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THE
Madras Geographical Association

RULES

1. The name of the Association shall be 'The Madras Geographical Association'.

Objects.

2. The objects of the Association shall be:—
   - (*A*) To promote geographical knowledge;
   - (*B*) To secure for geography its proper place in the High School, the University and its constituent and affiliated colleges;
   - (*C*) To help to improve the methods of teaching geography;
   - (*D*) To work for a school of geography being started;
   - (*E*) To promote studies about South India from various standpoints.

3. These objects shall be secured by:—
   - (*A*) Holding meetings and conferences, and publishing periodicals and occasional bulletins;
   - (*B*) Organizing geographical exhibitions and excursions;
   - (*C*) Helping in the preparation of geography books in the languages current in the Presidency;
   - (*D*) Forming a central library of geographical literature, and collecting maps, charts, plans, models, slides and instruments;
   - (*E*) Providing for circulation to members, of books, periodicals, and other collections;
   - (*F*) And by such other ways as are deemed necessary to effectuate the objects of the Association.

Membership.

4. The membership of the Association shall be open to all those who are interested in the promotion of geographical knowledge or in the teaching of geography.

5. There shall be two classes of members, honorary and ordinary.

6. Honorary members are those who shall be so elected by the council by the majority thereof present at its meeting. They shall exempt from liability to pay subscription, and shall have all the rights of ordinary members, except voting.

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—THE JOURNAL OF—

The Madras Geographical Association.

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The Geographical Distribution of Disease:

With some remarks regarding some common diseases in South India.

PART I.

From the earliest times men have observed that diseases were not uniformly distributed over the surface of the earth, and localities gained reputations for healthiness or unhealthiness. Many of the migrations in early times must have been undertaken as much in the search for more healthy environments as in the quest of food. In unhealthy environments, when other conditions were favourable man has always endeavoured to improve his surroundings so that they became more salubrious. Even in those early days, the influence of geographical conditions on disease prevalence was recognised by the more enlightened—unfortunately a microscopic minority—while by the ignorant and superstitious, noticeable unhealthiness of a locality was attributed to evil spirits or to the displeasure of the Gods, who therefore had to be propitiated; and this led to the adoption of the fatalistic attitude which is so characteristic of unhealthy areas.

Until intercommunications became easy, the early observations remained as isolated facts and did not have any effect in solving or throwing light on medical problems. When means of communi cation improved and people began to move about more freely, observations from widely scattered portions of the earth began to be collected, and theories as to the natural history of disease came to be discussed. Many fanciful ideas were put forward to account for the prevalance of certain diseases in certain localities: exhalations

from the soil, miasmata and vapours were invented to account for the unhealthiness of places. As methods of observation and diagnosis increased in accuracy, and with the discovery that many and probably all diseases were caused by minute germs, the old fatalistic connection between disease and locality gave way to a more rational and scientific explanation of the prevalence of diseases in certain localities. This advance in knowledge has come about only very recently. Medical geography or the geographical distribution of disease is therefore of very recent origin as a scientific study.

The discovery of the cause of many diseases, and therefore, eventually, of a means of preventing these diseases, should lead to the disappearance of the sense of helplessness in the presence of a disease whose cause appears to elude detection; and places considered uninhabitable may yet be opened up and made more fit for healthy life. As examples of what the discovery of the cause of a disease may result in, there are the development of West Africa and Malaya, the east coast region of Italy, the Compagna, the rice growing flats in the valley of the Po, the construction of the Panama canal and the retention of Ismalia as the administrative centre of the Suez Canal. These results were only possible as a result of the discovery of the part played by mosquitos in the causation and spread of malaria and yellow fever, and the adoption of measures of control based on this discovery.

The ideal for the study of the distribution of disease is the compilation and record of complete and accurate statistics from all parts of the world. Such an ideal is at present unattainable. In a few places the nearest approach to the ideal is a fairly accurate record of diseases as a cause of death. Still more rare and much more untrustworthy is a record of diseases as a cause of sickness, and although records and statistics of disease distribution are much more abundant than before, the materials for the study of the geography of disease are still very incomplete and not very reliable. Sickness and mortality statistics when used for this purpose should, therefore, be looked upon as relative and as an index of the frequency of disease in a place. Even so, this index must be used with great caution, and with due regard to what may be called medical history, as the geographical distribution of hardly any disease remains constant, and even those diseases that appear to be uniformly prevalent undergo great changes in intensity and as regards the

locality of their greatest prevalence; for example, cholera is never absent from the Madras Presidency, but the localities infected show the greatest variations from year to year, as also the intensity of the infection. (See Maps 1, 2, 3, 4, 5.) This study of the medical history of disease is rendered most difficult owing to the paucity and unreliability of the statistics relating to the prevalence in former times. Further there are the difficulties due to the scantiness of the records and the looseness of medical phraseology often found in these records—not that present records are irreproachable in this respect. These often render it impossible to be certain of the nature of the diseases that have been recorded and studied. The best example of a disease where these difficulties have arisen is the Black Death—the plague of the fourteenth century. It prevailed all over Europe for the best part of a century, and was estimated to have taken toll of 25 per cent of the then existing population. If, in the case of such an appalling epidemic, the source of the disease still remains a matter of controversy, it becomes apparent how great the difficulties are in the case of diseases which are not so striking. This disease is also an illustration of the great caution that must be exercised against dogmatism with regard to statements as to the prevalence of disease, based on its behaviour through too short a period. From time immemorial, plague had never been observed south of the equator, nor in the Western Hemisphere, that a conclusion might apparently correctly be drawn that plague could not spread to these regions; but since 1898, the begining of the present pandemic, it has spread south of the equator and to the Western Hemisphere, and to Australia. Many examples of this kind can be given of diseases spreading to places where they had not been observed before. Every year new observations of such spread of disease appear.

In studying the distribution of disease one of two methods may be followed. The various countries or geographical divisions of the world may be taken and in each of them the behaviour of the principal diseases noted. This method serves but to produce a catalogue of diseases, useful enough to a resident or would-be resident to assess, as it were, the amenities of the country or of particular parts of it. The facts are too isolated to be of much use in giving sufficient information as to the effects of the climate on disease. The second method is to consider the disease, to consider

the behaviour of each disease separately, tracing it from country to country through the continents of the world. This is the better method, as material will thus become available for readily drawing conclusions as to the manner in which the geographical conditions influence the disease. In practice both methods must be used to make a complete survey of the geography of disease: the first method giving a list of diseases likely to be of importance to the welfare of the country, the second showing how these diseases are influenced by their environment, and thus giving an indication as to how they may be dealt with to minimise their evil effects on the peoples concerned. The real and important study, however, is that carried out by the second method, which, by the way, of itself will eventually give a list of the diseases of chief concern to the country. Information given by the first method is more or less readily available in the official returns of sickness and morta lity, published by many countries, and incomplete though they may be, these records are of value for the settled regions of the world. The information may also be obtained from books of travel, reports of explorations or expeditions, for the little known regions of the world.

This, however, does not imply that the behaviour of diseases in more limited localities cannot be profitably studied or that from such local studies valuable information cannot be obtained. The study of the distribution of disease in even such limited localities has brought to light a great deal of knowledge of the causes of its incidence and spread, which has been of much help to the local authorities, enabling them to control many of the prevalent diseases. In such instances, however, the observations must be of considerable accuracy, the diseases must be carefully described, their incidence correctly noted, and their range of distribution minutely demarcated; for, in small areas, errors will assume greater proportions than they would if they occurred in observations over wider areas where the resultant averages would minimise their effect. This greater accuracy is not an unreasonable demand, because the observations can be readily carried out by the official and non-official medical profession as part of their daily round, and the accuracy of these continuous observations can be maintained in the official registers. The insufficiency of such records will not be in the accuracy of the individual data, but in the paucity of the data.

This defect can eventually be made good by the development of the medical profession. It very frequently happens that officially published statistics have the defect that being compiled for administrative purposes and not for scientific study the official record deals with groups and not with individual diseases. However, sources of detailed and considerably accurate information are to be found in the administrative reports of the Medical and Public Health Services. The reports of the Public Health Services contain valuable data regarding epidemic and communicable diseases chiefly, and their value lies in that they are a record of diseases in regard to death and therefore of considerable accuracy. In this connection, however, the agency employed in collecting and recording the data must be remembered; for, on this account the data tend to lose in accuracy; but as the diseases recorded by this agency are well known and as a constant check and watch is kept over the compilation, the data are for all practical purposes sufficiently accurate; and if the observations are studied over a sufficiently long period their value as a very good average becomes real as the error being more or less constant can be assessed and allowed for. As the records of the Medical Services, *i. e.*, the Hospitals, Dispensaries and similar institutions, are mainly records of disease as regards sickness, they are not as reliable as the records as regards mortality, but this tendency is counteracted by the educated and professional agency employed in their compilation, ensuring more accurate observation and diagnosis. There are, however, many diseases, about which it is important to get information as to their geographical distribution and natural history, diseases of which no record appears in the official reports. Information regarding these diseases must be sought for with great diligence in the case records of the individual hospitals. dispensaries and similar institutions, in special reports by individual medical and sanitary officers, medical books and journals, and case books of private practitioners. This involves so great an expenditure of time and labour that it cannot be readily undertaken outside official agency, and moreover, many of the records being confidential papers are not open to any but members of the medical profession under special conditions. On account of these, almost insuperable, difficulties, another method can be employed by the medical geographer, *viz.*, to circulate a questionnaire, and the investigator must be prepared to see his

appeals quite ignored. A questionnaire circulated by a medical investigator will also probably meet with more success than one circulated by a non-professional enquirer, not that the success of the former will be much to boast about.

Another source of information is local tradition. A very great deal of curious and often important information can be gained from these sources, not only as to the history and behaviour, but also of the reaction of the population to diseases. The local geographer can do much to help by accurately recording such tradition.

When we begin to consider the distribution of disease, we find, that, if we consider the distribution to be the resultant of several interacting forces, it is possible to classify diseases into two groups according as the forces are intrinsic to the disease itself, *i.e.*, closely associated with its cause and mode of spread; or extrinsic, *i. e.*, the action of outside forces, such as geographical conditions of latitude, altitude, temperature, humidity, soil, race and similar influences which are commonly included in the term climatic. It will also be found that although climatic forces are of great importance in other directions, such as agriculture, they do not exercise so great or so permanent an influence on the distribution of disease as may be the popular belief. In this matter at any rate man has apparently been able to interfere with nature so successfully that we will not be far wrong in saying that the prevalence of disease in any locality is due to his not interfering sufficiently actively or to his own carelessness. In fact the prevalence of disease in a place may be used as an index wherewith to measure the advancement of the population.

