

LEPROSY REVIEW

The Quarterly Publication of
THE BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION.

VOL. IX. No. 3.

JULY, 1938.

Principal Contents:

Domesticating Anti-Leptic
Species in Brasil. Part I.

The International Congress of
Leprosy.

Leprosy in Southern Rhodesia.

Leprosy in South Eastern
Nigeria.

Leprosy Survey in the British
Solomon Islands, W. Pacifico

Extensive Ulceration of the
Skin in Leprosy.

Reviews.

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LEPROSY REVIEW.

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EDITOR

E. MUIR, M.D.

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The Association does not accept responsibility for views expressed by the writers. Communications may be sent to the Editor, at 131 Baker Street, London, W.1.

NOTES ON CONTRIBUTORS.

- P. H. ROLFS, B.S.C., D.S.C., is the founder and former Director of the State Agricultural College of Minas Geraes, Brasil.
- E. MUIR, M.D., C.I.E., is the General Secretary-Treasurer of the International Leprosy Association, and Medical Secretary of the British Empire Leprosy Relief Association.
- B. MOISER, M.D. (LOND.), M.R.C.S., L.R.C.P., D.P.H., is the Leprosy Specialist for S. Rhodesia, and is in charge of the Ngomahuru Leprosy Hospital.
- T. F. DAVEY, M.S.C., M.B., CH.B., is the Medical Superintendent of the Leper Colony at Uzuakoli, S. Nigeria.
- J. ROSS INNES, M.B., CH.B. (EDIN.), was until recently Medical Officer in charge of the N.M. Wadia Hospital, Poona, India.
- J. LOWE, M.D., is the Director of the Leprosy Research Department at the School of Tropical Medicine, Calcutta.
- S. N. CHATTERJI, M.B., D.T.M., is Assistant Research Worker at the School of Tropical Medicine, Calcutta.

Editorial

In this issue we publish a short account of the International Congress of Leprosy, held in Cairo in the end of March. We hope to include the findings of the Congress in the October number.

* * *

Dr. Davey's paper on Leprosy in S.E. Nigeria raises many matters of interest and importance. One outstanding feature of the picture he draws is the definite attempt on the part of the villagers to limit the leprosy incidence by segregating their more infectious cases. The other is the more or less hopeless condition of these poor people without outside advice and help. Apart from an educative campaign, and, to begin with, European supervision, such attempts seem to have but little chance of succeeding. Yet the will to control the disease is there, along with some sort of idea of how it should be done. It is by encouraging and guiding such existing customs that final success is most likely to be gained.

* * *

Attention is directed to Dr. Ross Innes's report on his survey in the Solomon Islands. This is a difficult piece of work well done, and there are many items which will interest our readers.

* * *

The article by Drs. Lowe and Chatterji describes what has been named *lazarine leprosy*. Their two cases are of very similar nature to those described by Dr. J. M. M. Fernandez (see page 136). It is important to distinguish clearly between this acute "tuberculoid" reaction and the other condition commonly known as "lepra reaction." In the former the bacilli are far fewer in number; febrile symptoms are less and the health of the patient is generally much less impaired; the typical tuberculoid histological picture is found and the prognosis is usually considerably better.

Domesticating Anti-Leptic Species in Brasil

P. H. ROLFS AND C. ROLFS.

The domestication of anti-leptic species in Brasil has progressed very favourably and given data that we believe will be helpful to those who contemplate the propagation of these, and allied species.

The project is one for the horticultural scientist to solve. He has the training and experience, also the necessary equipment, land and technical assistants. The medical man cannot afford to absent himself from his patients to direct such field investigations. The chemist has quite a generous problem in the preparation and rectification of remedial products without diverting his attention to the domestication and propagation of plants. However, without the generous co-operation of the medical man and chemists, this, as a horticultural project, would have been engaged in combating leprosy should be especially grateful to Dr. H. I. Cole, of the International Leprosy Center, Rio de Janeiro, for his patient and exhaustive work on the Sapucainha. It was at his kindly urging that this paper has been prepared.

We hope that a sufficient number of illustrative photographs have been presented to make the discussion clear; all of them were taken by the senior author and most of them especially for this article.

This brief paper has been limited to results and data obtained from the three species—the Sapucainha (*Carpotroche brasiliensis*, Endl.); the Chaulmoogra (*Tarakotenus Kursii*, King) and the Gorli (*Oncoba echinata*, Olv.).

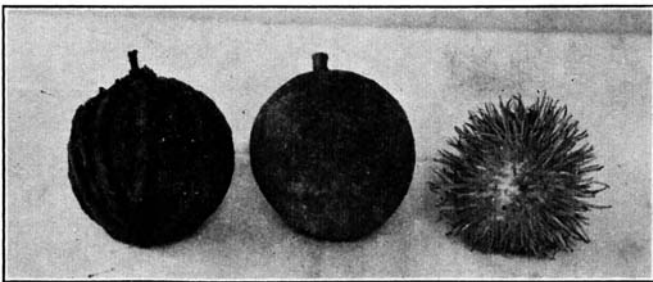


FIG. 1. Fruits, medium size, freshly gathered. At left, Sapucainha, bud from E.S.A.V. No. 1. Wt. 270 gms.; No. of seeds, 67; Wt. of seeds, 37 gms. Middle, Chaulmoogra, Tree A :1, Diameter, 7 cms.; Wt. 290 gms.; No. of seed, 21; Wt. of seed, 56 gms. Fruit mottled with lichens. At right, Gorli, bush 0:14. Wt. 70 gms.; No. of seeds, 141; Wt. of seed, 10 gms.

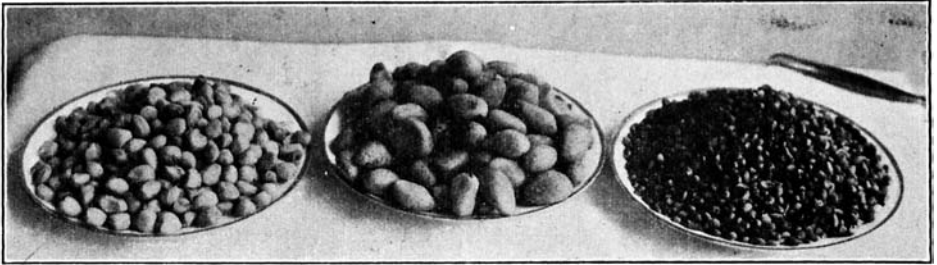


FIG. 2. Airdried Seed; 1937 Crop. At left, Sapucainha; Wt. 250 gms.; Vol. 546 cc.; No. of seeds, 462. Middle, Chaulmoogra, Wt. 250 gms.; Volume, 675 cc.; No. of seeds, 94. At right, Gorli, Wt. 250 gms.; Volume 430 cc.; No. of seeds, $3500 \pm$ (40 gms. counted 557.).

THE SAPUCAINHA.

The Sapucainha, *Carpotroche spp.*, is found natively in Brasil from the Federal District to the upper reaches of the Amazon and beyond the Brazilian border. Chemical analyses had shown that the family Flacourtiaceæ contained eight species with a varying per cent. of an oil analogous to Chaulmoogra oil. (1) The genus *Carpotroche* contained three species: *C. brasiliensis*, Endl., *C. longifolia*, Benth. and *C. integrifolia*, Kuhlman.

The species *Carpotroche brasiliensis*, Endl., includes many variants: aspect and size of fruit; variation in size of bloom; variation in size of seed; variation in leaves; type of growth of the trees; each so divergent that the extremes might be regarded as different species. Before taking up the problem of domestication seriously, it was of great importance that we should know definitely that the individual tr

oil content. Fortunately Dr. G. S. Jamieson of the Laboratory of Oils, Waxes and Fats of the United States Department of Agriculture, was interested in the same problem from a chemist's point of view. His generous co-operation greatly facilitated the selection of the parent trees with which to initiate the horticultural investigations. Being monoecious-dioecious (see Fig. 3), the group is constantly subjected to cross breeding. Under native conditions, the trees bearing staminate flow

bearing monoclinal ones. Dr. J. Geraldo Kuhlmann found the proportion to be about sixt ((1) p. 412.)

Ynez Mexia of Berkeley, California, found them more or less ten to one. Our counts in the native habitat gave similar proportion. In our orchards, seedlings from E.S.A.V. Tree

The numbers in parenthesis refer to those in Literature at close.

No. 1 and E.S.A.V. Tree No. 2, averaged four staminate trees to three monoclinal ones. The great preponderance of staminate trees in the forests may be due to poachers cutting the bearing trees to gather the fruit.

Field observations suggest that the species is self sterile or is not generally self fecundated. Such a situation is encountered in the avocado. Similarly some varieties of apples need to be cross pollinated to bear an abundant crop.



FIG. 3. Sapucainha Flower. Staminate; Tree B:53; 5 cms. diameter; $50 \pm$ stamens; flowers occur in profusion for several weeks. Growth buds visible above penduncles.

In other words, the presence of pollen bearing stamens in a monoclinal flower is not complete evidence that it is self fertile.

WHY DOMESTICATE THE SAPUCAINHA?

The native supply of seed is adequate for the present. Already there is a diminishing return. Seed hunters for the most part are poachers. Finding a fruiting tree cut it down to gather the crop. (Very much like the pecan hunters on the lower Mississippi some seventy years ago.) While we were scouting for productive trees, it was necessary for us to gain the confidence of the owner that we would not abuse our privilege. The following incident illustrates

the effect of poaching. On one property, said to contain over three thousand Sapucainha trees, our scout found only sixteen fruiting ones from which he gathered less than sixty kilos of fruit. Yielding about four kilos of seed. Average, 500 gms. per fruiting tree.

Numerous incidents come to mind where the product from domesticated plants has quite displaced that from the native source. The vast and what was heralded as inexhaustible rubber supply of the Congo and Amazon have been overshadowed by the orchards planted in the Orient. Andean cinchona planted in Java is now the world's reliance for quinine.

The Project. The following is a brief outline of the task before us, for domesticating the Sapucainha: (1) Locate highly productive trees (see Fig. 5). This required persistence and patience (lots of the latter). (2) Ascertain the oil content of the seed from all of the leading trees. Dr. Jamieson's co-operation was splendidly helpful. (3) Discover some convenient method of a sexual reproduction. The "T" method (discussed later) did this—a most agreeable surprise. (4) Precocious or not precocious? Productive trees growing spontaneously gave evidence of being decades to a half a century old. Results—another agreeable surprise.

PRECOCITY OF CULTIVATED TREES. (3) and (4).

In February and March (late summer), 1927, we removed all seedlings more than twenty centimeters tall from the seedbed and planted them directly to an orchard. In November, 1929, Tree B:100, only thirty-three months from the seedbed, matured nine fruits, yielding 532 seeds. A native tree about forty years old and reputed to be very productive,

most productive seedling trees in our orchards have fruited so heavily that they would have succumbed to their environment but for cultural attention. Many budded individuals and some of the seedling trees in the College orchards, produced more fruit at five and six years old, than did the entire wild orchard of "three thousand trees" in the forest referred to in another place.

Some of the buds produced bloom the year after being inserted. The second year some fruit were allowed to remain on the most vigorous. The following year some trees were so heavily loaded that the limbs had to be propped to keep them from breaking.



