcation; when diseased skin is left behind to be included into the healing scar tissue it starts to grow again within a few months of operation (this tendency to grow after operation strikes an analogy with Keloid and Cancerous tissues.)

A shallow transverse cut is made (in sound skin) across the Perineum in front of the Anus. A similar cut is made across the Pubis. The ends of these two incisions are joined by an irregular semi-lunar line along the thigh aspects, the incisions made in this operation are entirely guided by areas of sound skin. The mass is then suspended to the ceiling by a large fish-hook embedded deeply, and attached to a strong cord running over a pulley, which is manipulated by an assistant who can raise or lower the mass at will. Strong tourniquets are wound around the neck of the mass above the first inside lines and over the Pelvis in figure of 8 fashion.

Testes and spermatic cord are first dissected out by the help of long perpendicular incisions, the remains of the gubernacula testis being hooked up and snipped through. The channel of the Prepuce is then slit up and cut through around the corona of the glans, the incision extending up to the transverse Pubic line; the penis is

then released. If there is sufficient healthy skin, flaps are formed, but in this particular case, there was no healthy skin available and it was just a scramble to make good with the material at hand. The pubic and perineal incisions are then deepened. The Testes and penis being guarded, ~~and~~ the neck of the mass is then cut through close down to the perineum and pubis - just a steady hacking out operation. Blood vessels are ligatured as soon as seen, redundant tissues everywhere are cleared away and hydrocele if present, removed. When the haemorrhage and Lymph flow are controlled the posterior halves of the flaps are brought together by strong sutures and the anterior halves are then united over the pubis. The penis then emerges from a Y-shaped sutured area: The Testes are grafted with any healthy spare tissues on the perineum and the whole operation is made as neat as possible by removing tissue, stretching ^{here +} there, and so on.

After-dressing is important, as there is generally a large amount of oozing and a strong tendency to absorb toxic matter. We could get no oiled silk, so used sterilized young plantain and Bahana leaves which were renewed daily and answered the purpose quite well. There were covered with thick absorbent wool held in place. The small amount of skin grafting we did on this occasion was not successful, I have never seen it successful in the vicinity of Filariated skin. I cannot quote mortality statistics of this operation as I have only known of three cases and all lived for years after the operation.

ELEPHANTIASIS OF THE ARMS - Not very common and is more amenable to massage and bandaging than the legs - a simple matter of position and gravity. I have operated on a very large arm.

(a cooper) just as I have done in the leg by removing longitudinal strips of skin and subjacent tissues; the result was satisfactory and the man had a useful arm for years after.

ELEPHANTIASIS OF THE MAMMA - is somewhat rare and such cases as occur are generally hidden, I had four very interesting photos both of Mamma and Vulva but these are lost with the others. One case showed the breast a hard lobulated mass weighing 17 lbs. which stretched down to the waist and was carried in a canvas sling supported by the shoulders. I operated in one case just as one would for Scirrhus only in this operation incision had to be wider to keep clear of diseased skin; the accompanying photo shows a pair of breasts greatly enlarged but without loss of contour.

OF THE VULVA. I have only seen one case, an East Indian woman, she was wrongly diagnosed by a country dispenser as a case of Hernia and sent to town for operation. The right labium was enlarged into a mass like a melon, it had been bruised on several occasions, bore scars and was oozing Lymph fluid all the time. I removed the mass, four pounds in weight; she made a good recovery but whether it has grown back or not I cannot say. I believe that this form of the disease, whilst very rare in this part of the world, is common in West Africa.

OF THE CLITORIS - This form is still rarer, but I managed to secure a photo of a Dutch negress in which the mass weighs 4 lbs. photo accompanying. Operation in this case would be quite a simple matter but she emphatically refused to have it done as she makes her living by exhibiting herself.

OF LIMITED SKIN AREAS These cases occur but seldom and are often wrongly diagnosed as Ke loids Lipomas etc., they are not



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of much importance and can be removed but like Keloids they generally return. They frequently occur on the back of the neck, over the ribs, and in other places, I removed a large skin mass of this kind from the hip of a dispenser's wife, it weighed 11 lbs. The accompanying photo of a case some years ago was the subject of considerable controversy as the masses had been twice removed, and grown again after each removal and the diagnosis was divided between Filarial skin growth and Keloids.

CHYLOUS DROPSY OF THE TUNICA VAGINALIS is not uncommon and is diagnosed from ordinary Hydrocele by the opaqueness of the mass and the associated signs of Filaria e.g. Skin, Groin glands etc., Large numbers of m.c.f. and sometimes a few parent worms are found in the fluid.

PROPHYLAXIS - This chiefly depends on the elimination of the mosquito, and failing that on the prevention of mosquito bites by the regular use of mosquito curtains (especially for servants) and of mosquito-proof Houses. But other factors are to be considered:-

1. The keeping of the body in a fit state of health by exercise fresh air, good nourishing diet and cleanliness.
2. The elimination of Filariated servants.
3. The complete drainage of the grounds of the House and the clearing away of trees, especially the Banana, plantain, and cocoanut.
4. The careful screening of the water vats.