When we consider the forces that may be inherent in a disease, we find that these forces act differently when the cause of disease is parasitic, *i. e.*, when the disease is infective or communicable, and when the cause is not parasitic. In the latter case the geographical forces are supposed to act directly or mainly on individuals suffering from the disease, while in the former, the action of the forces is more complex because in addition to the person affected there are also the parasites which they harbour. This action is further complicated by the fact that the parasites, including in this term the smallest bacteria and filterable viruses to the largest animal that can cause disease, may have a life cycle which is entirely parasitic in the human host, or they may have an extra-corporeal

or independant stage, or a stage within some other animal or even plant. In the former are included the majority of the infective diseases caused by bacteria. These infecting organisms can pass directly from individual to individual, and there is apparently no need for any extra-corporeal development and here the effects of geographical conditions are mainly effective if operating on the individual. Although these parasites do not seem to need any intermediate host or stage to complete their life cycle, they can and do in many cases live outside the human body. Their behaviour during such an extra-corporeal stage is not known. In some their extra-corporeal life is so short, that they seem to pass directly from person to person, and in the absence of a suitable host they presumably die out. In such, geographical conditions can be considered to have scarcely any effect. In others their corporeal life may be of sufficient duration as to allow of the geographical forces to have some effect. This is inferred by varying degress of virulence, by seasonal and other periodicity, and by their occurrence as endemics and epidemics. In the latter are included diseases like malaria, filariasis, guinea worm infection, and other helminth infections, where without any intermediate host, or a stage of independant existence, infection does not take place. In these, geographical conditions can influence the distribution of the disease by acting on the intermediate host. This is a very important factor in determining the distribution of these diseases. As an example, we might take malaria. Although the mosquitos may be found everywhere, the fever may occur only in certain localities, and it is presumed that in these localities geographical conditions are favourable to the development of the malaria parasite in certain of the mosquitos. Insects which are infective in the plains may not carry infection in the hills. In their e xtra-corporeal life either in insects or animals or in some other medium, the parasites may be distributed over long or short distances—a distribution over a long distance is known as a geographical distribution, and a distribution over a short distance is called a topographical distribution.

There is also another class of infectious diseases transmissible from animals to man, either by sick animals, or by mere passive carriers of the infection. In such cases the distribution of the disease will follow the distribution of the animal, and this may also account for the variations in the prevalence of such diseases in

localities otherwise similar, and subject to the same geographical forces in other respects. Other epidemic diseases are carried and spread by water, *e. g.*, cholera and the enteric fevers. In such diseases there is a very close connection with geographical factors, and the prevalence of the disease follows the variations of climatic conditions, and in many instances, these diseases may on account of such forces be very restricted or localised in their range.

In yet another group of infectious diseases, the causal parasite apparently travels through the air. Here the favourable conditions are dust or other particulate matter in the air, a fairly high degree of relative humidity and of temperature and a low intensity of light. As these conditions can only be found favourable in enclosed places like rooms and halls and public conveyances, the ordinary outside air can scarcely be looked upon as a good medium for the spread of the disease over long geographical distances.

Finally a group of important diseases exists where the infection is carried in the soil, such diseases are tetanus, malignant oedema, anthrax, madura foot, actinomycosis, ankylostomiasis, and enteric fever, cholera and dysentery under certain circumstances. In these cases, however, the prevalence of the disease remains restricted to the localities where such infected soils occur and the geographic forces which act on such soils will have a corresponding influence on the associated diseases. In some cases, as in tetanus, the infection is found very widely distributed, originating in manured soils and spread thence by wind carried dust in which the spores are carried. In other cases, like the hookworm infection, the infection is strictly limited to the infected site, and the very widespread incidence of this infection is due to recent soil pollution on a large scale on account of the insanitary habits of the people. These disease germs do not of themselves spread in the soil, but may be carried mechanically from place to place,

The groups just mentioned are diseases whose geographical distribution is influenced chiefly by natural factors. The geographical distribution of many diseases may be influenced by certain artificial factors. One such important factor is what is usually called "fodmites." This is the term given to clothing, rags, furniture, bedding, grain and other foodstuffs and similar objects which may come into close and personal contact with human beings. Attached to such articles, it has been shown, disease germs can live

for considerable periods. Their virulence or potency to cause disease will be affected by geographical and climatic conditions, and by the dispersal of such articles diseases may be carried for very long distances, as the virus may remain alive up to periods extending to several months under the conditions that usually prevail in these cases. Small-pox is an example of a disease that may be thus spread widely.

These parasitic or infectious diseases are of the greatest interest to the medical geographer "as they are communicable either "directly or indirectly from person to person, and are associated "with a definite tangible something, which though essential to the "disease is not the disease, which can be carried from one place to "another, and whose distribution over the earth's surface is in "many ways analogous with the distribution of other living things, "animal and vegetable."

There are certain diseases caused by peculiar toxins, poisons, or defects in diet, whose geographical distribution will vary with the nature of the cause. Diseases, for example, like beri-beri, epidemic dropsy, pellagra, ergotism, where the cause is due to some defect in food grains, like rice, maize, and rye, have a distribution corresponding to those parts of the world where such grains are grown or are habitually consumed, and with increased facilities of transport and consequent changes in the dietary habits of the people, the distribution of these diseases will show a corresponding change.

All these diseases are instances of the fact that the distribution of diseases must depend on the presence or absence of their causes. It is therefore a vain task to try to study the distribution of any disease, unless its cause and mode of spread be constantly borne in mind.

Now, if we consider the forces that are extrinsic or external or purely geographical, we find that, of all the forces that may come into play, the one that exercises apparently the greatest influence is that due to latitude—the distance of the place from the equator. The most noticeable and constant effect of distance from the equator is the progressive drop in temperature away from the equator. Correspondingly one of the most important geographical distributions of disease is that which divides diseases into Tropical Diseases and Diseases of Temperate Climates. Although this classification is not strictly scientific, it is of great practical value. For although

there are many of the diseases of temperate climates present in the tropics, there are many diseases peculiar to the tropics. Another effect of this classification is also seen in the fact that most of the diseases of temperate climates are of bacterial origin, and most of the diseases peculiar to the tropics are due to animal parasites, and this in turn leads to the conclusion that for the diseases of temperate climates the best measures of prevention are those based on bacteriological investigations, while in the tropics the measures of prevention that will give immediate and most profitable results will be those based on improvements in Hygiene and Sanitation: in the former refinements in an already excellent and widely used sanitary system, in the latter the introduction of the elements of sanitation where none exists.

The reason for the apparent anomaly that though warmth is favourable to bacterial growth and yet the tropics are not favourable to bacterial diseases, is probably to be found in that very fact that warmth favours growth of bacteria. The pathogenic or disease causing germs are relatively delicate and so adapted to a parasitic life within the human host, that outside it they are exposed to too great a struggle for existence with much more resistant saprophytes and consequently are destroyed or are rendered harmless. Another reason is that the temperature conditions of the soil exposed to the tropical sun, the resulting desiccation, the exposure to actinic light, are conditions not at all favourable to these disease germs, which flourish with moderate warmth, moisture, and darkness. But with regard to the animal parasites, their life has become adapted to tropical conditions, by the development of a protective cystic stage, wherein they can tide over unfavourable conditions, or do the same thing by the adoption of intermediate hosts and thus complete their full development.

As stated before the distinction between tropical and non-tropical diseases, although of practical value, cannot be maintained if examined more closely, because in the tropics will be found many localities, some very extensive, where the climatic conditions resemble in all respects those of the non-tropical regions and in these regions will be found also the diseases commonly called non-tropical. Further in the tropics, may be regions, where the alternation of seasons may be so extreme as to present typical tropical and non-tropical conditions, and with this there will be found to be a

corresponding alternation of tropical and non-tropical diseases. The same observation may also be made with regard to temperate regions, and in former times, before the present advanced stage was reached by medicine and sanitation, temperate regions were ravaged by the so-called tropical diseases as badly as any tropical country now is.

It is obvious therefore that although the distance from the equator has an important influence in the distribution of disease, this distribution can readily be modified by civilised man's conscious effort.

The influence of season is also very important, because at certain seasons conditions favourable to the development and transmission of diseases occur, e. g., plague becomes prevalent and more widespread in the cool season, cholera becomes epidemic in or soon after the rainy season, small-pox is more common during the hot months, probably because the virus travels more readily in the dusty dry weather than in the humid and cooler months. In places where there is a seasonal rainfall, the rainfall has a greater influence than the temperature.

Pressure and variations in elevation have no effect of themselves except in so far as they bring about conditions resembling those in temperate or tropical regions.

Although soil in itself has not much effect on the distribution of disease, the nature of the soil may have a certain amount of influence. The geology of the soil in itself appears to have very little effect, except in so far as it may affect the temperature and humidity of the earth. The configuration of the surface, exposure to sun and wind, the presence on its surface or in it of decaying organic matter are, however, important features. The water holding capacity of the soil is also held to be of importance. Soils which are damp and clayey are said to be favourable to diseases of the respiratory system; water-logged and marshy soils are favourable to the development of mosquitos and the diseases they carry; damp polluted soil favours the spread of ankylostomiasis, enteric fever, dysenteries and diarrhoea, either by direct contact with the infected earth, or indirectly by contamination of water supplies, and less often of food grains and crops. Variations in the level of the ground water are held to have some connection with the prevalence of cholera in epidemic form.

The influence of race by itself upon disease is not of such importance as it may appear: differences of race usually imply different standards of sanitation and hygiene, divergencies of diet, clothing, housing and customs. There is no true racial susceptibility or immunity.

Probably the most important factor in the development of disease is the movements of mankind. There are numerous examples of emigrants, traders, expeditions, carrying diseases to places which before were free from them. In this country the most important migration that speads diseases is the pilgrimage to festival centres. From Hardwar, for example, pandemics of cholera have spread round the world, and in every district in this presidency there are festival centres that are not only potential centres for the spread of cholera (for example) but have more than once actually been the centres of more or less widespread epidemics, and in the case of others, epidemics of cholera break out with the same regularity as the celebration of the festival (see maps 7 and 8). Wars and similar expeditions may lead to the diffusion of disease, although this cause is much less prevalent now than before, on account of the great attention paid to the sanitation of armies.

Man is not only the greatest single factor in spreading disease, but he is also the greatest single factor in preventing its spread. So many maladies have been controlled to the point almost of extinction, that one might very truly say that the distribution of disease is a measure of either man's ignorance of the causes of that distribution or of his lethargy and apathy. A certain amount of support to this idea can also be found in the fact that in active and progressive countries, not only is the knowledge of the causes of disease widespread but the prevalence of disease, as indicated by death rates, is very low, while the opposite is the case in more backward countries. Even in smaller areas it will be found that the more enlightened communities are more healthy than the backward.

The use of maps in Medical Geography.

The most commonly used form of map in determining the distribution of disease is the "spot map." (See maps 9. 10.) These are usually maps of towns or of limited areas on which cases of disease or deaths are shown by means of "spots." which mark the place where the case or death occurred. These show the

topography of the disease. In large scale maps such as those of towns or even portions of a town, which are used to follow the daily course of the disease, one spot will indicate one case of the disease. In smaller maps one spot will represent possibly a certain unit number. An accumulation of spots will at once draw attention to the particular area. These maps are often a great aid in drawing conclusions as to the cause and in devising methods of prevention. Such maps bring out clearly and more rapidly than any report can, the relation of local conditions to the disease, *e.g.*, water supply, class of habitation, class of population. Maps showing the distribution of disease over large areas, like countries, continents or the world are of little value unless they show clearly the time at which such a distribution was prevalent, for it must be remembered that the distribution of disease is not permanent. (See maps 1, 2, 3, 4, 5). In the case of those diseases that are present in all places at all times a map is superfluous. Maps of large portions of the world would only show the distribution of disease in a general way, and conclusions on this general representation cannot be drawn without a knowledge of the behaviour of the disease over smaller areas. The study of the geography of disease should therefore go on with the simultaneous study of its topography. As an example of this we might take malaria, the distributions of which, if represented on a map of the world, would be found to cover the entire tropical belt as well as a good proportion of the temperate belts as well. This however will not represent the true distribution of malaria, for there are very extensive areas in these belts where there is no malaria (see map 11) and if malaria were represented on a small scale map and therefore with probably more accuracy (as in a town) the distribution would be found to be still more irregular (see map 12).

In drawing maps of very large areas, like continents and the world, there will be numerous areas about which there will be no information. These areas should be definitely indicated as such. If left blank it might be taken to indicate that the disease is not prevalent in these areas. This defect may also appear on maps showing smaller areas. Maps may also be drawn to show the relative incidence or mortality of diseases in several countries or in the several divisions of a country, a key to the relative scale being always included in the map (see maps. 1, 2, 3. 4, 14).