FIG. 4. Budded Orchard Tree. Bud from E.S.A.V. No. 1 inserted on seedling from E.S.A.V. No. 2, by Prof. Guimaraes Duque; Bud approximately 5 yrs. old. Producing two kilos seed. Over cropping caused shedding of leaves. Photo Aug. 9, 1937, near end of dry season. Compare with Fig. 1 and Fig 5.

PROPAGATION.

In its native element the Sapucainha exists as an undergrowth in the forests. Occasionally bearing trees are encountered growing near cabins and residences. The oil being employed as a remedy for skin diseases and to destroy vermin attacking man and domestic animals.

In 1924, when the writers undertook this project they were under no illusions that it would be speedily successful. The senior writer, during thirty years (1891-1920), had materially aided in the domestication of the pecan nut. He was the first to publish on the bud propagation of the avocado. (Bul. 104, B.P.I., U.S. Department of Agriculture, 1904.) These experiences were invaluable as guides in

domesticating the Sapucainha. There was no published information on its propagation. The verbal teaching was verbose. No matter. Ideas, apparently good, had to be tried. C. F. Kettering has said: "In research you need a lot of intelligent ignorance." The tales that seeds retained their viability for more than a year; even years, and that they germinated spontaneously when sown were very interesting, but had one serious defect—they were not true. Details of the many unsuccessful leads would be neither interesting to the writers nor profitable to the reader.

In this brief discussion only an outline of the operations that proved highly successful are presented. The story is simplicity itself; after it has been worked out.

THE NURSERY.

Our first attempt at establishing a nursery was by transplanting small trees from the forests. It ended in failure. (Please pardon this inadvertence, we promised to avoid recounting false leads.) This experience made us timid in transplanting either from the seedbed or from the nursery. Later we discovered that the Sapucainha transplants as readily as does citrus under similar conditions; more readily than do avocados.

Incompatibility of stock and scion are often encountered. The investigator must bear this in mind. By using buds from E.S.A.V. No. 1 and inserting them on seedlings from the same tree we were reasonably certain of an affinity. Not necessarily the most congenial. Later on we discovered that buds from this tree took quite readily on seedlings from E.S.A.V. No. 2, though the two mother trees differ markedly from one another. Future investigators may find another species of *Carpotroche* or even another genus of the *Placourtiaceæ*, more desirable as a bud stock. (Certain varieties of citrus do best when inserted on a stock belonging to another genus.)

Seedbed. After ripening of the fruit and before germination of the seed, there is a resting period. During this time the power of germination is easily lost. Our favourite preservative is well rotted, humid bagasse. Moist sphagnum or powdered charcoal are doubtless equally good. Some three months after ripening, the radicle and cotyledons of the seed about to germinate show signs of development. Under commercial conditions, seeds appear to lose their germinating quality readily. In 1926 we acquired some twenty kilos, not a seed of which germinated; it was said to be fresh. After that we used seed from fruits we gathered.

The Nursery Row. When the seedlings are twenty to thirty centimeters tall they may be transplanted to the nursery row. Set a half to three-quarters of a meter apart; and rows a meter apart are good distances. Provide a half shade and protect against dry winds until sturdy growth has been made.

Budding. The "T" method is the simplest and very successful. One of our budders had an instance of 90% take. The bark of the stock should slip perfectly. The stock at the point of insertion should be two to three centimeters in diameter. The bark chestnut coloured. Being hollow ("canudo de pito," "pipe stem" in popular vernacular), the smaller stocks are unnecessarily troublesome; the stocks whose bark has turned grey at point of insertion gave a low percentage of "takes." (The "patch" bud may prove suitable for such stock.) (Seedlings propagated in pot or basket rarely take a "T" bud. They may respond to inarching or to grafting.)

Budding the Sapucainha is easy provided the stock is in optimum condition and one has experienced men to do the budding. Fortunately we had scores of young men trained by having budded thousands of citrus. We chose three of the most proficient for our first test. These were constantly under the eyes of the senior writer and of Humberto Bruno, Professor of Pomology.

Wrap the buds in waxed tape, leave well sealed for a month, if you can restrain yourself that long; examine, and those whose "eyes" have begun to fill, may be unwrapped. Two weeks later examine the resealed buds; some "lean" for three months or even more and finally "spring."

Cut off the stock a handsbreadth or two above the bud, retain leaves above the bud if convenient. Remove all leaves below the bud.

Bud Sticks fifty centimeters long were cut from E.S.A.V. Tree No. 1, while in dormant condition. Those with grey bark and those of less than a half centimeter diameter were rejected.

ORCHARD.

The site chosen should be such as is employed for a citrus or an avocado orchard. Deep soil; well drained but not droughty. Sapucainha, especially the bearing trees, are sensitive to droughty soil than are citrus or avocados. If a drying out of the soil occurs when the fruit is small, heavy

casting will occur. If after the seeds have become "meaty," heavy defoliation. (See Fig. 4.) Either may be readily obviated by shallow cultivation (dust mulch) or by mulching with vegetable matter. (Unfavourable moisture condition of the soil often causes heavy casting of young citrus and avocado fruits.)

If set out in a single row, four to five meters apart will be a good distance. One staminate tree to four monoclinal ones is a good proportion. If set out in a solid block, the ratio may be one to eight; i.e., trees 2, 5, 8, etc., in rows 2, 5, 8, etc., may be staminate. Staminate trees need to be pruned back to prevent them from dwarfing the fruiting ones.

Cold. On July 6, 1928, the "Posto Meterologico" on the College grounds recorded four-tenths of a degree below zero (Centigrade). Considerable defoliation followed and slight bark injury near the ground, to a small number of the seedlings. On the older trees, no casting of leaves or bark injury could be detected. The same frost "scorched" the terminals in our citrus nursery. The Sapucainha and lemons appear to be about equally sensitive to cold. (For data on climate at Viçosa, see Chaulmoogra.)

PRODUCTIVENESS.

The E.S.A.V. Tree No. 1 carries the record for productivity. In 1929 it matured 798 fruits (see Fig. 5), weighing 191 kilos; yielding 28 kilos of air-dried seed; the largest fruits weighing slightly over a kilo and the smallest sixty grams. Thus the seed yield was about six per cent. by weight of the mature fruit. The estimated oil eleven and a half kilos. In general the ratio of seed to fruit is higher in the large fruits than in the small ones; also in the spherical fruits than in the oblong and pear-shaped. However, the thickness and weight of shell varies considerably with the different wild trees.

Longevity. In 1926, Cel. Alberto Pacheco of Viçosa, catching our enthusiasm, donated Tree No. 1 to the College. We estimated it to be about fifty years old. Some fifteen or twenty years previously, the tree had been felled by poachers. Later two of the "sprouts" had been felled. After the tree came into our possession, encroaching forest trees and brush were removed. Being careful to conserve staminate trees growing in the brush, of which there were a score or more, within some 25 meters. No other cultural care was given.

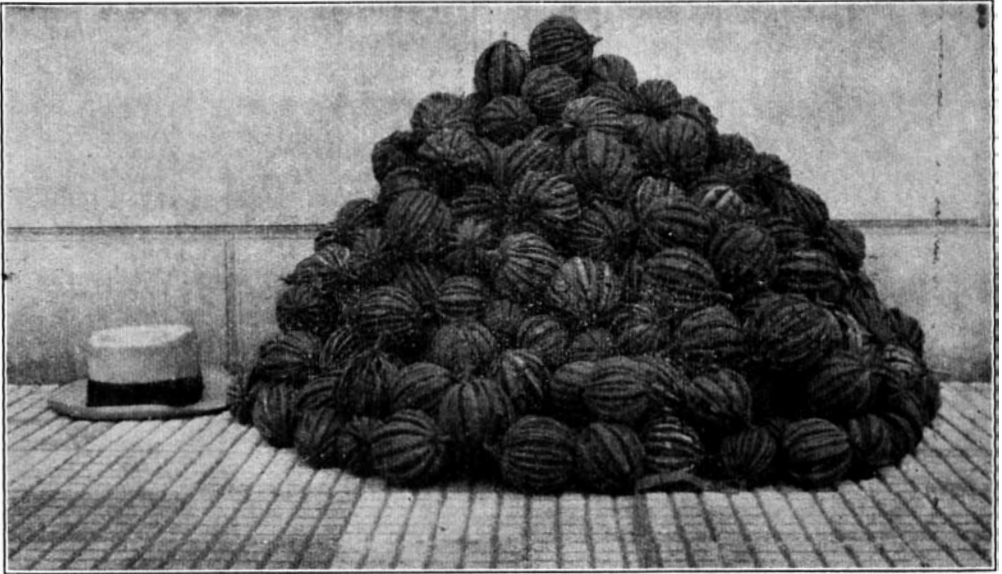


FIG. 5. The 1929 Crop from E.S.A.V. Tree No. 1. Appears to be record crop. Tree about sixty years old; twice cut down; estimated oil content, eleven and a half kilos. Largest fruit over 10 cms. long; wt. over a kilo. Budded trees began cropping at three years old. Requires 9 to 10 months from flowering to dropping of fruit.

RESUME.

1. By diligent search and perseverance, productive and otherwise suitable mother trees were discovered.

2. The seedbed is the despair of the amateur.

3. The nursery is the key to success in Sapucainha domestication.

4. The Sapucainha is more precocious than Citrus.

5. Many buds six years old produced two kilos of seed in 1937, in spite of having been stunted by being allowed to over-crop during previous years.

6. Only occasional seedlings seven years from the seedbed were equally productive.

7. Longevity is assured; the mother tree of stock and of our buds (E.S.A.V. No. 1) is now some sixty or seventy years old.

CHAULMOOGRA.

(TARAKTOGENUS KURZII, KING.)

During the International Centennial Exposition at Rio de Janeiro, in 1922, there was an exhibit of anti-lepric plants. Toward the close of the Exposition our good friend, Dr. Frank Lamson-Scribner, sent us a small shipment of those plants that were still alive. (A Centennial Exposition is not an ideal place for conserving the vitality of tender forest seedlings.) One specimen, labelled Chaulmoogra, S.P.I. No. 52,514, arrived alive and was planted Jan. 4, 1923. After some six months of industrious attention, it showed manifestations of growth. We called it the Centennial Tree.

Probably the oldest living *Chaulmoogra* in South America. Photographs illustrating the vigorous growth of this specimen in 1924 aided us materially in securing additional seedlings. In 1925, during a visit to Washington, Dr. K. A. Ryerson, in charge of Plant Introduction and Distribution, U.S. Department of Agriculture, promised us all the seedlings remaining in the greenhouses.

From Dr. Rock's discussion of the native habitat of the *Chaulmoogra* in Burma (see *Nat. Geo. Magazine*, Mar., 1922), we felt certain that in the highlands of Minas Geraes, a congenial location could be discovered. The climate and altitude of Viçosa seem to correspond closely to that of the native habitat. The altitude is 650 meters. For the ten year period of 1925-34 the extreme variations of temperature were from eight-tenths of a degree below zero Centigrade to 35 degrees above. The rainfall for the same period averaged one thousand three hundred and seventy millimeters (nearly 55 inches), occurring mainly during the five summer months (November to March). An average of 132 rainy days per year were recorded.

March 29, 1925, we received ninety-three seedlings labelled *Chaulmoogra*, S.P.I. No. 56,633. They averaged forty centimeters high. Illustrated in "A Lavoura." Nine of the larger were forwarded to Dr. Felisberto Camargo, Director of the National Experiment Station at Deodoro, Federal District. The remaining eighty-four were set out in a nursery to attain robustness and size suitable for planting in an orchard. In April, 1926, some seventy-eight were set out. A half dozen were rejected as being too weak.