5. The regular flushing out and oiling of drainage trenches. In fact all the prophylaxis of Malaria. The Prophylaxis depends largely on the Country in which it is to be practiced. *See* Panama natural drainage is fairly easy and the Government used their power to the fullest, to secure their ends irrespective of

individuals and their protests. But in a place like Demerara, low-lying coast land, actually below sea level, with a dense clay soil, dependant on open trenches for drainage, rank with vegetation where the people use the trees about their houses not only for their fruit but also as necessary sunshades - "The Sanitary Officers lot is not a happy one." He has a very disheartening task and I have often discussed the matter with Dr. W. de W. Wishart, chief sanitary Officer in Demerara and an old Edinburgh student. He has not the whole hearted support of the Government, as the old Saga that an Englishman's Home is his castle, holds good even in the Colonies: A Sanitary Officer can only suggest that such and such a tree ought to be cut down - he dare not touch it without the consent of the owner. The result is that Georgetown is very much like a garden City but with millions of Filariated and Malaria infected mosquitos harboured in the shady spots and infecting the inmates of surrounding Houses. Sir Rupert Boyce tried to clear away most of these trees and failed, as he was up against public opinion; today Government House itself is so surrounded by dense foliage as to be invisible from the roads on either side. Starting this year, a large sum of money, five million dollars, is to be spent on a new sewage system combined with a modern subterranean drainage throughout the City - this, after many weary years of importunate threats and pleadings. I have every hope that this will open a new era in the health returns of the City, but anomolous as it may sound it will first of all start an epidemic of Malaria, Filaria and other ailments when large areas of the City will have to be dug up and opened out for the laying down of sewage pipes. It is well established fact in the Tropics



that wherever land is dug up and opened out there starts an epidemic of fever. This interesting fact applies to Filaria as well as Malaria infected mosquitos. Whether in dry or rainy season, the Earth is so disturbed, an epidemic fever starts. In rainy weather puddles of water form, acting as a breeding place for mosquitos, but this does not apply to dry weather and the explanation of this phenomenon is beyond me.

In this Treatise I have frankly followed Sir P. Manson. I started to learn his methods and absorb his ideas as a student in 1905, read and re-read his books so often that I practically speak it as my own language - a professional form of plagiarism, which I fear is unavoidable. The operations I learned from his book were followed as closely as circumstances would permit. His methods of nomenclature and arrangements I have also copied. Unfortunately I have not yet seen the published results of the Filariel Commission which came to Demerara two years ago, under Professor Leiper, but I do know that they went over the same ground and confirmed most of the facts mentioned in this Treatise. Individual experiments made by them tended towards differentiating the various forms of parent and Micro. Filariae found in Demerara. During his researches in Dutch Guiana, Leiper found the Bilharzia parasite, up to that time, only considered a myth, but he gave ~~his~~ no new results from his researches on Filariasis.

When I look back eighteen years to the time when I started making notes on Filariasis and collecting specimens and photos of the different stages of the disease and remember how jubilant I was when I started to get some results from Sodium Cacodylate

injections and later in 1911 from 606, I fully realise that my hopes were short-sighted and didn't make sufficient allowance for the pathology of the disease and for the fact that for people living in the Country where Filaria is endemic THERE CAN NEVER BE ANY HOPE OF PERMANENT CURE BY ANY MEANS UNLESS COMPLETE REMOVAL FROM THAT COUNTRY BE INSISTED ON. Even if some injection is discovered which will destroy the parent worms and all the m.c.f. in the Lymphatic and blood stream, yet re-infection is sure to occur and the second stage of that man will be no better than the first. The whole cure is preventative and lies in the complete elimination of the mosquito and the strict segregation of the Filariated subjects - in one word Sanitation. Much has been done towards alleviating the condition and preventing its spread in subjects already infected.

Dr. Rose, Government Bacteriologist, Demerara, uses a vaccine which has given fairly satisfactory results, the whole object of the vaccine is to annul and prevent added infection, and so keep off the Acute Lymphangitic attacks which start elephantoid growths. I have used this vaccine on many of my cases and the general results are fairly good. Lymphangitis in some cases disappeared completely in others, the attacks became less frequent, and in a few the vaccine seemed to excite new attacks. Salvarsan and Silver-Salvarsan I have injected into fifty selected cases which I kept under observation. Perhaps I am optimistic, but although I am not sure that those cases are cured, yet from the glowing reports they gave me from the abatement of symptoms and the arrest of growth, I believe that some distinct benefit was conferred. Bayer 205 is still under observation and I cannot yet make any definite

statement about it. If any of these injections can ameliorate the condition and help to check the advance of Elephantiasis they are truly worth a trial. This much I can state definitely, viz. that in many cases so treated the subjects have gone to U.S.A. and Canada and have never had another attack of Lymphangitis . A few who had Elephantiasis have written to assure me that their swellings have shown a regular definite decrease, of course, change of climate and the absence of any chance of re-infection are the potent factors. Even in the paliative treatment a practitioner daily uses in the Colony, much good can be done by a man who has faith in what he is doing, and who doesn't just hand out any kind of treatment to the sufferer just because he believes that the disease is incurable.