Part II.

Now that we have considered the factors that may influence the geographical distribution of disease, and the methods by which this distribution can be determined and recorded, we may consider a few of the more important diseases and their distribution in the Presidency.

Smallpox. The large mortality from this disease, its rapid spread, and ready control by vaccination, give this disease a pre-eminent position in the list. So far as the medical geographer is concerned, this is one of the diseases, where it would be superfluous to draw a map, as it is universal in its distribution, no climatic factor or geographical feature, seems to have any effect on its distribution. Nothing—not even perfect sanitation—except efficient vaccination and revaccination appears to be able to control the disease. Although it is universally present, nevertheless, there is a seasonal periodicity, there being a greater incidence during the hot weather, and a more or less definite increase in virulence every 5 or 6 years. These variations however cannot be shown geographically or topographically on a map.

Cholera. This is a disease which is always the immediate concern of Public Health Departments in most tropical countries. In this Presidency out of the organisations devised to cope with this disease, arose the present highly organised Public Health Department. This is a disease, which is very much influenced by geographical and climatic factors. Rainfall, temperature and humidity, severally and combined, have a very close connection with the prevalence of cholera. The actual physical features of the soil are also contributory factors. Of these several factors rainfall is perhaps the single factor that has the closest connection and according to the rainfall the country can be mapped out into areas of cholera prevalence. It has been found the Presidency can be divided into three divisions (see map 13) according to the behaviour of the monsoon, *viz.*, those districts in which the chief monsoon is the South-West, those in which the chief monsoon is the North-East, those in which the two monsoons prevail. It is found also that these three groups of districts may be defined in relation to the Eastern Ghats, *e.g.*, Districts south of the Ghats include the coastal districts as far as Tanjore, and also the Ceded Districts, Chittoor and North Arcot; Districts North of the Eastern Ghats include

Malabar and South Kanara; in this group also is included Tinnevelly; a central group of districts include Salem, Trichinopoly, Coimbatore, Madura and Ramnad. In the Districts north of the Ghats the South West Monsoon prevails; in the districts south of the Ghats the North East Monsoon prevails; in the central districts both monsoons prevail. King showed that in this Presidency cholera followed the monsoons with great regularity, and Russell confirmed this observation and showed that the chief incidence of cholera in a district followed the chief monsoon, that districts with only one monsoon had only one cholera season, those with both monsoons had two cholera seasons, and that the chief epidemic followed the chief monsoon. There is another interesting point in connection with this disease, that is brought out in a study of large scale spot maps, and this is the close connection between pilgrim centres and outbreaks of cholera. Such a study will show that festival centres are centres of infection which spreads more or less regularly in a centrifrugal manner from the centre along the chief arteries of communication; should a stream of any size pass through the centre, the river will be found to act as an additional path of infection down its course. The festival centres of Palni and Tirupati have been studied in this connection. (See maps 7 and 8.). A third point that may be observed in studying maps of cholera outbreaks is that deltaic areas are endemic foci of the disease, an example of this may be seen in the delta of the Ganges which has been called the home of cholera and from whence it may spread all over India and even further. In our Presidency also examples may be found; *e.g.*, the delta of the Godavari and Kistna and the delta of the Coleroon. The latter has been particularly studied and from it, *i.e.*, from Tanjore District cholera has been traced in epidemic form to other districts. In fact, Tanjore is the chief endemic area in this presidency (see map 1. 2. 3. 4. 5). In certain places, cholera epidemics are associated with conditions of drought, *e.g.*, In Tanjore district, the Southern Taluqs are dry Taluqs, not only in regard to rainfall but also in regard to water supply. In this region when the dry conditions are at their worst, cholera epidemics are liable to occur, these being due to contaminated and unsafe water supplies being used owing to lack of or drying up of safe supplies. Here, with the rains, the cholera disappears, as the water supplies improve.

In this district also when the irrigation season begins, cholera spreads; and with the extension of the irrigated area there will probably be also an extension of cholera into the dry areas, which are now more or less free; and epidemics, which are now limited to the dry season, will become prevalent throughout the year, both factors being present, *viz.*, cholera carriers and endemic conditions. (see maps 14, and 15.)

Plague. This is a disease with a limited distribution under ordinary conditions, being limited to upland areas, and plateaux, where the temperatures are moderate and where the humidity is fairly high, these being the conditions favourable for the active propagation of the rat flea, and where the people in consequence of the climate tend to crowd together in small insanitary houses for shelter and warmth (see map 16.). The disease may however extend to any place when the conditions are favourable, as they may be when the rainy or cold season sets in, and when the particular rat flea concerned is also present. Instances of such spread are common in this Presidency. A good deal of the plague infection in our Presidency however comes in from the neighbouring states (see map 22). An endemic centre however is present in Madura and the Cumbum valley, where probably the infection is kept up by importation.

Relapsing Fever. This is a disease, where as in plague, conditions favouring overcrowding in a temperate climate with fair humidity are prevalent. It is therefore found in cool places, in the hills, and in the cold season of the year. (see map 18). It may however be found in hot places during the rainy season, as in Trichinopoly and Tanjore (see map 9) when the living conditions of the infected persons are such as to favour overcrowding in insanitary dwellings. This disease is spread by lice and it is easy to see how habits of personal hygiene can play a very important part in the incidence and spread of this disease. In fact it has been shown, that although climatic conditions are very important, the standard of personal hygiene is still more important, as in the outbreaks illustrated the persons infected were those of the lower classes, the higher classes escaping almost entirely, (see map 19). In this disease also, as in the case of plague, the infection appears to be imported from the neighbouring provinces (see map 20).

Malaria. This is a very important and disabling disease. It has been considered to be the cause of the downfall of more than one civilisation in the past, *e.g.*; those of ancient Greece and Rome are attributed as much to malaria as to invasions of the Barbarians, who were free from malaria. In former times malaria was extremely prevalent over large regions of the globe, extending practically throughout the North and South Temperate regions as well as the Tropics. At the present day it has receded considerably in the temperate regions and remains still very widely prevalent in the Tropics (see map 11). The reason for this recession is not any climatic or geographic factor, but the deliberate interference of man with the operation of the forces of nature. This disease is one of the best examples of the fact that the distribution of disease is not constant, but may be considerably modified by man's own activity. It will therefore be a legitimate conclusion, which can be proved by a study of the distribution of the disease, that the prevalence of malaria may be looked upon as an index of the advancement of a country, and wherever intelligent counsels prevail the disease will be found to be under control *e.g.*; Panama, the Suez Canal zone, the Straits Settlements, West Africa—all these places were extremely unheathy, but have now become either quite free from the disease, or have the disease under good control and on the way to extinction. The countries of Europe which were once very malarious, have become free on account of the extensive land improvements that have come about with their advancement, *e.g.*; intensive cultivation and under drainage. In our Presidency the disease is so widespread that it would appear superfluous to make a map showing its distribution, but if a sufficiently large scale map were made, it will be found that the distribution has certain peculiarities (see map 12). If the scale were large enough, it would be found that considerable areas were free from infection, *e.g.*; Country over 5000ft. above sea level, country where flood irrigation is common, especially during the period of irrigation, and hot dry localities, especially during hot weather. It will also be found that the foot hills and slopes of the the Ghats, especially the afforested areas, deep valleys even at some elevation, and dry crop areas at the time of the rains are very seriously infected. In more limited localities malaria will be found distributed where tanks, channels and irrigation channels are neglected and allowed to fall into disrepair. and in towns where

sufficient care is not exersised over casual and other collections of water; and in making a malaria survey maps on a large scale are produced to show the prevailing conditions. These are topographical maps, where the conditions are very much localised (se- map 24).

Yellow Fever. This disease is included here only to show in a very striking manner how the distribution of a disease may be changed by the intelligent interference of man (see map 6) as a result of which the disease has become extinct over large areas of the world's surface.

Hookworm Disease.—This is a disease which can be used as a good index of the sanitary development of a country; and in a country where the standard of sanitation is uniformly low—as it unfortunately is in this Presidency—the distribution of the disease is greatly affected by climatic conditions (see Map 22). In the dry districts the infection is low, in the wet districts the infection is high. The infection is greater in the country than in the town, as in many instances, in towns the standard of sanitation is slightly better than in the country.

Filariasis: which is a cause of elephantiasis is so commonly and widely prevalent in the Tropics (see Map 23) that it seems scarcely necessary to make a map for it. In our Presidency, it is more common in the coastal regions than inland, especially in the coastal districts such as Vizagapatam, Madras, Tanjore and Cochin. It seems to be absent in dry plateaux (see Map 24). The disease is not due to drinking contaminated water but to the bite of infected culicine mosquitos, and measures suitable for the extermination of Malaria are also suitable for the eradication of this disease.

Leprosy (see Map 25). It is stated that there are two million lepers in the world and that half of them are in India. The last census enumerated 15,700 lepers. No part of India is free. Of the provinces in India, Madras Presidency has the smallest proportion of lepers to the population, the ratio per 100,000 being in 1871, 44, in Bombay it was 85, in Bengal 52, and in Burma 116. According to the 1921 census, the ratio in Madras Presidency is about 37. The distribution of leprosy in the Presidency does not seem to show any common feature. Ganjam,

Vizagapatam, North Arcot, South Arcot and Malabar have the largest number of lepers, over 1,000 each; Bellary, Anantapur, and the Nilgiris have the least below 100 each (see Map 26). The distribution according to actual numbers of lepers is better than that according to ratios per 100,000, because the chief preventive measure being segregation and isolation, the extent to which these measures must be provided for is better estimated from actual numbers than from ratios. Leprosy in fish eating populations is said to show a peculiar distribution, being least on the coasts or river banks, increasing with the distance from the water and again diminishing as the interior is reached, where the fish eating population is least. This distribution is said to be due to the state of freshness or rather stage of decomposition reached by the fish as it is carried away from the rivers and waters.

Leishmaniasis.—The only form of this infection that we find in this Presidency is Kala Azar. The distribution of Kala Azar is along the East Coast and has been investigated closely in Madras and Tinnevelly Districts, where it is confined to the coastal strips of the district (see Map 27). The other form of Leishmaniasis, Oriental Sore, is not seen in this Presidency and it would appear from an examination of the distribution of Leishmaniasis in India, that where Kala Azar is prevalent Oriental Sore is absent (see Map 28).

Dengue is distributed chiefly in the central coastal and central districts of the Presidency, *viz.*: those between the sea and Mysore. It is also prevalent in Tinnevelly and Malabar (see Map 29). Although the sandfly is said by some to be the vector of the infection in this disease as in Kala Azar, the distribution is quite different to that of Kala Azar and much more extensive. The same can be said of the other view that the vector is a stegomyia mosquito as it is also a vector in Filariasis, but the distribution of the two diseases is quite different, (compare the Maps 23 & 24; 24 & 29).

Guinea Worm Disease is widely distributed in the dry districts, where also the water supplies are from step wells (see Map 30). The distribution of this disease can be very readily disturbed by the conversion of step wells into draw wells, and by the provision of protected water supplies.

Beri-beri and Epidemic Dropsy.—The latter is rare in this Presidency, being limited as far as we know to Madras City. Beri-beri on the other hand is common in the north coastal districts from Ganjam to Nellore (see Map 31). When the distribution in India is studied it is found that where epidemic dropsy is common, beri-beri does not occur and in localities where both diseases are present as in Bengal and Burma the areas infected with the one interdigitate with areas infected with the others "like pieces of a jig-saw puzzle." They do not seem to overlap. If limited areas are studied, it will be found that more cases of beri-beri are found in places with rice mills than in places where there are none, and that with the introduction of rice mills beri-beri also begins to be prevalent.