THE ORCHARD.

November 1, 1937, forty-two of the original eighty-four seedlings were three meters or more tall; nine less than two meters, but looking healthy. Thirty-three, including those rejected in the nursery, had died from other causes than neglect, attacks by insects or visible disease. Thirty-seven of them robust to very vigorous; i.e., over forty per cent.—an excellent showing. (In citrus only about twenty-five per cent. of the seedbed seedlings are expected to make acceptable orchard trees. Citrus has been domesticated for hundreds

Staminate Trees. The proportion of staminate trees is uncertain. Owing to the relatively small number of trees in the orchard, the data would not compensate for the labour involved. Unchecked trees would have to be visited almost

daily for about ninety days. Staminate flowers are ephemeral; opening in the early morning and are likely to be shed the next. There is a great variation in the number of flowers produced. In 1937, Trees III :4 and A :17 each produced twenty times as many as did Tree IV :3. The latter is the most stately tree in the orchard, pyramidal, six meters tall and six meters of spread, but produced relatively few flowers. (A veritable dressed up p dandy ; useful only as a show specimen.)

(To be continued.)

The International Congress of Leprosy

E. MUIR.

The Congress held in Cairo from the 21st till the 27th of March was in many ways unique. It is 15 years since the last International Conference ; and this is the first time that the Governments of all countries that are concerned in any way with leprosy have been invited by the country acting as host to send official delegates. These invitations met with a most satisfactory response, no fewer than fifty countries being officially represented.

In August, 1935, a meeting of the Council of the International Leprosy Association was called in London. Only four members were able to attend, and as one of these, Dr. Wade, was in the hands of the surgeon, the meetings were held in his room in a nursing home. Another of those who attended had to leave before the end to undergo an operation. In spite of these initial difficulties it was agreed that the time was becoming ripe for an international meeting of leprologists, and 1938 was provisionally fixed for the event, Egypt being suggested as the *venue*. Subsequent correspondence with the other members of Council confirmed this decision and the Government of Egypt responded generously, not only giving their hospitality, but offering to organise the Congress under the patronage of H.M. King Farouk.

A strong Committee was formed with the Minister of Public Health as President, and Prof. Khalil Bey as Secretary, ably assisted by Dr. Dalgamouni. This Committee made all arrangements for conducting the Congress. It also made lavish provision for social entertainments and for visits to scientific institutions and places of general and scientific interest.

The scientific side was fittingly delegated to a committee composed of the Council and officials of the International Leprosy Association.

Another unique feature of the Cairo Congress was the method of its deliberations. At the previous international conferences papers had been read and discussed in full session. It was realised that, valuable as such a method of presentation and discussion of the problems of leprosy may be, real advance towards agreement can only be attained by small carefully selected groups meeting together and thrashing out the points at issue. This method had been used with signal success at the representative conference held in the Philippines in 1931, under the auspices of the American Leprosy Foundation.

With this in view four sub-committees were appointed, their respective subjects being: classification, treatment, epidemiology and control, and *in vitro* cultivation of *M. lepræ*. Care was taken to see that on each committee opposing viewpoints should be represented. The objects in view were, (a) to reach as far as possible agreement on matters in dispute; and (b) failing agreement, to formulate common methods of procedure along which all could work, and common methods of record which would make it possible to compare results obtained in different places. In spite of the shortness of time available satisfactory progress was made, and the lines have been clarified along which concerted action should be taken in the next five years, at the end of which time it is proposed to hold the next Congress. Resolutions based upon the reports of the first three sub-committees were put forward by the Resolutions sub-committee and adopted by the Congress. Arrangements have been made for the immediate publication of these resolutions, and they will appear later, along with the papers read at the Congress and the discussions, in a publication which will be issued by the Government of Egypt.

The papers read at the Congress were divided into six sections, one whole session being devoted to each. These sections comprised: A. Geographical Distribution and Epidemiology; B. Clinical Types and Classification; C. Research, including Cultivation and Inoculation of the Leprosy Organism; D. Treatment; E. Methods of Control; F. Miscellaneous, including Rat and Buffalo Leprosy.

Among the many aspects of interest and importance raised, a few may be mentioned which attracted particular attention.

Perhaps the most outstanding of these was the much

discussed difference between the two main types of leprosy. In this connection it may be mentioned that the term "cutaneous," as applied to one of these types, has been definitely abandoned in favour of the term "lepromatous." There is general agreement that the lepromatous type of lesion differs widely from the neural, and especially from the tuberculoid. This difference extends to all aspects of leprosy. The clinical and histological pictures are distinct; the prognosis is much more favourable in the tuberculoid; the lines of treatment differ in the two types, as do also the methods of control. The tuberculoid type of lesion, at first supposed to be confined to one or two countries, is now recognised to have a much wider distribution; it may, in fact, be the commonest type.

Under *treatment*, the primary importance of general physical improvement was again emphasised. It is recognised that the principal predisposing causes may vary in different places, also that the disease may take on a more severe form and be less amenable to treatment than in others, though whether this is due to psychological, sociological or economic differences is not yet clearly determined.

The oils of the various chaulmoogra or hydnocarpus species still hold first place under special treatment. Reports were given from various centres where better results had been obtained with larger doses of the oil or esters, as much as 20 c.c. or more being given subcutaneously per week. These larger doses are now made possible by the pure nature of the oil prepared from carefully selected seeds.

French workers reported promising results with a new preparation in the form of a combination of Chaulmoogra and Cholestrol which, in the form of a fine emulsion, is given intravenously.

One of the most important aspects of leprosy centred round methods of conducting leprosy surveys and recording results. The findings of the sub-committee on *epidemiology* which dealt with this subject, should be of distinct value, and should gradually produce in coming years a harvest in the form of comparable reports from widely varying endemic countries. It may then become possible to determine whether leprosy is increasing or diminishing in any area surveyed, and what are the principal factors governing incidence.

Much interest was called forth by a paper read by Dr. Soule on *in vitro* culture of *M. Lepræ*. He has now succeeded in carrying on a slow-growing culture through 60 series of subcultures. Controls with heated lepromatous

material produced scanty numbers of organisms by "carry over" only to six subcultures. Ordinary media are used, but the results are apparently due to the carefully regulated pressure of oxygen and carbon dioxide under which the cultures are kept. Unfortunately other experienced workers who have used Soule's methods have so far failed to confirm his results.

Dr. Adler's paper on inoculation of splenectomised Syrian hamsters with *M. lepræ*, and the microscopic slides he demonstrated, roused much interest. There seems little doubt that human leprosy has been transmitted successfully to these animals and that the bacilli have multiplied considerably. It is still too soon to know whether progressive disease will result and whether the infection can be transmitted through successive series of animals. So far human leprosy has proved refractive to animal inoculation; and if human leprosy can be developed in Syrian hamsters we may be able to gain light on some of the more obscure aspects of Hansen's bacillus, and it may be possible to test out more satisfactorily the effects of chemotherapy.

The Cairo Congress was the occasion of the first General Meeting of the International Leprosy Association. As many of our readers are aware, the formation of this Association was one of the important outcomes of the leprosy conference held in the Philippines in 1931. It includes in its membership leading leprologists throughout the world, and has done much by means of its quarterly journal to co-ordinate effort in all countries where leprosy is a disease of importance. The publication of this first class journal is rendered possible through the generosity of the American Leprosy Foundation. The office bearers and Councillors of the International Leprosy Association are elected at five yearly intervals, and the following are those now in office:—

President : Dr. E. Marchoux.

Vice-Presidents : Western Section—Dr. P. Balina.
Eastern Section—Dr. J. Lowe.

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The Congress provided an opportunity—and this was perhaps after all its most valuable aspect—for lonely workers scattered all over the world to meet together face to face with their colleagues in other countries. We had read with interest the publications of many of these colleagues, and had agreed or disagreed with their findings. But at these meetings the dry bones of scientific discussion became clothed with flesh and blood. Friendships were formed which will make future discussions more human. In their arduous and often disappointing labours isolated workers will look back to those strenuous days of fellowship at the Cairo Congress.

An invitation has been received and accepted to hold the next International Congress in Paris in 1943. This is particularly appropriate as the new President of the International Leprosy Association is Prof. Marchoux, of the Pasteur Institute, the well-known authority on leprosy. While some agreements have been reached at Cairo, much more important is the co-ordinated effort which has been set in motion, and which should make it possible, after the next five years, to record steady progress.

Leprosy in Southern Rhodesia

Report of Ngomahuru Leprosy Hospital for 1937.

B. MUISER.

There are now 4 institutions in Southern Rhodesia, where lepers are segregated and treated, namely:—Ngomahuru, near Fort Victoria, Mtemwa near Mtoko, Mnene Mission near Belingwe, and Mount Selinda Mission, near the Eastern border.

The following table gives the numbers treated, and results:—

	On Register 1/1/37	Admitted	Discharged or Died	On Register 31/12/37	Total Cases Treated
Ngomahuru ...	407 (515)	179 (85)	128 (196)	458 (407)	586 (600)
Mtemwa ...	283 (326)	141 (341)	140 (384)	284 (283)	424 (667)
Mnene Mission ...	38 (42)	10 (6)	8 (10)	40 (38)	48 (48)
Mt. Selinda Mission	5 (not available)	3 —	1 —	7 —	8 —
	733 (833)	333 (432)	277 (590)	789 (728)	1066 (1315)

Figures in brackets are for 1936, for comparison.

At Mnene, the patients have been moved to a new site, some distance from the General Hospital, with very satisfactory results. At Mount Selinda, a small compound has been erected in an isolated position, and treatment carried out under supervision of the nursing sister, who paid a visit to Ngomahuru in order to become acquainted with the methods.

The following specific preparations have been in use: Moogrol (B.W. & Co.), Alepol, Bayer's Jantol and Jantol Forte, the last of which contains 10% of Iodine. Of these, Moogrol has been used to the largest extent, and has given very good results.

Messrs. Bayer Pharma Ltd. have supplied their newest preparations free of charge to Ngomahuru, and continue to do so. In return, they receive reports of results, which have been most satisfactory. Jantol Forte has now been taken out of the market, but sufficient has been supplied to carry on treatment of one Dutch woman, an N1 C2 case, who is making remarkable progress with intramuscular injections.

Some leprologists assert that no form of specific treatment is of any use, and that general hygiene alone produces as good results, but this has certainly not been borne

out in Southern Rhodesia. At Ngomahuru every case who was not receiving specific treatment became steadily worse, and has shown improvement from the time that treatment with Moogrol was begun. There are now no longer any of these "controls" left. This experience proves, to my mind, that treatment with derivatives of the Chaulmoogric series is of great benefit. General hygiene is also of much importance, good food, including fresh vegetables and milk, regular exercises, and recreation are all given attention.

Leprosy is regarded by some as a "deficiency disease," with this in view, Bayer's have brought out a new preparation "Betaxin," a biologically standardised Vitamin B1, a large quantity of which they have lately supplied to me free of charge, but it is yet too early to report on results.

The results of treatment with Moogrol at Ngomahuru is shown by the following record total of 581 patients who received regular treatment:—

- 98 became arrested and were discharged.
- 363 improved, some considerably.
- 53 stationary.
- 42 became worse.
- 25 died.