[Many of the maps used to illustrate the distribution of the diseases noted, have been specially drawn or adapted for the purpose; where original maps are not used the source of origin is indicated. I am indebted to the Director of Public Health for permission to use several maps illustrating the distribution of cholera, plague and relapsing fever.]

Maps.

1. Map C. 1. Distribution of Cholera in Madras Presidency. 1866. (By courtesy of the Director of Public Health).
2. Map C. 21. Distribution of Cholera in Madras Presidency. 1886. (By courtesy of the Director of Public Health).
3. Map C. 41. Distribution of Cholera in Madras Presidency. 1906. (By courtesy of the Director of Public Health).
4. Map C. 61. Distribution of Cholera in Madras Presidency. 1926. (By courtesy of the Director of Public Health).
5. Map C. 72. Distribution of Cholera in Madras Presidency, 45 years, (1881—1925). (By courtesy of the Director of Public Health),
6. Map showing the distribution of Yellow Fever, before 1925, and in 1925. (Modified from Manson—Bahr).
7. Spread of Cholera from Palni (Festival Centre), 1924. (After Russell).
8. Map C. 65. Spread of Cholera from Tirupati (Festival Centre), (1881). (By courtesy of the Director of Public Health).
9. Map No. 2. Spot Map of Relapsing Fever villages, 1923. (By courtesy of the Director of Public Health).

10. Spot Map of Malaria Infection in Madras, 1923. (Public Health Code).
11. The World Distribution of Malaria. (Byam and Archibald).
12. Distribution of Malaria in Madras Presidency. (From the Malaria Map of India—Suiton).
13. Distribution of Cholera in Madras Presidency according to Monsoon Prevalence. (Original).
14. Map C. 73. Distribution of Cholera Tanjore District. (By courtesy of the Director of Public Health).
15. Map C. 73. Spot Map of Cholera in Tanjore District. (By courtesy of the Director of Public Health).
16. Map P. 29. Distribution of Plague in Madras Presidency. 1926. (By courtesy of the Director of Public Health).
17. Invasion of Plague—Madras Presidency. (Original.)
18. Map B. Distribution of Relaping Fever in Madras Presidency 1922-23. (compiled from Annual Reports of the Director of Public Health, 1922-23).
19. Diagrammatic sketch plan of Village in Tanjore District showing Distribution of Relapsing Fever. (Public Health Code).
20. Madras Presidency—Invasion of Relapsing Fever from neighbouring states, 1922 1924. (Original).
21. Distribution of Malaria in Madras Presidency, 1927-28.
22. Hookworm infection in Madras Presidency. (Chandler).
23. World distribution of Filariasis (Manson—Bahr).
24. Filariasis in Madras Presidency. (Megaw 1927).
25. World distribution of Leprosy. Manson—Bahr.)
26. Distribution of Leprosy in Madras Presidency, Census 1921. (Original).
27. Distribution of Leishmaniasis. (Manson-Bahr.)
28. Distribution of Kala Azar in Madras Presidency Megaw).
29. Distribution of Dengue. (Megaw).
30. Distribution of Guinea Worm. (Megaw)
31. Distribution of Beri-beri and Epidemic Dropsy. (Megaw

An ordinary meeting of the Association was held at 6-30 p.m. on Thursday the 28th March 1929 in the Medical College Hall, when Capt. A. M. V. Hesterlow, I. M. S. read a paper on "*The Goography of Disease: with special reference to South India*" Col. J. W. D. Megaw, C. I. E., V. H. S., I. M. S., Surgeon-General with the Government of Madras occupied the chair. Besides a number of visitors, among the members present were Messrs. S. Lakshmana Iyer, G. Ratnam Pillai, K. K. Raghava Charya, A. Appadorai, Miss F. A. Baker, Messrs. N. Subramanyam, S. Veeraraghava Chari, and L. R. Sundaresa Iyer.

After a few introductory remarks from the Chairman, Captain Hesterlow read the paper (printed above). A short discussion ensued.

In his concluding remarks the chairman pointed out that very often the increase in figures regarding a particular disease was due to the opening of a new treating centre where the existence of the disease was recognised and people began to congregate. Maps showing the distribution of diseases have sometimes to be prepared from the personal impressions of the local doctor. An accurate disease survey of India is long overdue, and he was glad to know that in Madras they were talking up the question. There ought to be a good organisation in which every medical man, whether offical or private practitioner, should take part in the supply of accurate facts, so that the maps prepared from such materials may be reliable. A questionnaire is not generally useful in getting trustworthy facts, as often there is little response. In conclusion, he said, he had great plesure in being there that evening, as he enjoyed the lucid and interesting paper of Capt. Hesterlow. He congratulated the Madras Geographical Association on arranging for the study of a subject in which members of his profession were also interested

With a vote of thanks to the chairman and the lecturer the meeting came to a close.

The Home Country:

(*According to the new A-group Syllabus of the S. S. L. C. Course*).

Assuming that the present syllabus in Geography is to stand—for the extraordinary delay of the S. S. L. C. Board in finally approving and publishing it makes one suspect that it may yet be scrapped—it is proposed to give here some running hints and comments on the treatment of the Geography of India at the High School stage as a A-group subject. It is hoped that even if it undergoes any modifications the authorities will see to it that the syllabus is Indo-centric and not Brito-centric.

Glancing at the present syllabus as a whole, it will be found that the approach to this 'round of the world' is from the Indian Ocean and India and that the course is rounded off towards the end of the third year 'by posting up the ledger' as it were, the Geography of the Home Country being revised with a knowledge of the world background and with a greater emphasis on the economic side. In this article, however, we shall confine ourselves to a portion of the first year's work, and offer a few hints and suggestions regarding the plan and method of treatment of the Geography of India in accordance with the syllabus.

After the introductory lessons on the position and winds and currents of the India Ocean are finished, the transition to the climate of India is an easy and natural one, and is far preferable to going back to start the study of India in the usual order of position, coastline, structure, relief, climate etc. In fact, the study of the Monsoons of India is pushed on as a continuation of the study of the winds of the Indian Ocean in some detail.

Four lessons can be given on the climate of India, two on the monsoon winds and rainfall (summer and winter), and two on temperature conditions (January and June). With regard to the latter, stress may be laid on the comparative range of temperature in differents parts of the country; and in this connection the Indus basin will receive a special and fuller treatment on account of its continental character leading to the formation of low pressure thereabouts and to its becoming the goal of the monsoon winds. Further, as there is no provision in the syllabus for a separate treatment

of this region, it is suggested that the main facts of its human geography with special reference to irrigation works and chief crops may be dealt with incidentally in this connection. The principal method to be followed here as later on is that of map study. The pupil learns the chief climatic facts and principles by reading the temperature winds and rainfall maps with the help of the suggestive questions of the teacher, and notes them in his own outline maps as well as in his note-book. This section can fitly close with a division of the country into natural (mainly climatic) regions.

For regional study of the country the Ganges Basin is taken up first as a typical river-basin. The main topics in this section have been clearly indicated in the syllabus; and it is suggested that four or five lessons may be given on them, two on the physical side and two or three on the human side. In considering the crops of the three sub-regions of the Gangetic plain, those of the Indus basin may be contrasted. With regard to the location and development of important towns, it is not expected that the pupils should be made to get up exhaustively all the causes that may be at work but that they should trace under the guidance of the teacher and with the help of large scale maps or diagrammatic sketches the broad and essential factors of site and situation that have operated in history or have been still at work at the present day.

Four lessons are suggested on the Deccan region. Without dragging in any geology it is belived that it is easily possible to bring home to the pupils by means of models or illustrations the idea of "*an old crust block with an upturned edge to the west*": that it is the core or oldest part of the land is not a difficult conception. The area may be subdivided into the lava lands of the north-west, the higher plateau of the south (both being comparatively dry regions) and the more dissected plateau of the north-east, forming the middle basins of the Mahanadi and the Godaveri with heavier rainfall and surrounded by a ring of forested highlands. The correlation of the differences of rainfall and soil conditions with the resulting crops and forests and the distribution of population forms an interesting study for the pupils. The railway routes and the location of the important towns along these routess may be studied in relation to relief.

For the two coast strips four or five lessons are suggested—three for the west coast and one or two for the east coast. The study

of the coastline comes in for the first time; and the two coasts may be contrasted now. The idea of faulting (of the west coast strip) is easily explained by means of models or diagrams. This coast divides north to south into two sub-regions both stucturally and climatically with the lava soil in the north and the old rocks in the south, and with a difference of rainfall. The importance of spice trade in history is interesting, and may be touched upon.

The east coast region may similarly be sub-divided north to south into two sub-regions about the latitude of Nellore according to differences of rainfall conditions mainly; and the deltas can be taken up for separate treatment, and contrasted with the Gangetic Delta in the ways mentioned in the syllabus.

Ceylon is to be treated as a region of insular or maritime climate and affording as such a strong contrast to the Indus Basin. One or two lessons will do.

About twenty lessons or one short term's work at two periods per week is the aggregate time that will be required to cover the portion of the first year syllabus dealing with India. The treatment of India in the third year will be dealt with in a separate article in a later issue.

Until text-books written according to the syllabus are available, the existing books have to be used judiciously under the guidance of the teacher. L. D. Stamp's Regional Geographies of India, Part IV, published by Messrs. Longmans, Green and Co., is no doubt a good book; but it is too full and too high to serve as a text-book at this stage for a meagre A group syllabus, though it can be profitably used as a reference book. C. Morrison's Geography of the Indian Empire in English, published by Nelson, is not quite modern in treatment; while his Tamil and Telugu editions of a more recent book, published by Macmillan, is not available in English. David Frew's Regional Geography of the Indian Empire (Blackie) is too matter of fact, and not modern in treatment. H. Pickles' India, World and Empire (Oxford) is recent and quite good so far as it goes, but the section on India needs supplementing by the teacher.

For the teacher's reference Imperial Gazetteer of India (Imperial series) Volume I and India by Sir Thomas Holdich (Oxford Regional Geography Series) are two good but rather old books.

The attention of teachers is specially drawn to the following magazine articles, which will be found to be very valuable, suggestive and interesting:—(1) 'Notes on the Natural Regions of India' by J. N. L. Baker in the Summer Number 1923 (No. 81) of "Geography", (2) 'The Natural Regions of India' by L. D. Stamp in "Geography", Autumn Number, 1928 (No. 82), (3) 'Cultural Regions in India' by F. J. Richards in "Geography", March, 1929 (No. 83) and 'Geographic Regions of India' by D. R. Bergsmark in the Journal of Geography—March, 1929.

For the pupils' use one of following atlases is suggested:—The Indian School Atlas by J. Bartholomew (Oxford University Press); Indian Schools Improved Atlas (published by. The Calcutta Fine Arts Cottage); Longmans Vernacular Atlases in Tamil and Telugu; W. & A. K. Johnston's Enlarged Atlas for Indian Schools (Macmillan & Co.).

For class use Philip's Series of 8 Wall Maps of India are recommended.

N. SUBRAHMANYAM, M. A., L. T.

List of Minimum Geographical Equipment for a High School.

Furniture :—Flat tables or teapoys are to be preferred to sloping desks. Armless chairs are to be preferred to stools or long benches, as affording support to the spine and allowing free movement of pupils from place to place. Map-hangers are to be preferred to easels as being more economical in space and money and as being more effective. These are rods, hanging from ceiling by ropes moving over pulleys, with movable hooks on which eyeletted maps can be hung. Eyeletted maps are dissected and folded, and can conveniently be put into drawers, a chest of which is necessary. One or two wall cup-boards for keeping globes and other small appliances, a notice-board for putting up cuttings of pictures and news items of geographical interest, and a graph-board in addition to an ordinary black-board are other necessary pieces of furniture. It is presumed that a separate room is set apart for Geography.