The number of patients who seek admission voluntarily continues to increase, but we are still dependent upon the activities of the Native Commissioners for the majority of patients. The Native Commissioner of Wankie must be particularly mentioned. He has sent 32 cases during the year, and hopes to be in a position shortly to assert that he has not a single leper left in his district. I wish to afford praise for this noteworthy attitude. If this system is actively carried out in all districts, this country will soon be free of leprosy, provided that immigrants can also be controlled, a matter of great importance.

The great majority of patients come from native reserves, very few from the industrial centres, mines, railways, etc., so that one must look at the habits of the natives in the reserves to ascertain the cause of spread of leprosy. One very important factor has come to light, namely, beer drinks. Beer drinks are a national institution in this part of the world. They take place very frequently. They do not only afford means of close contact, but lepers almost always drink from the same vessels as the general community. It is rare to elicit a history that lepers are treated in any other manner than that of communal guests.

I am definitely of opinion that beer drinks are the main factor in the spread of leprosy in this country, and steps should be taken to bring this matter to the notice of the natives in the reserves. I believe that every infectious leper is known to the community, and if these people were refused admission to the beer drinking parties, we should have at once put a stop to the main spread of infection. Lepers must be told by their Chiefs that they must go to a leprosy hospital, where they will in all probability be cured and allowed to return to their homes in due course. Beer drinks are not prohibited at the leprosy hospitals, but they are controlled.

During the year two applications were received for admission to Ngomahuru of European patients from other countries, and it was with the greatest regret that these had to be refused on account of lack of accommodation.

Now, Southern Rhodesia enjoys a very fine climate, and leprosy is a mild disease here, as compared with many other countries. These facts indicate that Ngomahuru is a most suitable place in which to establish a "British Empire Leprosarium."

The proposal is as follows:—Immigration law against admission of lepers to be altered to allow of European patients being admitted to Ngomahuru; the Government of Southern Rhodesia to build a few detached houses, patients, or responsible Governments, to pay rent, and small fees to Treasury for treatment; patients to be brought by air, and to be landed within the grounds, to overcome the difficulty of transport by sea and rail, should that arise.

At Ngomahuru we have about 8,400 acres enclosed in a fence, with excellent sites for many detached houses, a good water supply, gardens of utility as well as beauty, and many forms of recreation, riding, fishing, shooting, tennis, golf, etc., and moreover we can give European patients regular employment, and whatever treatment is required, with the addition of supply of electricity.

It is difficult to imagine a more suitable place for European patients, or one where they have better prospects of recovery and return to their homes. Patients in England do very badly, for the climate is unsuitable, and probably 8 or 10 of them could be flown here as soon as accommodation is available. A separate treatment centre would be required, and one or more nursing Sisters added to the staff, but I do not propose that a large hospital should be erected.

The scheme would involve an initial capital outlay of a few thousand pounds, but this would be productive of

income, and the reputation of Southern Rhodesia as healthy country would be enhanced considerably.

We received many valuable gifts during the year from various private individuals and companies, to all of whom our warm thanks have been extended and are gratefully repeated. I would like to say that charity is particularly acceptable at leprosy hospitals.

Leprosy in South Eastern Nigeria

Report on a Survey at Etiti Ama, Nkporo, Bende Division, Owerri Province.

T. F. DAVEY.

INTRODUCTION.

Etiti Ama is one of a group of eight villages which together comprise the town of Nkporo in the Bende Division, Owerri Province, Southern Nigeria. Situated in hilly country at a height of about 400 feet, the village lies at the northerly edge of the belt of tropical forest which extends across Nigeria. Here and there are areas of grassland, which become general a few miles further north.

The village is in Ibo country, in the midst of an area where leprosy is known to be rife, but where no accurate statistics have yet been obtained. From the standpoint of leprosy work it is of peculiar interest in that for more than 10 years the people have of their own accord adopted a system of segregation for the lepers of the village and have co-operated with a neighbouring village in building a leper village about half a mile from the parent villages, to which lepers are sent when recognised.

LOCAL CONDITIONS.

The village is as yet little touched by civilization as it is four miles from the nearest road. The compound is the unit of the social life of the people. It consists of a roughly circular area of ground around which houses are built, the majority of them small, dark, unventilated, unhygienic. Their back walls constitute a wall around the compound, while any openings remaining are closed by means of a stockade. Access to the compound is by means of a single narrow entrance. A

village consists of a group of such compounds, their entrances converging on a central open space or playground, where the village council house is usually constructed. Etiti Ama is a large village with 25 compounds, and contains several playgrounds and council houses.

The village is occasionally visited by a sanitary inspector, and is kept moderately clean. There is a great deal of overcrowding, however, and the sanitary conditions are most primitive, the water supply being of doubtful purity, latrines are of the open, untrenched type, while the rubbish is deposited without system.

The diet of the people is largely vegetarian, and consists of yams, cocoyams, cassava and its derivatives, various other vegetables, palm oil, stockfish, with an occasional goat or antelope. Fresh fish is unobtainable.

Cases of cassava poisoning are not rare in the area. Yaws, malaria, and helminth infections are extremely common.

THE LEPROSY SURVEY.

The complete co-operation of the people is the first essential of successful survey work. Unless elders are willing for all members of their families to be examined, and the examination of each person be thorough, the value of the survey is vitiated. The interest of the people of Etiti Ama in leprosy and their eagerness for the segregation of their lepers suggested this village as a good centre for a thorough survey, as not only could the incidence of leprosy be discovered, but the value of the method of segregation adopted by the people could be estimated. This report follows a survey undertaken by a group of workers from the Uzuakoli Leper Colony, including the Medical Officer, a clinical assistant, an experienced laboratory attendant, and others.

A preliminary visit was first made to both Etiti Ama and the leper village when local conditions were observed, and the suggestion of a survey was made to the elders, this meeting with their unanimous approval.

The second visit was a prolonged one, and was made a fortnight later. A meeting of the representatives of each family was first called when the method of survey was carefully explained, questions were answered, and the importance of seeing every member of the community was stressed.

When the people were ready, all the compounds of the village were visited in turn. In each case the men and boys were seen together in one part of the compound, the women and girls in another part. When coming for examination the men were either completely stripped or wore a minimal

loin-cloth. The women wore a cloth drawn between the legs and tied round the waist. As they came for examination, a census of the people was made by one observer who recorded the age group of each person, reckoned in decades, and noted the names of any absentees. The actual examination was made by two, sometimes three, trained observers simultaneously, and it was almost impossible for any lesion to remain undetected. The names were taken of all persons having lesions which could possibly be produced by leprosy, and when all the people had been seen, all these people were thoroughly examined, both clinically and bacteriologically.

THE TESTING OF SENSORY LOSS.

Nigerian practice has convinced me of the value of testing for the loss of thermal sensation in establishing a diagnosis of neural leprosy. In the majority of cases this is the first type of sensation to be impaired, analgesia and loss of the sensation of light touch following later in that order. The test is easily carried out, two test tubes, one containing warm water and the other cold, being required, and even primitive people have no difficulty in differentiating between the touch of the two tubes.

All three types of sensation were tested in this survey, but a number of early neural cases were found in which, while there was no analgesia and no loss of sensation of light touch, there was definite impairment of the sensation of hot and cold. In two cases the perception of cold was alone lost, the patient distinguishing the hot tube with accuracy.

In a few cases, a decision had to be reserved, and the names of these people were put on the observation list. On subsequent visits to the village absentees were seen, and some cases were re-examined.

In the leper village, every person was examined clinically and tested bacteriologically.

POPULATION OF ETITI AMA.

The population of the village is given in Table 1, the people being subdivided into age groups. The co-operation of the people was such that 99% of them were seen.

TABLE I.

		POPULATION OF ETITI AMA.								
Age	0-5	5-10	10-15	15-20	20-30	30-40	40-50	50-60	60 plus	Total
Male	230	104	62	35	44	85	108	40	13	721
Female	270	139	62	56	144	204	102	38	26	1041

As no previous census returns are available, conclusions based on these figures must be made with caution. The most striking features are:—

- (1) Females considerably outnumber males.

- (2) The enormous number of infants in relation to the older children and young adults. 500 children between 0-5 compares with 91 between 15-20. This either indicates a very high child mortality rate or a recent sudden and remarkable increase in the birth rate. There is no doubt that the child mortality in the area is very high.
- (3) The few young adults compared with those in middle life (180 between 20-30 and 289 between 30-40). The reason for this is obscure. One fact to be presumed is that a few young males may be away from their villages engaged in trading or labouring at the sea-ports, etc., but their number is few and will not account for the differences observed. The influenza epidemic of 1918 surely resulted in a high mortality and a low birth rate at that time.

CLASSIFICATION OF LEPROUS LESIONS.

The following classification of leprous lesions is adopted.

- (1) *Lepromatous Leprosy*—three clinical forms of leprosy were found in the survey, classified as follows:—(a) Nodular form, (b) Diffuse infiltration, (c) Macular form.

These are all well known forms, the first two needing no particular description. The third form is not common in Nigeria. It is usually of acute onset, numerous macules appearing within a short time of one another over all parts of the body. They are characterised by erythema, some degree of depigmentation, are raised, tense, and thickened, the edge is not clearly defined, there is no alteration in sensation, and they contain masses of acid-fast bacilli.

- (2) *Neural Leprosy*—for convenience, the manifestations of neural leprosy are classified as follows:—(a) The pale flat macule, (b) Major tuberculoid lesions; (c) Minor tuberculoid lesions.

(a) The term '*pale flat macule*' is applied to all those lesions of neural leprosy in which there is no elevation above the surrounding skin. They vary in size from half an inch to a foot in diameter, may be single or multiple. A single macule is more or less circular in shape, but a variety of appearances may follow the confluence of adjacent macules. A greater or lesser degree of depigmentation is always found, clearly marked at the edge of the macule which is well defined. Anhydrosis is commonly found, the macule being drier than the surrounding skin, and it may be scaly. Loss of hair over the macule may be observed. Impairment

of sensation in the macule occurs early, commencing in the centre. As already mentioned impairment of thermal sensation is usually the first abnormality, and is followed by analgesia, and loss of the sense of light touch. I have never felt thickening of the cutaneous nerves around such macules, but thickening of the ulnar nerve, and less frequently, of the great auricular nerve and the external popliteal nerve is of common occurrence as the disease advances.

Some degree of retrogression of the disease is not uncommonly found, particularly in the centre of the macule, Here the skin may be thin and atrophied, and a greater or less degree of repigmentation observed.

(b) *Major tuberculoid lesions.* In this case, the macule is clearly raised above the level of the surrounding skin. Two forms are seen:—The annular form and the plaque form.

The annular form commonly exhibits three zones from without inwards: a narrow zone of depigmentation; a thick hard raised zone of depigmentation, often erythematous, $\frac{1}{8}$ "— $\frac{1}{2}$ " in width, with anhydrosis and impaired sensation; an inner zone, which may not be raised at all, exhibiting a greater or less degree of retrogression. The skin may be atrophic, and pigmentation may be returning.

The macule is often of long duration, and commonly slowly increases in size until it may cover a large part of the body. "Colonial" macules are very commonly seen, and the cutaneous nerves around the macule may be thickened.

In the plaque form, the whole macule has the characteristics of the thickened zone in the annular form, an outer depigmented zone is commonly seen, and the macule may be scaly and bear some resemblance to the lesion of psoriasis. Some impairment of sensation is distinctive. On the face the macule is rarely scaly, and may indeed have a greasy appearance, while loss of sensation is not invariably found. The majority of major tuberculoid lesions are of the plaque form when they first appear, but have a marked tendency to revert to the annular form.

(c) *Minor Tuberculoid Lesions.* This term is applied for convenience to all manifestations of neural leprosy which are intermediate between the typical pale flat macule and the major tuberculoid macule. It covers a variety of forms, plaque, annular, serpiginous, papulate, etc., all characterised by depigmentation, impaired sensation and some slight degree of elevation. Resolving major tuberculoid forms are included. The classification is clinical and not based on histological findings.

RESULTS OF THE SURVEY.

The following cases were found:—

			Etiti Ama.	Leper Village.
Lepromatous Cases	...	...	4	27
Pale Flat Macules	...	...	19	20
Major Tuberculoid Lesions	...	...	13	7
Minor Tuberculoid Lesions	...	...	28	9
			—	—
Totals	...	...	64	63

All the lepromatous cases gave positive bacteriological findings.

All the cases with tuberculoid lesions gave negative findings except in one minor lesion which was slightly positive at the edge. Only eight of the pale flat macules gave positive findings and these were all scanty.

DISCUSSION.

1. *The Incidence of Leprosy.*

In spite of 10 years of segregation, 65 cases of leprosy remained at large in the village, an incidence of 3.7%. There were 62 lepers living in the leper village, of whom 41 had come from Etiti Ama. No Etiti Ama lepers were living elsewhere, so that the total incidence of leprosy in Etiti Ama was 106 lepers, or almost exactly six per cent.

2. *The Sex Incidence.*

The following table gives the sex incidence of leprosy in the village, the leper village, and the total number of Etiti Ama lepers.

TABLE II.
SEX INCIDENCE OF LEPROSY.

			Males	Females
Etiti Ama	...	...	24	41
Leper Village	...	...	18	44
Total Etiti Ama Lepers			37	69

The preponderance of females will be observed and is characteristic of leprosy in South Eastern Nigeria.

3. *The Age Incidence of Leprosy.*

The incidence of leprosy at the different ages of life is presented in Table III.

TABLE III.

	AGE.								
	0-5	5-10	10-15	15-20	20-30	30-40	40-50	50-60	60 & over
Etiti Ama	1	3	1	1	15	36	6	2	
Leper Village		3	4	1	11	30	7	4	2
Total Etiti Ama Lepers	1	6	3	2	24	55	9	4	2

At Etiti Ama, leprosy is particularly a disease of active

adult life, more than half of the total cases being people between 30 and 40 years of age. The two decades 20-40 years contain 74 per cent. of the total cases.

In Table IV., the above figures for the total number of Etiti Ama lepers are represented as percentages of the population at the corresponding age group. Between the years 20-50 the sex ratio is also given.

TABLE IV.
INCIDENCE OF LEPROSY AS PERCENTAGE OF POPULATION
AT CORRESPONDING AGE GROUP.

Etiti Ama total lepers	AGE.								
	0-5	5-10	10-15	15-20	20-30	30-40	40-50	50-60	60
	0.2	2.4	2.4	2.2	11.6	18.1	4.2	5.0	4.9
				Males	11.1	18.9	3.7		
				Females	12.0	17.5	4.8		

These figures indicate firstly that there is little difference between the susceptibility of the two sexes to leprosy, and also that the susceptibility of the people to leprosy as indicated by the percentage of the population affected for each age group is low and relatively constant throughout childhood, but rises rapidly in adult life until no less than 18 per cent. of the population between the ages 30-40 are affected. This is a matter of great importance, as at that age, the intimate contacts of family life are a potent factor in the spread of infection. Further, many of the women have small children, and although the incidence of leprosy is low in the village in the early years of life, later discussion suggests that children are highly susceptible when placed in repeated contact with a source of infection.

4. *Source of Infection—Evidences of Contact with other Lepers.*

It was found impossible to obtain accurate data as to the contact of people living in the leper village with other lepers. In Etiti Ama itself however, it was discovered with the aid of the chiefs that no less than 39 of the patients (60 per cent.) had actually lived with a leper before they themselves exhibited signs of the disease. In many instances, the apparent source of infection was dead when the survey was undertaken.

5. *Leprosy as at Present in Etiti Ama.*

Both lepromatous and neural types of leprosy were discovered, and were classified as follows :

Lepromatous Types :	Nodular	2
	Diffuse Infiltration	1
	Mixed leprosy	1
	Total	4 (6 per cent.)

Neural Types :	Pale flat macules	19
	Major Tuberculoids	13
	Minor Tuberculoids	30
		—
	Total	61 (94 per cent.)

Speaking generally, the cases were on the whole not advanced. The lepromatous cases were all in the early stages, and their rarity is to be observed. Many of the neural cases presented a solitary macule, easily concealed by clothing.

6. *The Leper Village.*

The village was situated about half a mile from the parent villages, and had been built without supervision. The houses were, on the whole, no worse than many in Etiti Ama itself, but the majority were nothing more than hovels, huddled together, dark, small, and with no ventilation. A small council house was found at one end of the village, and this was kept reasonably clean, but there was a general atmosphere of decay, reflected in the hopeless faces of the villagers. From the list of cases presented, it will be seen that they embraced people of all ages. Several of the women had young children in arms, most of whom were suffering from yaws. It is the custom for the women in the village to care for their children until they are three years of age, when they are sent back to the parent village if they have no sign of leprosy. The effects of this custom were apparent. One child was seen who was said to be ready for its return to Etiti Ama. Macules were clearly seen on its arms and face. Two others had been sent to Etiti Ama, but had contracted leprosy and had returned. One of them was found in a dying condition in the last stages of neglect and starvation. A fourth child was traced to Etiti Ama, and on examination was found to be suffering from leprosy. There is no doubt that children living with their leper parents can be regarded as extremely prone to infection, and tend to acquire a virulent form of the disease.

The able bodied lepers in the village are able to support themselves by farming, palm nut cutting, and in other ways. The lot of the enfeebled cases is, however, a very hard one, for they are sometimes deprived of any means of support, and, deserted by relatives, are dependent on the charity of fellow sufferers. One woman was found in a serious state of neglect. Such people are apparently left to die and are

then buried in their house, which is closed until the arrival of the next patient in the village.

All types of leprosy were discovered in the leper village and were classified as follows:—

Lepromatous Types :	Nodular	5
	Diffuse Infiltration	3
	Macular	1
	Mixed	18
		—
	Total	27 (43 per cent.)
Neural Types :	Pale flat macules	20
	Major Tuberculoids	7
	Minor Tuberculoids	9
		—
	Total	36 (57 per cent.)

In Etiti Ama, the majority of the cases of leprosy found were of a mild type, but in the leper village every case was unmistakable and many were advanced in type. The most striking difference between the two villages however was in the incidence of lepromatous leprosy cases, 4 in Etiti Ama contrasting with 27 in the leper village. There was considerable evidence that a proportion of these were not suffering from the lepromatous form of the disease when they were segregated, but that this form developed later.

With one or two exceptions the villagers stated that the disease was advancing, in many cases rapidly, and the clinical findings pointed to the same conclusion.

These facts are of considerable importance. In many cases the effect of segregation on those segregated at Etiti Ama has been to accelerate the course of the disease, and at the same time a number of neural cases have become lepromatous in type.

The incidence of leprosy in Southern Nigeria is so high the application of adequate measures to combat the disease is an almost overwhelming problem. Insistence on segregation seems the first measure necessary, but in this connection the results of segregation at Etiti Ama give food for thought. If segregation is not accompanied by a radical change in the hygiene of village life, is it not likely that what is happening at Etiti Ama will occur elsewhere, and it is a matter for debate as to whether the picture presented by numbers of segregated lepromatous cases of leprosy, *with no adequate supervision*, is preferable to unsegregated neural cases.

Further work is necessary before it can be definitely

established that segregation alone is liable to involve an increase in the number of infectious cases. The following fact is of interest. While the survey was in progress, numbers of lepers came from other segregated villages, eager to see the Medical Officer. They were classified clinically as follows:—

Lepromatous Types :	Nodular	12
	Diffuse Infiltration	5
	Macular	2
Neural Types :	Pale flat macule	23
	Major Tuberculoid	6
	Minor Tuberculoid	6

All were advanced cases, and the high proportion of L cases is noticeable.

Leprosy Survey in the British Solomon Islands, Western Pacific

A summarised account of the work and results.

J. ROSS INNES.

A systematic leprosy survey was carried out by the author between the dates 31st August, 1937, and 5th March, 1938, in the British Solomon Islands Protectorate. This comprises a group of islands with a population of 94,000 people, mainly of Melanesian race, and a few Chinese and Europeans. Nearly a quarter of the total population was examined in repeated journeys and continued residence amongst the people. The only forms of transport were by small schooners, or foot along native tracks.

(1) MAIN METHODS OF THE SURVEY.

In each island, large or small, either the whole population was attracted for survey in the various centres or good representative samples were obtained. It was found not practicable to use treatment of leprosy as an attracting force: instead, treatment of yaws was often used, for even the bush natives knew the value of yaws injections, and assembled in full numbers whenever it was notified to them that injections were to be given. In addition, the very simple but effective

scheme was followed of rewarding lepers and those who brought them, with sticks of tobacco, also headmen who turned the people out well. Finally, the influence of government district officers was always of great value: the natives readily responded to their propaganda and preparation of the field. The result of all this was that men, women, and children invariably came for examination in fine numbers. The physical examination was usually of naked or almost naked people, and to careful inspection and palpation was added the specific tests for disturbance of sensation and the examination of specimens microscopically. Obvious diseases were noted for each person examined, whether a case of leprosy or not. By residing in each island, it was possible to study the people, their mental attitude, folklore, diet and ways of living.

(2) LEPROSY SURVEY, BRITISH SOLOMON ISLANDS. TABLE OF MAIN ESSENTIAL DATA AND RESULTS.

NAME OF MAIN ISLAND OR DISTRICT	Area in sq. miles.	Population.	Density of Population per sq. mile.	No. of people examined.	Percentage incidence of leprosy.	No. of lepers actually found.	No. of lepers computed for the area.
ISLAND OF MALAITA ...	1,450	40,000	27	10,245	1.347	138	600
ISLAND OF NGGELA ...	235	5,300	24	1,410	0.992	14	40
ISLAND OF GUADALCANAL ...	2,500	14,880	5 to 6	5,023	0.89	44	120
ISLAND OF YSABEL ...	1,802	4,200	2 to 3	2,717	0.552	15	25
RUSSELL ISLANDS ...	70	853	12	853	0.47	4	4
ISLAND OF SAVO ...	12	700	58	249	0.44	1	4
I. OF SAN CRISTOVAL	1,789	7,560	4	1,118	0.45	5	35
Total figures for whole B.S.I.P.	11,458	94,000	6 to 7	21,615	1.02	221	900

NOTES.—Along with the above Table, it is advisable to study the general map of the Protectorate.

The figures for the Island of Nggela include those of the capital of the Protectorate, Tulagi. In this place, besides natives, 76 Chinese residents were examined: there was no case of leprosy amongst the Chinese, though a case had been diagnosed and had died a few years before.