Apparatus and appliances :—*Globes* :—A fairly big globe of not less than 12" diameter, a slate globe of about the same size, and some three or four small globes for pupils' use may be considered necessary. Special Seasons Apparatus of any kind is costly is not indispensable.

Maps:—One-inch Ordnance Survey maps of the home region ; the district, the taluq and the town survey maps, systematic sets of maps of the World, India and each of the continents, a physical map of the Madras Presidency, and map-building sheets or outline demonstration maps of the same areas are required. (For the choice of these maps reference may be made to the catalogues of Oxford University Press, George Philip & Sons whose Madras agents are Longmans, Green & Co., W. & A. K. Johnston whose Madras agents are Macmillan & Co., and Bacon & Co., whose Madras agents are Blackie & Sons).

Plans, Charts and Diagrams, available from the publishers mentioned above, are better prepared by the drawing master, geography teacher and the pupils in co-operation. Such work will be enlargements of illustrations in books and periodicals or adaptations of them, and preparation of charts and diagrams from statistical and descriptive material.

Pictures:—The same publishers have produced typical pictures of geographic value at fairly low price. Cheap picture postcards, prepared by R. Tuck & Sons as well as by several photographers, and albums of cuttings from pictorial magazines by the teacher and pupil in co-operation, advertisement pictures of railway, shipping and tourist companies, etc., can all serve the purpose well.

The stereoscope with a collection of typical views and a lantern and slides are very useful.

Meteorological Instruments.—Wet and dry bulb, and maximum and minimum thermometers, an aneroid barometer, the rain-guage, and a wind-vane are the minimum essentials, which need not however be duplicated if they can be made readily available from the science laboratory. An album of weather report can be prepared from cuttings from the daily newspaper.

Mathematical Instruments.—For the teacher's use of the blackboard a protractor, T-square, set squares, etc., and for purposes

of elementary surveying and of measurement of heights and distances, and for measuring sun's altitude from time to time, a simple plane-table, a tape-measure, a clinometer, a sextant, a prismatic compass and an altiscope may be provided. A few lenses are required for map-reading.

Museum:—Museum articles are best collected or prepared by the pupils and not purchased. They should be renewed from time to time.

A Suggested List of Geography Books.

Books for Reference

The World of To-day (6 Volumes)	Hope Moncrieff	Gresham Publishing Co.
Hand-book of Commercial Geography	Chisholm & Stamp	Longmans Green & Co.
Industrial and Commercial Geography	Russell Smith	Henry Holt & Co.
Physical Geography	Lake	Cam. Univ. Press
Shorter Physical Geography	De Martonne	Christophers
Climates of the Continents	Kendrew	Oxford Univ. Pr.
The New World	I. Bowman	Harrap
Geography and World Power	Fairgrieve	Lond. Univ. Pr.
The Relations of Geography and History	George	Oxf. Univ. Press

General Books for the Teacher

Human Geography	Brunhes	Rand McNally
Principles of Human Geography	Vidal De La Blache	Constable
The Groundwork of Geography	Wilmore	Bell & Sons
Principles of Geography	E. G. Skeat	Oxf. Univ. Press
The World and its Discovery	Wetherill	Oxf. Univ. Press
World Geography and World Problems	Unstead	Sidgwick and Jackson
Modern Geography	Newbigin	William &Norgate
Scientific Study of Scenery	Marr	Methuen
The Dominion of Man	Prothero	do
Geographical Essays	W. M. Davis	Heath & Co.
Climatic Control	Bonacina	A. & C. Black
Commercial Geography	Newbigin	William &Norgate
Man on the Earth	Lyde	Blackie

Man in many Lands	Lyde	A. & C. Black
Man and his Work	Herbertson	do
Man and his Conquest of Nature	Newbigin	do
An Introduction to Plant Geography	Hardy	Oxf. Univ Press
Animal Geography	Newbigin	Oxf. Univ. Press
General and Regional Geography	Unstead & Taylor	Geo. Philip & Sons
The Influence of Geographic Environment	Semple	Constable

Method Books for the Teacher

Geography in School	Fairgrieve	Lon. Univ. Press
Geography in education and Citizenship	Barker	do.
The Teaching of Geography	Wallis	Cam. Univ. Press
Unit Studies in Geography	Clark	World Book Co., Chicago
The Teaching of Geography	Sutherland	Scott, Foresman & Co.
School Geography	Bradford	Ernest Benn
Principles and Methods of Teaching Geography	Holtz	The Macmillan Co.
The Teaching of Geography	Welpton	Univ. Tutorial Pr.
Special Method in Geography	Mc Murry	The Macmillan Co.
Teaching of Geography	Branom	Ginn & Co.
The Scope of School Geography	Brown, Howarth & McFarlane	Oxf. Uni. Press
Teaching of Geography and History	Mackinder	G. Philip & Son.
The Teaching of Geography in Elementary Schools	Archer, Lewis & Champman	A. & C. Black
The Teaching of Geography in Elementary Schools	Dodge and Kircheway	Rand McNally
The Teaching of Geography to Children	L. Winchester	Methuen & Co.

Text books Illustrative of Modern Methods of Treatment

Human Geography (Two books)	Russell Smith	John C. Winston Co., Chicago
Human Geographies (Primary and Secondary Series (6 and 3 books)	Fairgieve & Young	G. Philip
New Regional Geographies (4 books)	Fairgrieve & Brooks	Lon. Univ. Pr.
Junior Regional Geographies (3 books)	Barker & Brooks	do.

Essentials of World Geography	Unstead & Taylor	G. Philip & Son.
The World (Indian Edition)	Stamp	Longmans, Green & Co.
Regional Geographies of India	do	do.
The World	Howarth & Bridewell	Oxf. Univ. Press
Introduction to World Geography	Wilmore	G. Bell & Sons
Complete School Geography (2 Vols).	Taylor	Methuen & Co.
The World	Newbigin	Christophers

Books on Practical Geography :

Applied Geography	Steevens	Blackie
Practical Exercises in Geography	Wallis	Macmillan
Practical Geography	Unstead	Oxf. Univ. Press
Class book of Practical Geography	Fairgrieve and Young	G. Philip
Practical Geography	Finch	Evans Bros.
Outdoor Geography	Hatch	Blackie
Educative Geography	Haddon	do
Field Work for Schools	Harrison and Hunter	Pitman
Introduction to Practical Geography	Simmons & Richardson	Macmillan
Geographical Exercise Books for India	Stamp	Longmans

Atlases for Reference

Oxford Advanced Atlas	Bartholomew	Oxf. Uni. Press
Philip's Systematic Atlas	George Philip	Philip
Oxford Economic Atlas	Bartholomew & Lyde	Oxf. Univ. Press

Atlases for Pupils

The Indian School Atlas	Bartholomew	do.
The Indian Schools Improved Atlas		Calcutta Fine Art Cottage
Enlarged Atlas for Indian Schools	Johnston	Macmillan
Vernacular Atlases (Tamil and Telugu)		Longmans

Books for Pupils' Library

Adventures of Exploration (6 books)	Scott Keltie & Gilmour	Philip
Peeps at Many Lands (Series)		A. & C. Black
The Romance of the Wor d (Series)		Ox. Univ. Pr.

The Pioneer Library		Blackie
The Romance of Travel (Series)		Ox. Univ. Pr.
Descriptive Geographies from Original Sources (Series)	Herbertson	A. & C. Black
Scholar's Book of Travel (4 books)		G. Philip

Magazines and Periodicals :

Journal of the Madras Geographical Association	M. Geo. Assn.
Geography	Geo. Assn., 1, Marine Terrace, Aberystwyth, (Wales.)
Journal of Geography	A. J. Nystrom & Co. (Chicago)
National Geographic Magazine	National Geographic Soc. of America, Washington
Geographical Review	American Geo. Society of New York
Scottish Geographical Journal	Roy. Soct. Geo. Soc., Edinburgh.
The Geographical Journal	Roy. Geo. Soc., London.
The Times of India Illustrated Weekly	The Times Prs, Bombay.
The Pictorial Education	Evans Bros., London.
The Indian Pictorial Education	The Times Prs. Bombay.

News and Notes.

The scheme for constituting a Department of Geography in the University of Madras, which was recommended by the Academic Council has not been accepted by the Senate at its October meeting owing to some technical objection to the proposal. The long expected Diploma Course intended to create a set of qualified teachers in the subject, has now little chance of being started in July next.

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Since the formation of the Madras Geographical Association some other provinces such as Bombay, Bihar, Burma and the Punjab have also started Geographical Associations. To co-ordinate their activities, a periodical conference of the Geographical Associations in India has been proposed.

Meantime, the need for preparing the qualified teacher of Geography has become more urgent not only for work in the Intermediate classes but also for handling the subject on right lines in the High School classes. The Malabar District Board has, therefore, to be congratulated on having run a successful Refresher Course in Geography during the last Dasara holidays for the benefit of teachers in the whole district. It is hoped that other District Boards would follow this commendable example and thus satisfy an immediate educational need.

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On the request of several teachers a short list of necessary equipment in Geography with a select list of books has been included in this issue. It is intended to publish supplementary lists from time to time.

Books and Journals Received.

The World in Outline—Book I by J. T. Mulley (Edward Arnold.)

Essentials of World Geography for Junior Students by J. F. Unstead and E. G. R. Taylor (George Philip and Son.)

A New High School Geography—Part I—The Indian Ocean Basin by V. K. Subrahmanya Ayyar (Palghat.)

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Field Experiments with Calcium Cyanide as Manure : Bulletin No. 94 of the Madras Agricultural Department.

The Work of the Livestock Section : Bulletin No. 95 of the Madras Agricultural Department.

Cultivation of Grape Vines : Bulletin No. 96 of the Madras Agricultural Department.

Rural India : August, September, and October 1929.

The South Indian Teacher : August, Sept. and Oct. 1929.

The Geographical Journal : August, Sept. and Oct. 1929.

The Educational Review : August, Sept. and Oct. 1929.

Journal of the Travancore Teachers' Association : Sept. 1929.

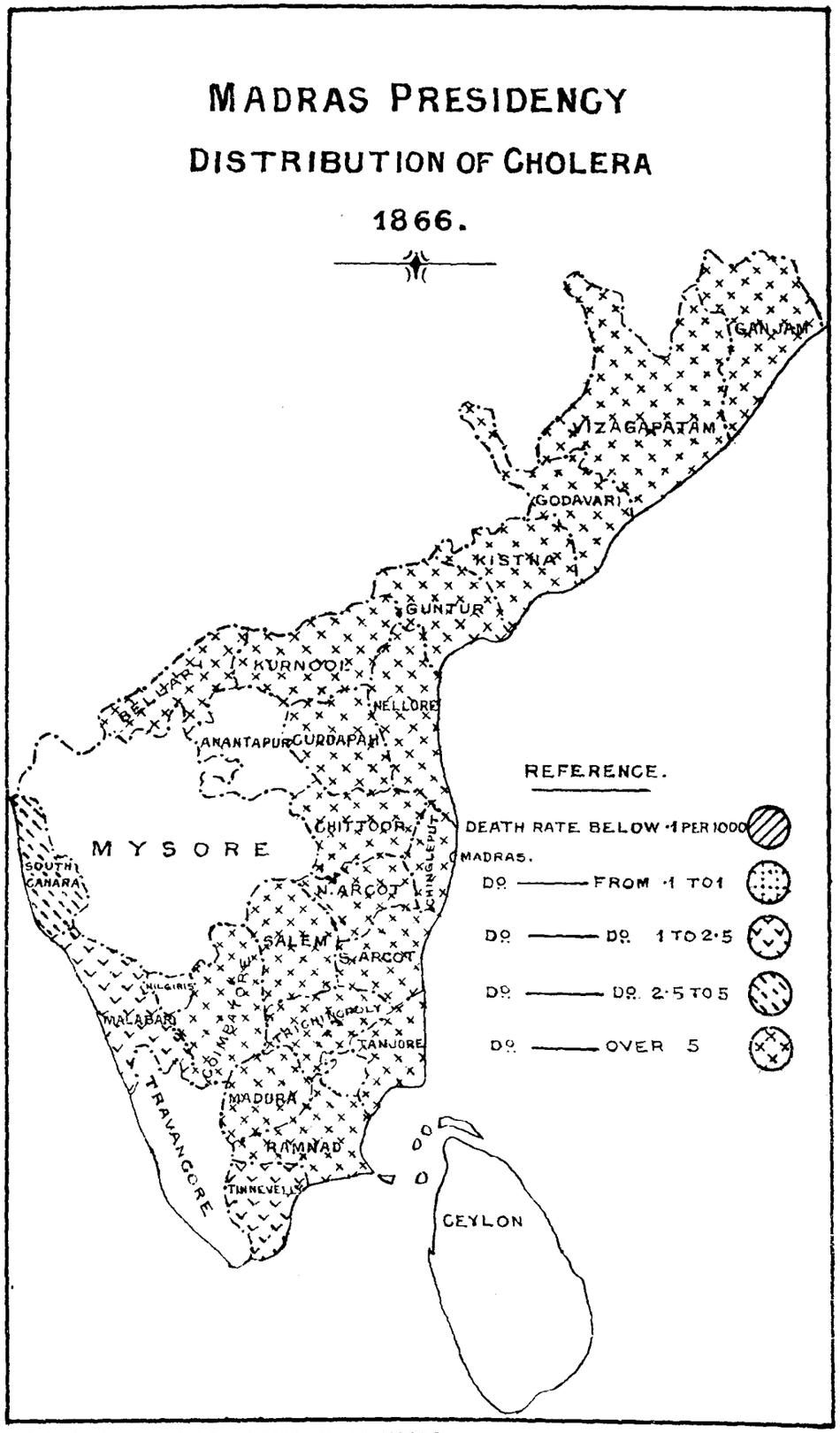
Quarterly Journal of the Mythic Society : October 1929.

Exploits of King Kampila and Kumara Ramanatha : Reprint from above.

Geographical Review : October 1929.

Geography : September 1929—Vol. XV, Part 3.

Our Home Magazine : October 1929.



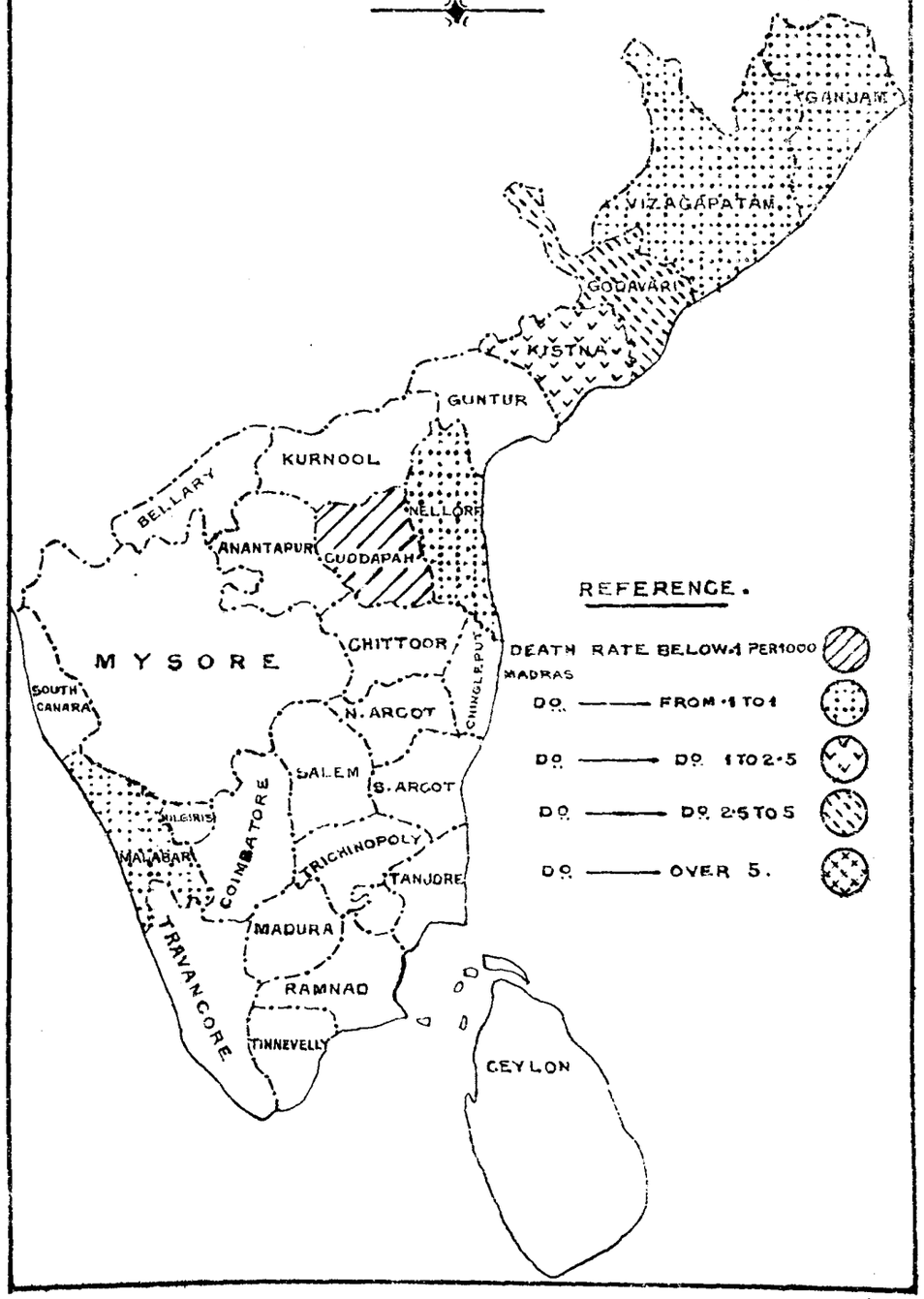
LITHO: BY P. N. N. R. SONS. PURASAWALKAM, MADRAS.,

C. 1.

MADRAS PRESIDENCY

DISTRIBUTION OF CHOLERA.

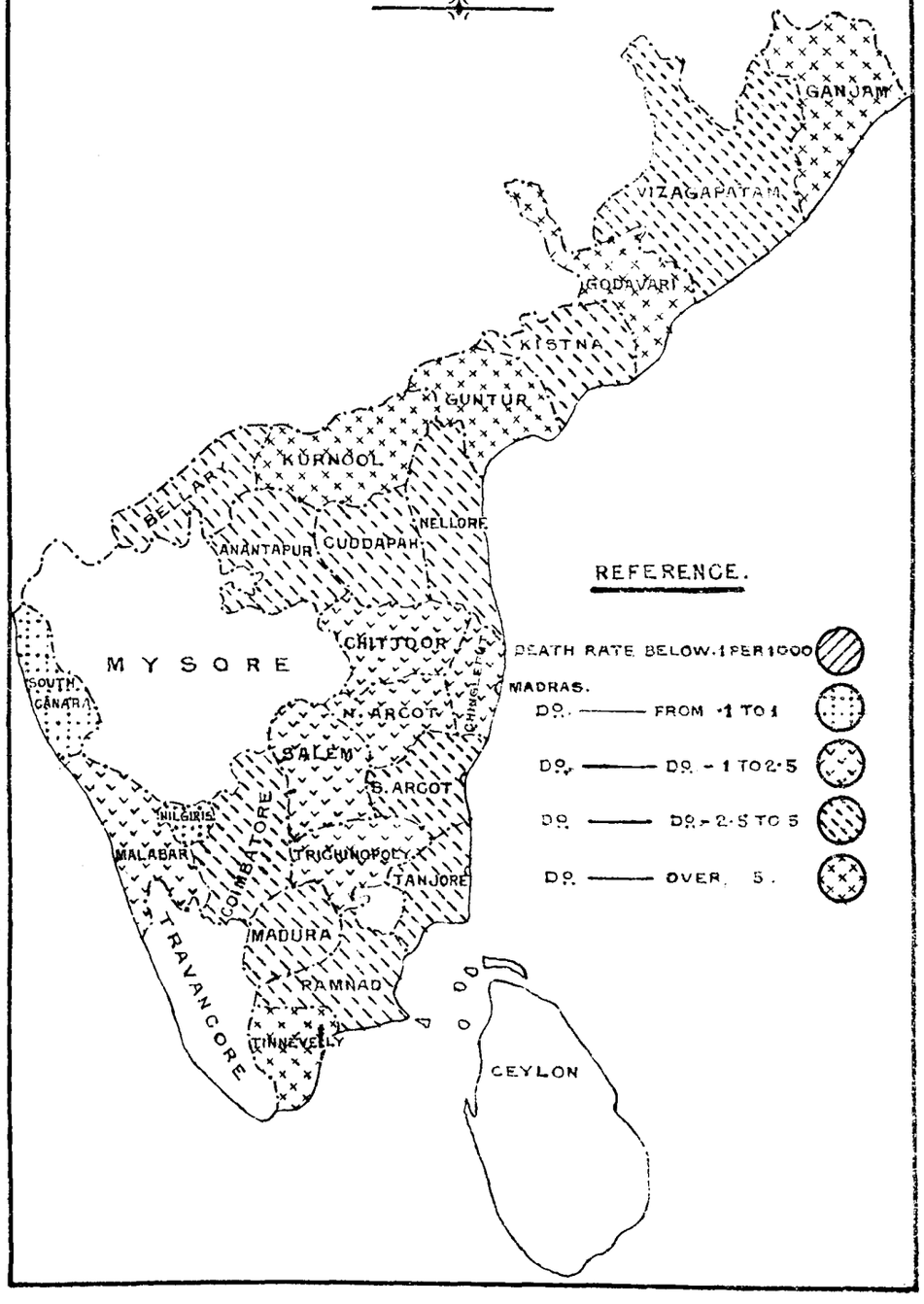
1886.