Of the main areas not visited by me, there is other evidence that there are no lepers on Choiseul, and in New Georgia and other north-western islands from earlier available data and the trend of the present survey results, I think it is very probable that they have an incidence

LEPROSY SURVEY

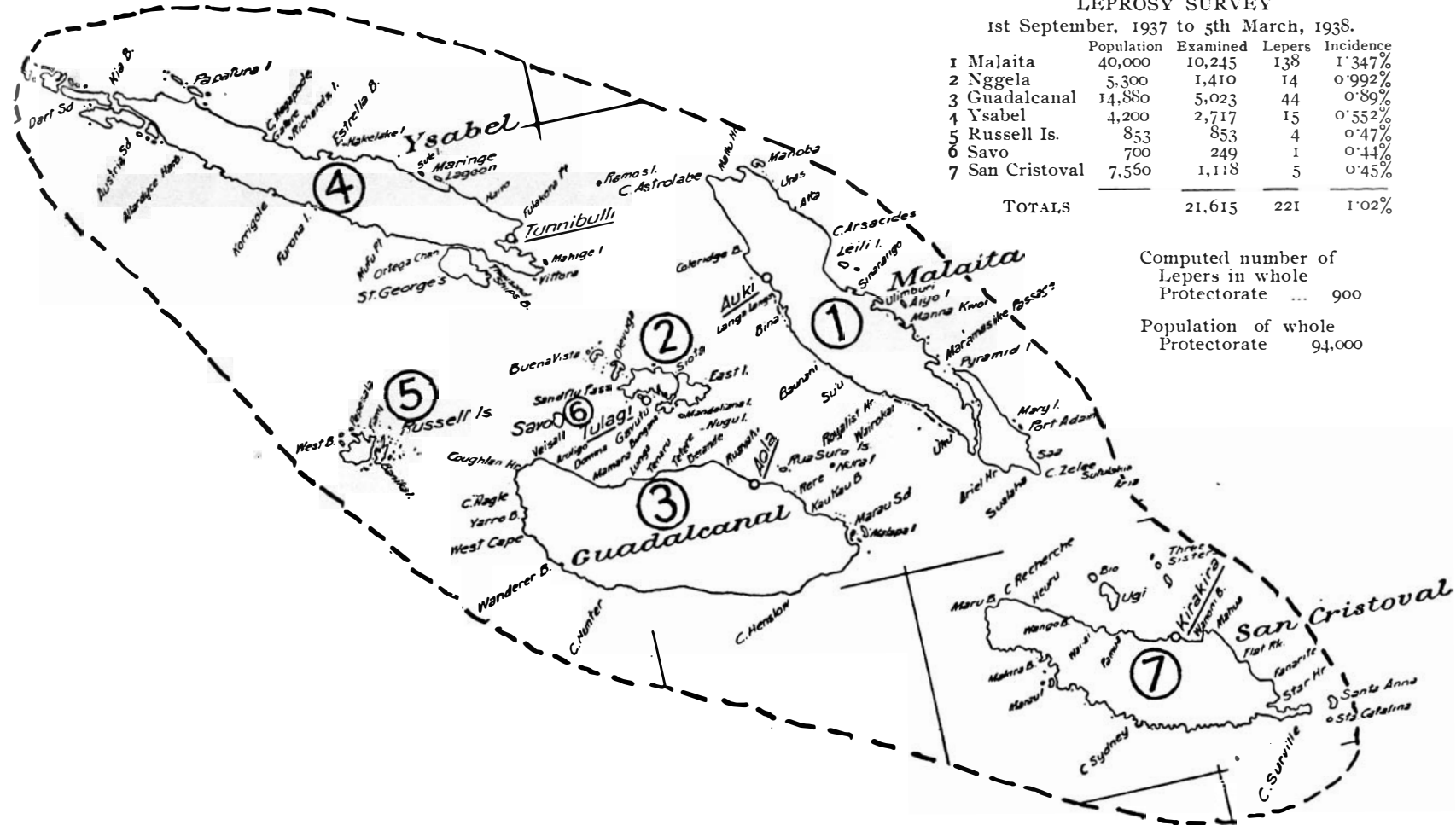
1st September, 1937 to 5th March, 1938.

	Population	Examined	Lepers	Incidence
1 Malaita	40,000	10,245	138	1.347%
2 Nggela	5,300	1,410	14	0.992%
3 Guadalcanal	14,880	5,023	44	0.89%
4 Ysabel	4,200	2,717	15	0.552%
5 Russell Is.	853	853	4	0.47%
6 Savo	700	249	1	0.14%
7 San Cristoval	7,550	1,118	5	0.45%

TOTALS	21,615	221	1.02%
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Computed number of
Lepers in whole
Protectorate ... 900

Population of whole
Protectorate 94,000



of leprosy of between 0.5 and 0.6%. In the outlying islands, such as Lord Howe and Rennell and Santa Cruz, there is apparently not much fear of leprosy outbreaks, nor knowledge of it.

The islands included in the survey being all the important ones, sufficient information was gained to assess the leprosy problem and to work out a plan of control.

(3) THE DISTRIBUTION OF LEPROSY.

Points of interest are (a) the *preponderance of leprosy in the Island of Malaita*: (b) the marked tendency for the disease to be of *heavier incidence in bush* than coastal dwellers: (c) the striking fact that *density of population in small islands did not necessarily imply a high incidence*, as in the Island of Savo in the Table given, the small islands of Santa Anna and Santa Catalina off San Cristoval, and the large number of artificial islands off the Malaita coast: (d) leprosy is distributed as *a small group or family disease*, there being no roads and nothing of modern intercommunication among the people: (e) leprosy in the Solomons has been found to be most heavy in the primitive, and to *lessen in incidence with degree of successful sophistication or civilization* of the natives.

DISCUSSION OF THE ABOVE POINTS.

Malaita leads the list in leprosy incidence. It has the heaviest population, and enquiries into folklore and tradition gave distinct evidence that the disease has been indigenous a very long time, and it is even possible that the original fount and focus of the Protectorate's leprosy is Malaita. The people are still largely savage and semi-savage, and it was in this island that the striking preponderance of leprosy amongst the bush or inland dwellers first emerged. Even in spite of the overcrowding on the coastal islands, very little leprosy was found on the coast. I think the explanation must be that not only are the coastal dwellers more cleanly and have a better diet, and more intelligence and adaptability, but that the real home of leprosy is in the bush, and that when these coast people long ago escaped to the coast from the bush, they escaped to a larger life, and removed themselves from proximity to the leprosy foci of the island. One may imagine that leprosy was long ago brought to the island by the original invasion of Indo-Melanesians, people who first domiciled themselves in the bush. Now it happens that not all the islands are alike. They have varying degrees of bush versus coastal inhabitation. Yet in all the same definite tendency can be traced, that is, that leprosy is or was a bush disease. The island of Guadalcanal is in a stage further on of the modern movement to civilize, and to have more people living back on the coast again. The survey here revealed a less incidence of leprosy than in Malaita, and an expedition to obtain a pure bush sample revealed a greater bush incidence once more, namely, 1.43% against coastal 0.67%.

Consider now the Island of Ysabel. In this, the process of civilizing and of migration back to coastal domicile has gone much further

than in Malaita or Guadalcanal, so that there are 1,400 bush people in 20 villages, and 2,800 coastal people in 37 villages. The survey found an incidence of 0.43% bush and 0.59 coastal leprosy. For the first time it seemed as if the bush predominance was lost, but on the discovery that many of these coastal lepers had had in their youth a bush domicile, it was seen that the survey if done some 15 or 20 years ago would have found the true bush predominance.

(4) THE DISEASE ITSELF.

The clinical appearance of leprosy in the Solomons, bearing in mind the differences of skin colour and texture, were much the same as what the author was accustomed to in India. The disease bore all the marks of a *long domiciled leprosy* of moderate incidence, manifestations, and rate of increase. There was no evidence suggesting any danger of an explosive outbreak anywhere in the Solomons: on the contrary, in some islands, e.g., Ysabel and Guadalcanal, there is some evidence of decrease. Of the 121 cases of leprosy studied, about one half were infectious, and of all cases the predominating type was Neural. There was found to be an unusually large number of *child contacts* living in close association with lepers.

(5) PREDISPOSING FACTORS.

(a) *The attitude of the people to leprosy.* The native explanation of leprosy is usually a smiting by spirits. There is some glimpse of the idea of its contagion, but in practice nothing is done to segregate, unless in peoples under the propaganda of government officers. There is no understanding of the danger of children living in close contact, and propaganda should be extended to this point. There is not much of social ostracism of lepers, and there is no trace of murder of lepers by the community.

(b) *Lack of personal cleanliness* is more marked in bush people, but in most inhabitants the spread of the use of bathing with soap and fresh water is called for.

(c) *Deficient diet* is a definite problem, for the native diet being mainly root vegetarian, there is a great lack of first class biological protein in many cases. The modern foods introduced have been tinned meats, biscuits, and rice: these are not available to the bushman to any extent, and only to the wealthy on the coast. The introduction of the use of wheat, and the foundation of a milk supply and demand are likely to be of great public health and anti-leprosy value. Goats may be found more suitable than cows. Coastal dwellers have much more fresh fish in their diet than the bushmen: apparently it benefits them greatly.

(d) *Lack of roads and lack of a widespread system of schools.*

Without these propaganda in public health and the best work in civilization are held up, which predisposes to the persistence of the bush foci of leprosy. The dietary improvements and the subjugation of concomitant diseases also are held up for lack of roads and schools.

(e) *Predisposing diseases.*

In the examination of 21,615 inhabitants, the plan of recording the more obvious prevalent diseases gave the following incidences:—

Enlarged malarial spleen	...	...	...	70%
Yaws	...	...	...	54%
Skin diseases, including a most striking prevalence of ringworms	...	...	...	27%
Eye diseases	...	...	...	5%
Tropical ulcer	...	...	...	2%
Tuberculosis	...	...	...	1%
Filariasis	...	...	...	2%
Infantile paralysis	...	...	...	0.4%
Rickets	...	...	...	2%

Many other diseases were noted, but for brevity the ones consolidated above will suffice. It is evident that the dominant trinity is *malaria, yaws, and skin diseases*: and it is very likely that they must be regarded as the chief predisposing diseases to leprosy. In the cases of yaws and skin diseases we also have the chief confusions in the diagnosis of leprosy in the islands.

(6) OUTLINE OF THE PROBLEM IN LEPROSY AND ITS SOLUTION.

We have 94,000 people of varying types, temperaments, and degrees of intelligence scattered at 6 to 7 per square mile over these many islands of the Solomons. Fortunately there seems to be a well-marked common racial inheritance, and there is a central Protectorate Government which can co-ordinate all efforts to improve the leprosy situation. Sea divides island from island, and if necessary each island could be cleaned up in turn. The incidence of leprosy is moderate, and the increase at a slow normal rate. The people respond to civilizing influences well, and likewise does the leprosy incidence. The centre of the problem is Malaita, with its heavy population and heaviest incidence, and its being

perhaps the least civilized. It seems to me that the lines of advance must be on the paths of :--

Roads, schools and propaganda, dietary and agricultural studies and improvements, instruction in hygiene, the use of soap, making soap more available.

Provision of adequate sea transport for the leprosy campaign in the shape of a fast seaworthy modern schooner with reliable engines.