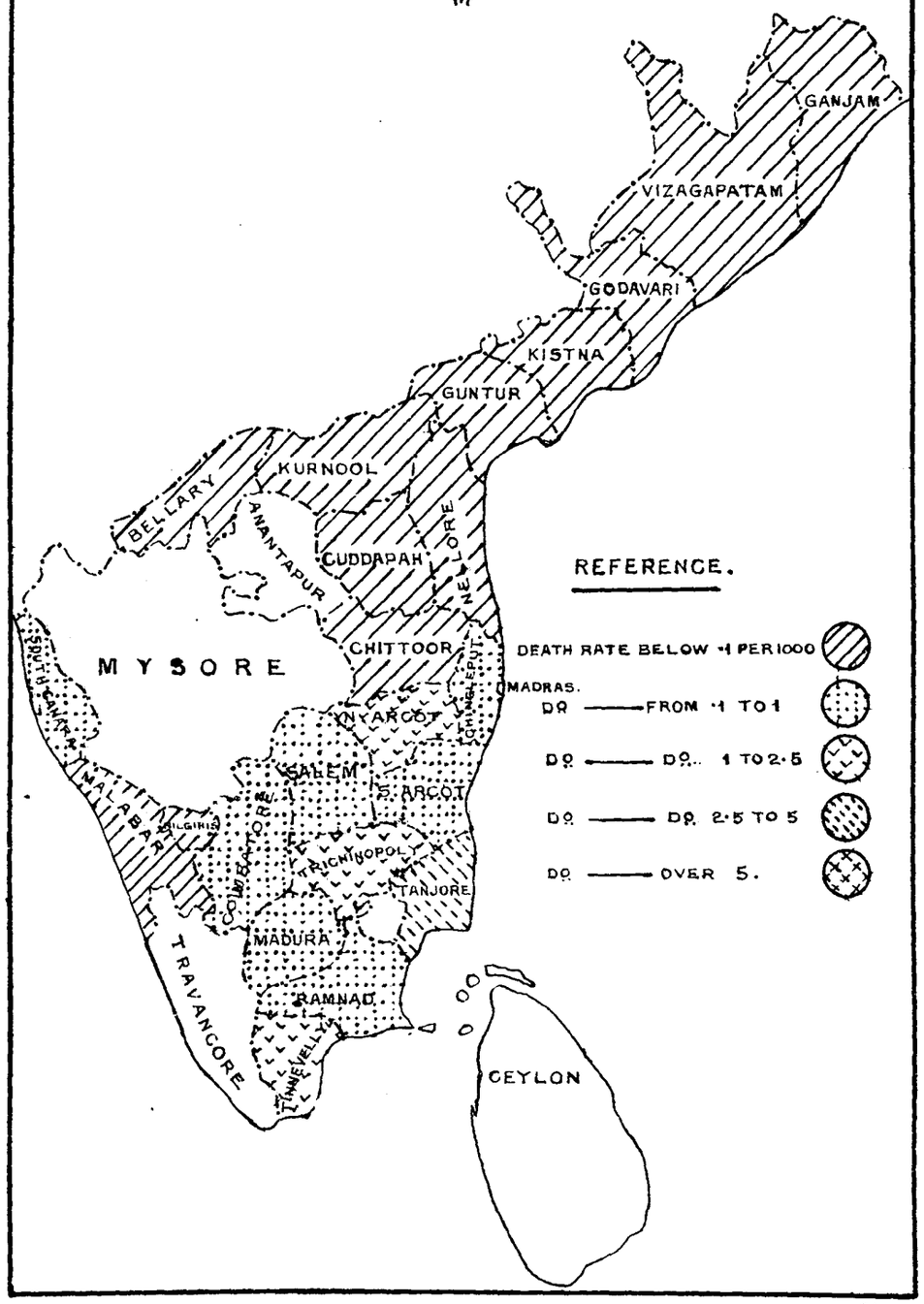
MADRAS PRESIDENCY

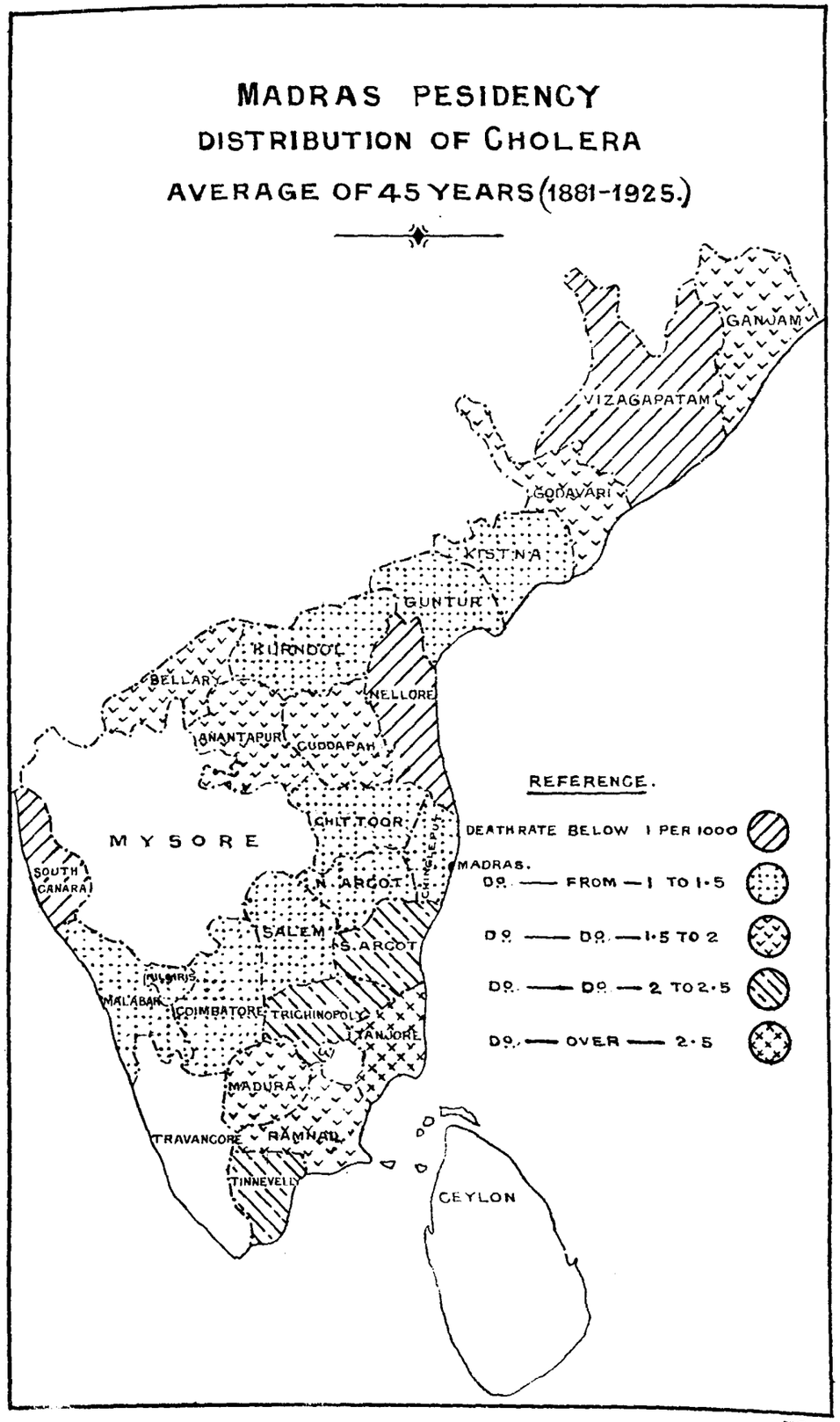
DISTRIBUTION OF CHOLERA.

1906.

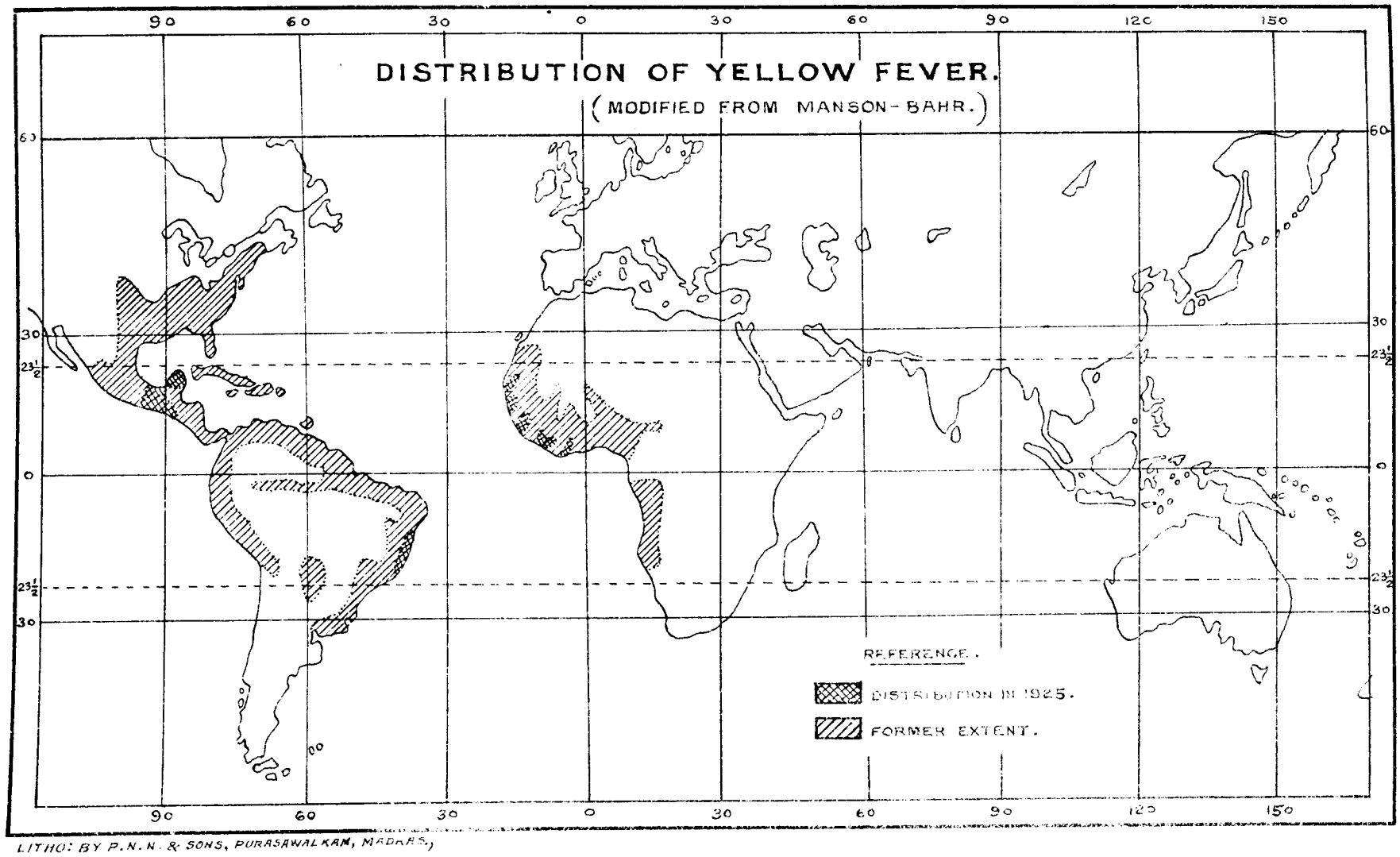


MADRAS PRESIDENCY
DISTRIBUTION OF CHOLERA.
1926.