Founding of a leprosy scheme to include a special medical officer, a central clearing station for lepers from all islands, a leper colony on the Island of Ysabel on the voluntary principle with full provision for occupation of the patients in farming or industry, and for the care of children of leprous parents.

(It may be found more convenient to the needs of the Protectorate to appoint a medical officer of health including leprosy, because of the linkage with malaria, yaws, and public health. The existing yaws campaign might thus be expanded to include leprosy and public health.)

The valuable mission medical work on some of the islands and their schools would no doubt be found easily to fit into the anti-leprosy scheme, likewise the persuasive influence of district officers and of native medical practitioners under government. The latter would be trained in leprosy at the Colony.

If possible, it would be of the greatest value if a European lay worker were obtained for the Colony, as so much of a practical nature needs to be worked out in housing, agriculture, industries, and the like.

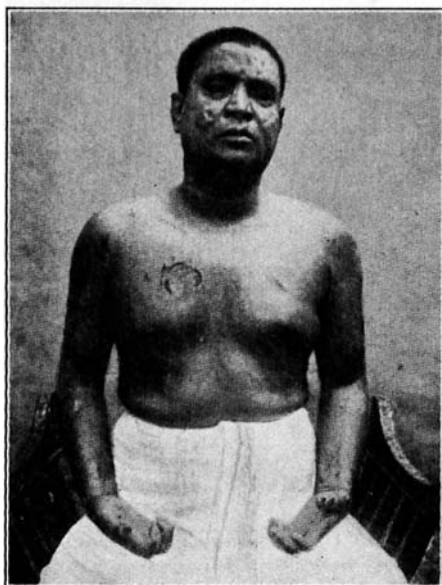
ACKNOWLEDGMENTS.

I am grateful to Dr. Ernest Muir, C.I.E., who suggested that I do this survey : to His Honour the Resident Commissioner, F. N. Ashley, Esq., C.M.G., and to Dr. H. B. Hetherington, Senior Medical Officer, for continued assistance and advice during my stay in the Protectorate : to all District Officers and other government officials who helped on the progress of the work : to missionaries and planters who gave generous assistance : to Dr. Clifford James of Fauabu who gave in his area valued help and information : to Mr. A. N. A. Waddell who drew maps and to a great number of friendly natives, police, and boats' crews who made life possible. I wish also to express my admiration for the work and usefulness of the native medical practitioners with whom I had the privilege of co-operating in the survey.

*Extensive Ulceration of the Skin in Leprosy

JOHN LOWE & S. N. CHATTERJI, *Calcutta.*

During a recent visit to Malaya one of us (J.L.) was shown a number of cases of leprosy in Chinese patients, in which a very striking feature was the occurrence of ulceration of large areas of skin. Pathological investigation was impossible but it seemed probable that the condition was an



CASE 1.

extremely severe ulcerating form of tuberculoid (neuro-macular) leprosy. He had never seen such cases in India although he had seen and described minor degrees of ulceration in such lesions (1).

Shortly after his return to India a patient came to the School of Tropical Medicine showing a severe but very chronic form of nerve leprosy with extensive and marked anæsthesia, paralysis and deformities, but also showing marked scarring following ulceration of extensive areas of skin in various parts of the body. It seemed likely that this was an example of the condition seen earlier in the year in Malaya.

On discussion, the other of us (S.N.C.) stated that he had years ago seen a case somewhat similar and he was able to find case notes and photographs. These two cases form the

* Reprinted from *Leprosy in India*, Vol. X, No. 1.

subject of the present note. The histories and clinical findings are as follows:—

CASE 1.

Male Age unknown.

History—

Fifteen years previous to examination a small anæsthetic patch appeared on the skin at the back of the right knee. Tincture of iodine was applied. Later the patch increased and became thick and red. A doctor examined and reported finding lepra bacilli in the patch. 'Nastin' treatment was given, and the skin of the patch ulcerated and other ulcers appeared on the same leg. Bacteriological examination then showed no lepra bacilli. The ulcers healed leaving scars.

Three years later new patches appeared on the back followed by thickening and ulceration, healing and scarring. For the next 12 years there were repeated outbreaks of a similar nature with the appearance and ulceration of new patches and also ulceration of the margin of old scars. During the same period there developed extensive anæsthesia, deformities and paralysis.

Condition on Examination—(See photograph).

There is extensive anæsthesia covering most of the body, paralyses and deformities of the face and all the four limbs, and the body is covered by large scars at the site of the old ulcerating patches.

CASE 2.

Male Age 26.

History—

Twenty years ago when he was six years of age a patch appeared on the abdomen. The patch was hypo-pigmented. About a month later erythematous anæsthetic patches appeared on face, body and extremities. The patches spontaneously ulcerated and then gradually healed. No local application was used. For several years the disease was not active but after this there was a long period of activity of the disease which showed itself by the appearance of new red patches which ulcerated and healed leaving scars, and by the appearance of redness, thickening and ulceration at the margin of old scars. During this time the patient was receiving 'Nastin' treatment and he associated the reaction and ulceration of the lesion with this treatment. During the same period there developed anæsthesia, paralyses and deformities in the limbs and for the last 15 years he has had trophic ulcers of the foot.

Present condition—

Patient shows anæsthesia covering nearly all the body, facial paralysis, claw hands, drop foot, trophic ulcers of the sole and some thickening of the peripheral nerves. All over the body there are scars varying in size, some of them being several inches in diameter; other scars are narrow but are oval or circular in form and obviously indicate ulceration at the margin of large patches.

These two cases show exactly the same features; the appearance from time to time during several years, of patches which were thick and red and later ulcerated and slowly healed, leaving extensive scarring; the subsequent

development of extensive anæsthesia, deformities and trophic lesions. The clinical features and subsequent development of the disease indicate that the ulcerative condition of the skin was associated with the 'neural' type of the case, and this is borne out by the fact that bacilli were not reported as being found in the lesions except on one occasion.

Unfortunately both these cases were seen long after the ulcers had healed, and biopsy material was not examined. There seems to be no doubt however that these two cases were similar in many respects to cases which have been described in other parts of the world as 'Lazarine leprosy.' In *Leprosy in India* (2) there appeared an article by Dr. J. Rodriguez on 'Lazarine leprosy,' in which he summarised the literature of the subject as follows :

'Lazarine leprosy' is a peculiar form of the disease which used to receive much more attention in the past, particularly from European authors, than at present. According to Jeanselme, it is common in America, particularly in Mexico.

The distinguishing features of this variety of leprosy are the following :—

1. A rapid, sometimes sudden, development often in the early stages of the disease. In some cases, there may be 'no lepromas or macular lesions or any other dystrophic manifestations of leprosy'.
2. Formation of blisters and blebs. These usually start from an erythematous patch, a solitary nodule, or on a pachydermic edema of an extremity. Sometimes, they may appear on normal-looking skin.
3. Rupture of the bullæ producing rapidly growing ulcers or areas of skin necrosis, which may 'disorganise cutaneous tissues, muscles, tendons and bones, opening up joints, and ending in tremendous deformities.'
4. Presence of *M. lepræ* in the fluid of the bullæ and particularly in the secretion from the ulcers, usually in large numbers.
5. Histologically, the picture is typically 'tuberculoid' but in contrast with the usual scantiness of the organisms in 'tuberculoid leprosy' numerous *M. lepræ* are found in the tissues.

This variety is considered by many authors as synonymous with bullous leprosy and according to Caballero, the condition reported by Guiteras as *chappa* or *acropatia mutilante* is none other than lazarine leprosy. Good descriptions of the disease are to be found in the books of Zambaco Pacha and Jeanselme. Nicolas Gate and Ravault reported one case at the Third Leprosy Conference at Strasbourg. The most recent and one of the best articles on the subject is that of Pardø-Castello from which I have drawn liberally. This article based on 23 Cuban cases, is accompanied by excellent photographs of the condition.'

The chief difference between lazarine leprosy as described

in the literature and the two cases recorded here appears to be a difference of degree and not of kind. In our cases the ulceration was not so deep or as extensive as is sometimes found, nor were bacilli found in the discharge from the ulcers except on one occasion.

It is interesting to find that in typical lazarine leprosy bacilli are often found in considerable numbers, but at the same time the histological appearances of the tissues is typically of 'tuberculoid' type in which bacilli are usually few. In a previous article we have described 'tuberculoid' lesions with a fair number of bacilli and minor degrees of ulceration.

We suggest that these cases previously described by us, the present two cases, the lazarine leprosy of America, and the cases seen in Malaya are merely different degrees of the same pathological process.

It would be interesting to know if other workers have seen cases of a similar type, for up to the present such cases have not been recorded in India.

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REVIEWS

International Journal of Leprosy. Jan.-Mar., 1938, Vol. VI, No. 1.

M. A. K. Dalgamouni writes on *The Antileprosy Campaign in Egypt*. He mentions a disease resembling leprosy described in ancient papyri dating from 1500 B.C. The known lepers of that time, numbering some 80,000, were forced to live in a separate city in the north-eastern part of the delta. He asks the searching question whether advance has been made with regard to the control of leprosy since that time:—

"During the reign of Ramases II (about 1324-1258 B.C.) the disease was said to be prevalent in the country, especially among the slaves captured by the Great Warrior and his mighty army in his wars against Abyssinia, which is considered as a mother country of leprosy and is still a highly endemic centre. The Jews, according to some

historians, were expelled from Egypt partly because leprosy was prevalent among them. The disease seems to have declined in Egypt since that time, but there are proofs that it was still endemic during the Ptolemaic Dynasty, shortly before the beginning of the Christian era. The Arabic physicians in Egypt also described leprosy, and during the reign of the Mamelukes in the 10th Century A.D. asylums were started for the segregation of lepers but were later deserted."

Dr. Dalgamouni describes the present methods by which it is sought to bring about relief and control of leprosy:—"1. First, to start outpatient clinics in the highly endemic centres, to serve both for treatment of patients and as survey centres. 2. To start an agricultural colony for segregating the infectious cases under conditions that would permit them to live more or less normally. 3. To carry out a well-organized system of propaganda:—(a) To teach doctors and laymen to detect and to suspect leprosy; (b) To teach lepers to seek immediate treatment; (c) To teach the public, mainly in the provinces, hygienic measures of life which will serve to protect them against infection by the disease."

Up to date at the Cairo Leprosy Hospital, the Abu Zaabal Colony and four clinics and their branches, 4,172 lepers have been examined. From this it is calculated that there must be at least 15,000 lepers in the country.

Observations on the Leprolin (Mitsuda) Reaction is the subject of a paper by J. N. Rodriguez. This is a very thorough review of previous work by other observers followed up by much careful work of the writer. The article will repay careful study in the original. The main conclusions are as follows:—

"The results of this study suggest that a positive reaction depends on the presence of sessile antibodies attached to the cells in the dermis. Efforts either to stimulate or to exhaust these hypothetical antibodies by repeated injections of the test material at varying intervals were unsuccessful, but the experiments in this respect were not entirely satisfactory because of insufficiency of material. A positive leprolin reactive in a case of the cutaneous type of the disease may be considered a favourable prognostic sign, but it is not necessarily a guarantee that the case will improve to the bacillus-free stage within a reasonable time. Among bacteriologically negative candidates for parole, strongly positive reactors are seldom found to relapse. The usual negative result of the leprolin test among cutaneous-type lepers seems to be based on positive or specific energy, though we have failed to demonstrate the presence of hypothetical substances analogous to the anticutines shown by Picker and Loewenstein to exist in tuberculosis. On the other hand the negative result in infants and young children seems probably to be nonspecific. The leprolin and the tuberculin reactions have some points in common, but they are so dissimilar in certain important respects that in all probability they are fundamentally different. Neither can be transmitted by passive transfer and both are more delayed than the usual cutaneous tests. However, one of their important differences lies in the fact that the leprolin reaction has been found to be positive in most normal adults,

whether they have been in contact with the leprosy or not, whereas the tuberculin reaction is positive only in those who have acquired an infection. Furthermore, the tuberculin reaction is usually at its maximum and is read at the end of 48 hours; the leprolin reaction is much more delayed and is ordinarily read at the end of the second week. The reaction to tuberculin is to a protein; that to leprolin very probably is not. Experiments here reported show that some laboratory animals that are resistant to infection by human leprosy fail to react to leprolin. Although leprolin is an interesting substance with which to study the different phases of leprosy, it is well to bear in mind, in interpreting the results obtained with it, that it is composed of a combination of many substances derived from the tissues of the leprotic nodule as well as from the leprosy bacillus." (Reference (13) should be corrected to 1928.)

The Present Status of Diagnostic Skin Tests in Leprosy, by E. B. McKinley. This paper is based on the report of a Special Committee appointed by the Director of Health of the Philippine Islands. The conclusions are as follows:—

"Over five thousand intradermal skin tests have been performed with antigens prepared from various acid-fast bacteria, some of which have been isolated from cases of leprosy. The antigens have included the TPT (protein) of many of these organisms; the protein, polysaccharide, phosphatide, leprosin (wax), and leprosinic acid from one strain of acid-fast isolated from a case of leprosy; and a protein prepared from the fibrin of the blood from leprosy cases. Cases of leprosy in various stages of the disease, individuals who have been in contact with the disease, suitable control individuals having had no contact with leprosy, individuals of both sexes and varying ages, cases of both neural and cutaneous leprosy predominating, and cases bacteriologically positive and negative have been given intradermal tests with these antigens. The study indicates that in none of the antigens studied have we found a specific antigen for a diagnostic skin test for leprosy. The work also suggests that the supposed strains of *M. lepræ* from which several of the antigens were prepared are not related specifically and etiologically to the disease."

The Leprosy Census in Mexico up to 1936, by J. G. Urueña. The total number of persons known to be infected with leprosy amounts to 3,882. Of these 2,264 are males and 1,618 females, a proportion of 1.4:1.

"Few cases have been found in children in the first decade of life; there were registered only two single cases under 5 years of age and 22 between 6 to 9 years. There were 111 cases from 10 to 19 years, 852 from 20 to 29, 1,018 from 30 to 39, 753 from 40 to 49, 514 from 50 to 59, 274 from 60 to 69, and 116 of more than 70 years."

This indicates, says the author, that the disease is contracted mostly by individuals in the fullness of life, when they should be most useful to society.

"In keeping with what we have observed previously in Mexico and in other countries, the nodular type of the disease prevails above

the others. There was a total of 1,168 such cases, and 1,147 of mixed type—altogether 59.6 per cent. of the whole. The macular and anæsthetic types, with 787 and 780 cases, totalled only a little over 40 per cent.”

A note by Longe describes the efforts at control of leprosy in the Circle of Sini-Saloum (Senegal). Here there are 100,000 inhabitants in an area of two thousand square kilometres. A census in 1932 showed 354 lepers to which were added 220 new cases in 1936. The people are callous with regard to the spread of infection. By means of persuasion 60 patients have been segregated in a leper village.

The “*Happy Mount Leprosy Colony*” in Formosa is described by G. Gushue-Taylor. This colony was established in 1931 by the Canadian Presbyterian Mission and is subsidised by gifts from the Dowager Empress and the Government of Japan. Official records give the number of lepers in Formosa as 1,084 in a population of five millions, but the actual number is estimated to be much greater.

G. G. Villela writes the first section of a review to be concluded later, on *The Biochemistry of Leprosy*. Under biochemistry of the blood there seems to be no evidence that there is any relationship between the serum calcium and bone changes, and that chaulmoogra has no influence on calcemia of lepers. Inorganic serum phosphorus is not affected by leprosy. Certain authors suppose that the decrease in the alkali reserve in the febrile cases is due to an excessive decomposition of tissue proteins. Treatment with sodium bicarbonate gives good results and the administration of ammonium chloride, which increases the acidosis, is harmful. The association of calcium treatment with alkaline therapy is advantageous in severe cases. The high degree of hyperglobulinemia that is found in leprosy sera is equalled only in kala-azar and schistosomiasis. That condition may be due to erythrocyte destruction, fever, local injuries, autoimmunization, allergy and malnutrition. In the opinion of Wooley and Ross the serum globulin decreases in improved cases, and may be an index of good prognosis. Many authors agree that the red-cell sedimentation rate is correlated with the albumin-globulin ratio and the fibrinogen content of the blood plasma. Under blood and tissue lipase the recent opinion of Emerson and others is quoted. They found low values for tissue lipase in rats infected experimentally with rat leprosy, and concluded that if the chaulmoogrates exert any indirect action in leprosy therapy, besides their direct bactericidal

action, it is improbable that the fat-splitting ferment is involved. The questions of cholesterol, lipids and fatty acids, glucose and other blood constituents are also reviewed.

An editorial, which should be read in full, discusses *The Immunology Problem* in leprosy. The conclusion is that "for the present the situation seems to be one of stalemate."

La Reaccion Leprosa Tuberculoide, by José M. M. Fernandez. (*Revista Brasileira de Leprologia*, Vol V, No. 4, p. 419.)

The following is a summary of an interesting and well-illustrated article, and we reproduce photographs illustrating two of the cases.

Tuberculoid lepra reaction has been studied in 12 cases; the clinical histopathological and bacteriological events were recorded in the different phases. The following observations were made:—The chief symptoms of lepra reaction occur in all forms of the disease. The type of lepra in which the reaction takes place gives it, nevertheless, certain peculiarities which make it possible to distinguish a tuberculoid lepra reaction from an cutaneous lepra reaction. Tuberculoid lepra reaction has a subacute evolution, sometimes it is greatly prolonged; there are no general disturbances, the leprolin test is always positive and the sedimentation rate low. Two outstanding symptoms are observed: inflammatory congestion of old lesions, sometimes accompanied by the appearance of new ones, and in the first stages the presence of bacilli in the lesions. In 10 of the 12 cases numerous bacilli were found as the reaction declined. Cutaneous lesions are transformed into residual atrophic maculæ once the reaction has subsided. Microscopical examination shows, during the acute stage, an intense tissue reaction with abundant epithelioid cells and lymphocytic infiltration. During the regression stage fibroblasts are numerous and occasionally small necrotic foci are seen. In none of the 12 cases a change towards the nodular form was observed. The process can be considered as an allergic phenomenon produced by the bacillus or its toxins in contact with sensitized tissues. The presence of bacilli in the initial stages and the results of leprolin test inoculation are in favour of this interpretation. Tuberculoid lepra reaction has a favourable prognosis, since no serious complications occur which might threaten the life of the patient. The different therapeutic measures that were used did not alter the course of the reaction."

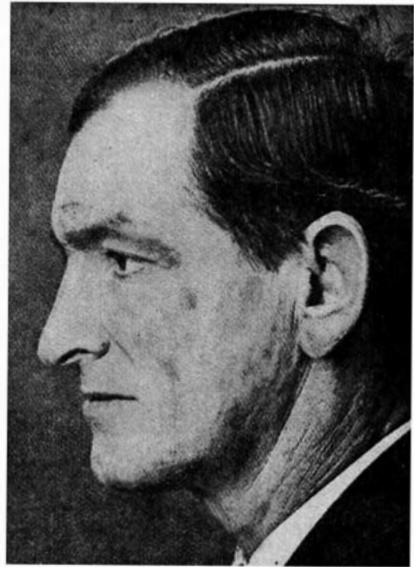


FIG. 1. December, 1936. Intense tuberculoid reaction. The presence of abundant bacilli and the clinical aspect of the lesions resembled the nodular form.

FIG. 2. October, 1937. The same patient after subsidence of the condition. Bacteriological examination negative.

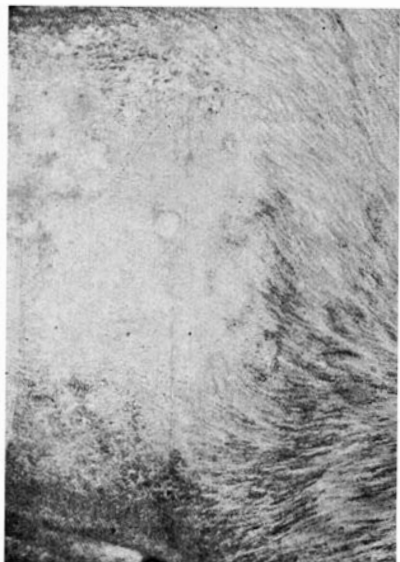


FIG. 3. Intense generalised tuberculoid reaction localised in small elements, full of acid-fast bacilli.

FIG. 4. The same area in regression, bacteriologically negative, five months later.

Statistical Summary of 10,369 Cases of Leprosy in Sao Paulo. Brasil-Medico, 1937, Apr. 17, Vol. LI, No. 16, pp. 478-489. By A. Azevedo Sacramento.

This analysis of over ten thousand cases of leprosy in Sao Paulo is presented in the form of graphs and tables, giving the nationality, age, sex and occupation of the patients. The following are the main conclusions:—

Whites are much more attacked than the coloured, 90.5 per cent., and males preponderated in the proportion of about three to two (61.4 and 38.6 per cent.). Foreigners and their children constitute more than half of the patients, 54.2 per cent., or in actual figures, 2,410 foreigners and 3,207 of their children. Italians head the list (40.6 per cent.), then Portuguese (6.3) and Spaniards (3.8). The disease is commonest in the urban centres and in the poorer and most thickly populated quarters. Clinically the mixed form is most often seen. As regards age, the disease in Brazilians is mostly in those under 30 years, in foreigners over 30 years.

Experimental Studies on Animals concerning Leprosy. Report VIII. On the Influence of Inoculation with Heated Emulsion of Rat Lepra Tissue on the growth of Rat Leprosy. By Yoshimasa Watanabe. Kitasato Arch. Experim. Med., 1937, May, Vol. XIV, No. 2, pp. 125-141.

In this interesting communication the author records experiments to show that if normal rats are repeatedly inoculated with emulsions of rat leprosy bacilli in white lepra granulomatous tissues, killed by heating to 70 C., the injected rats develop a certain degree of resistance to subsequent inoculations of fresh rat tissue emulsion, as shown by a large proportion of mild infections ensuing. On the other hand, injection of rats with heated human leprosy emulsions did not confer any such protection against subsequent rat leprosy infection.

The Lepers of Turkey.

There are still many lepers in Turkey. At Scutari, the suburb of Stamboul, is a large leprosarium, but the proximity of the large city creates irregularities, the lepers finding means of leaving their buildings for a tour of the town. These evasions cause panic in Stamboul. But henceforth the danger of infection will cease to exist. All the lepers of Turkey are to be gathered in a large lazaret which is to be established in the neighbourhood of El-Agir in East Anatoli. Stamboul will be at peace and so will the lepers.

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