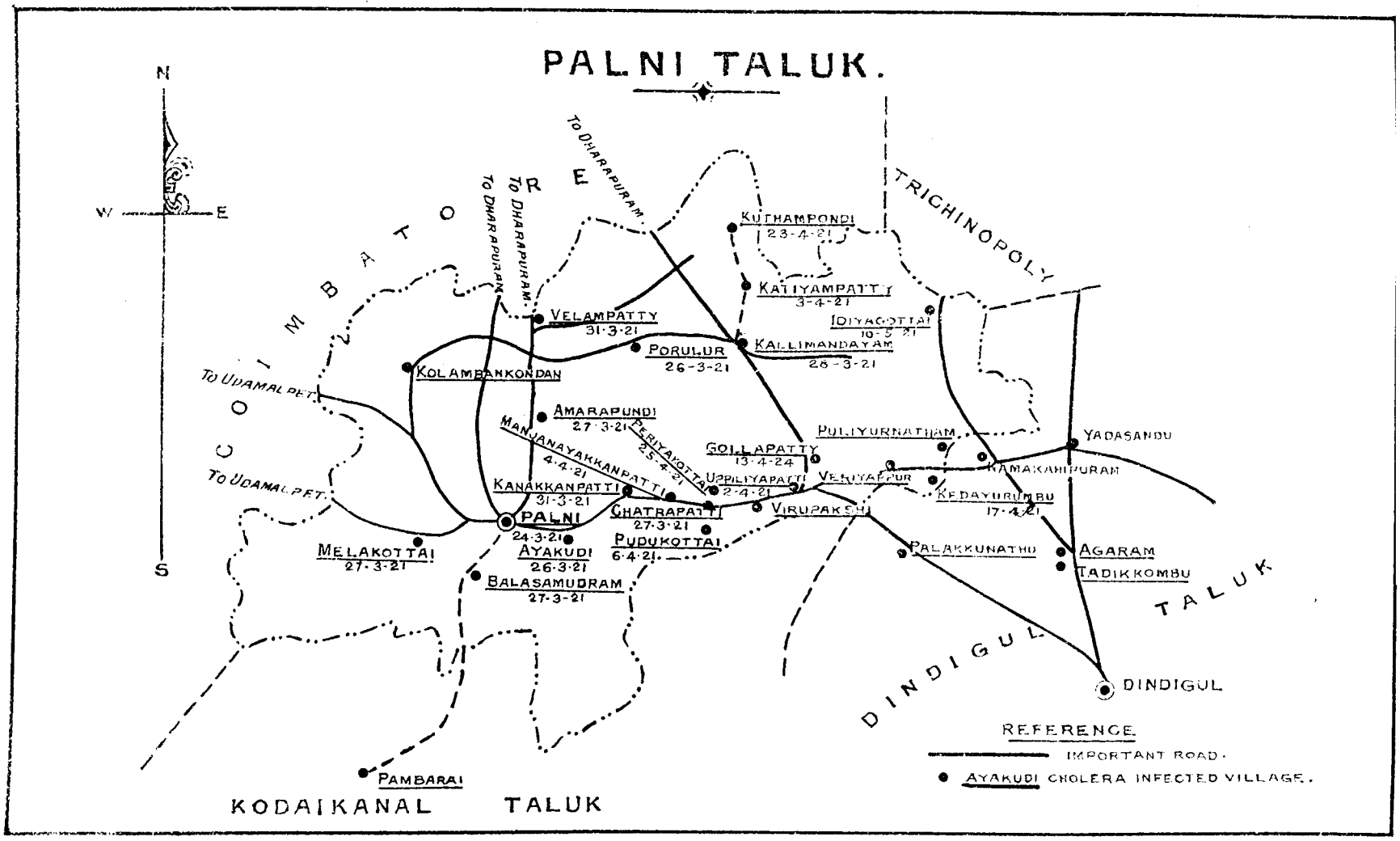



MADRAS PESIDENCY
DISTRIBUTION OF CHOLERA
AVERAGE OF 45 YEARS (1881-1925.)
GANJAM
VIZAGAPATAM
GODAVARI
KISTNA
GUNTUR
KURNOOL
BELLARY
NELLORE
ANANTAPURI
CUDDAPAH
CHITTOOR
MYSORE
SOUTH CANARA
N. ARCOT
SALEM
S. ARCOT
NILGIRIS
MALABAR
COIMBATORE
TRICHINOPOLY
TANJORE
MADURA
TRAVANCORE
RAMNAD
TINNEVELLY
CEYLON
REFERENCE.
DEATHRATE BELOW 1 PER 1000
MADRAS.
Do. —— FROM — 1 TO 1·5
Do. —— Do. — 1·5 TO 2
Do. —— Do. — 2 TO 2·5
Do. —— OVER —— 2·5

72.



LITHO: BY P.N.N. & SONS, PURASAWALKAM, MADRAS.)

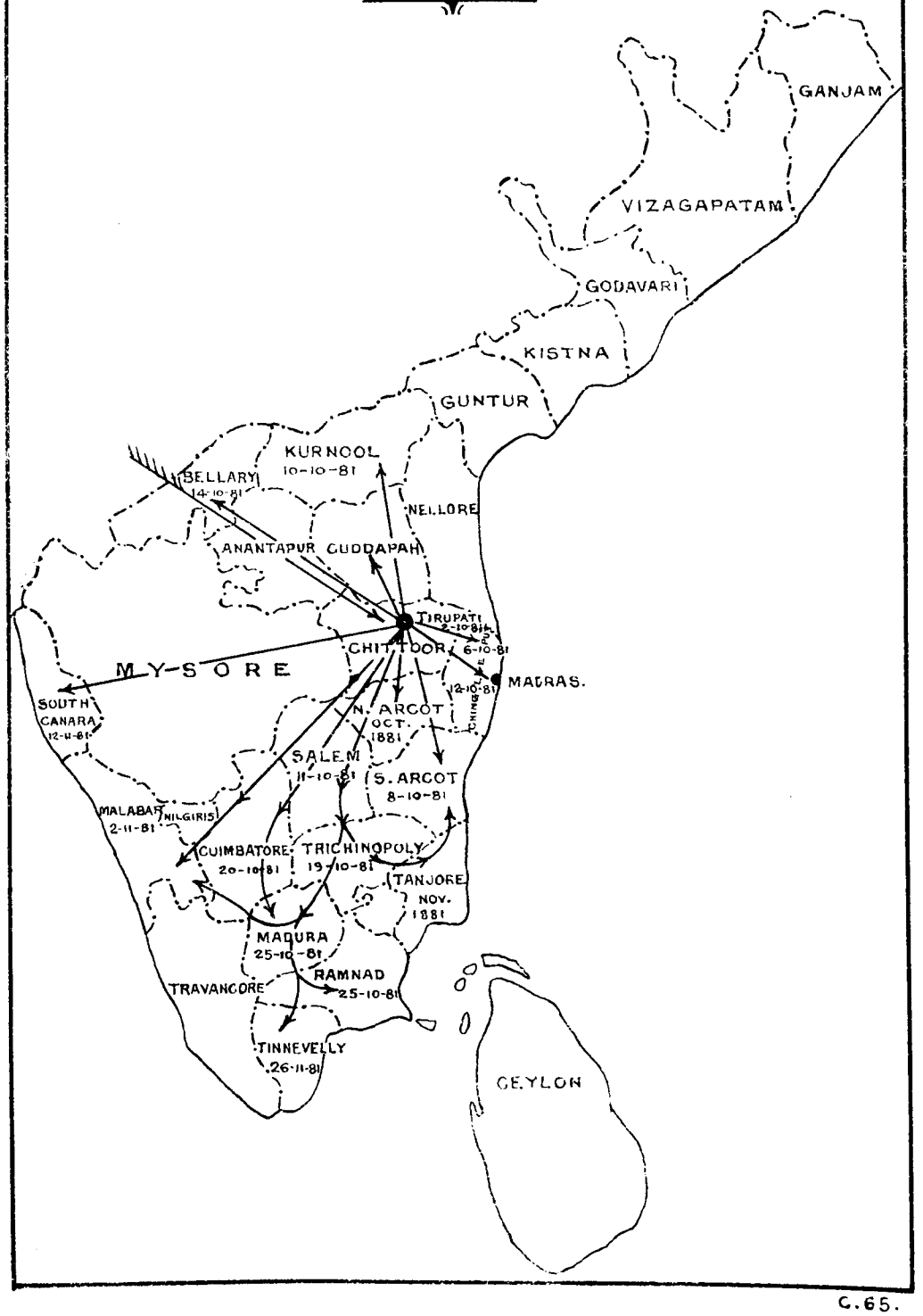


LITHO: BY P. N. N. & SONS. PURASAWALKAM, MADRAS.,

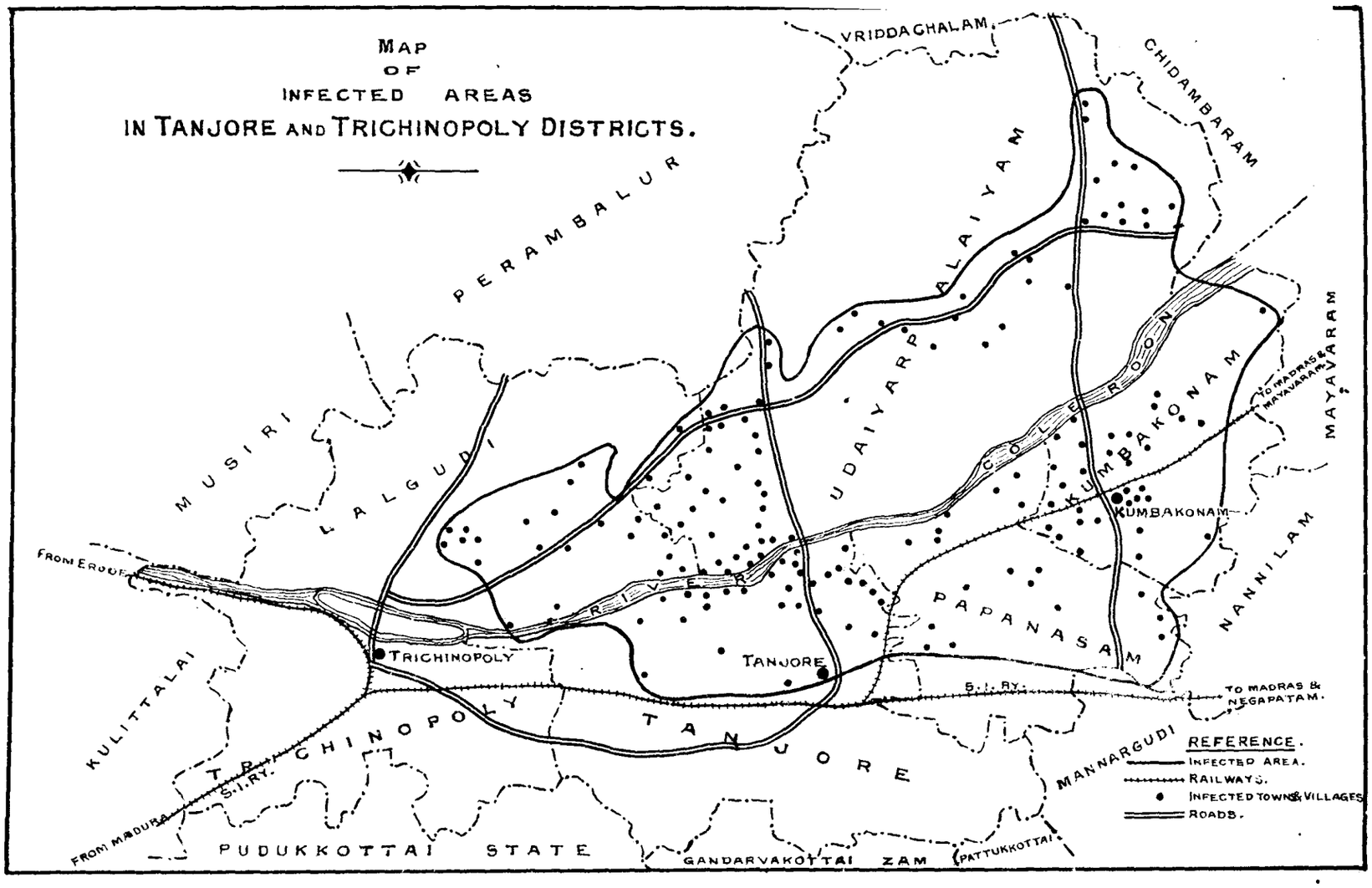
7.

MADRAS PRESIDENCY

SPREAD OF CHOLERA IN 1881.



C.65.

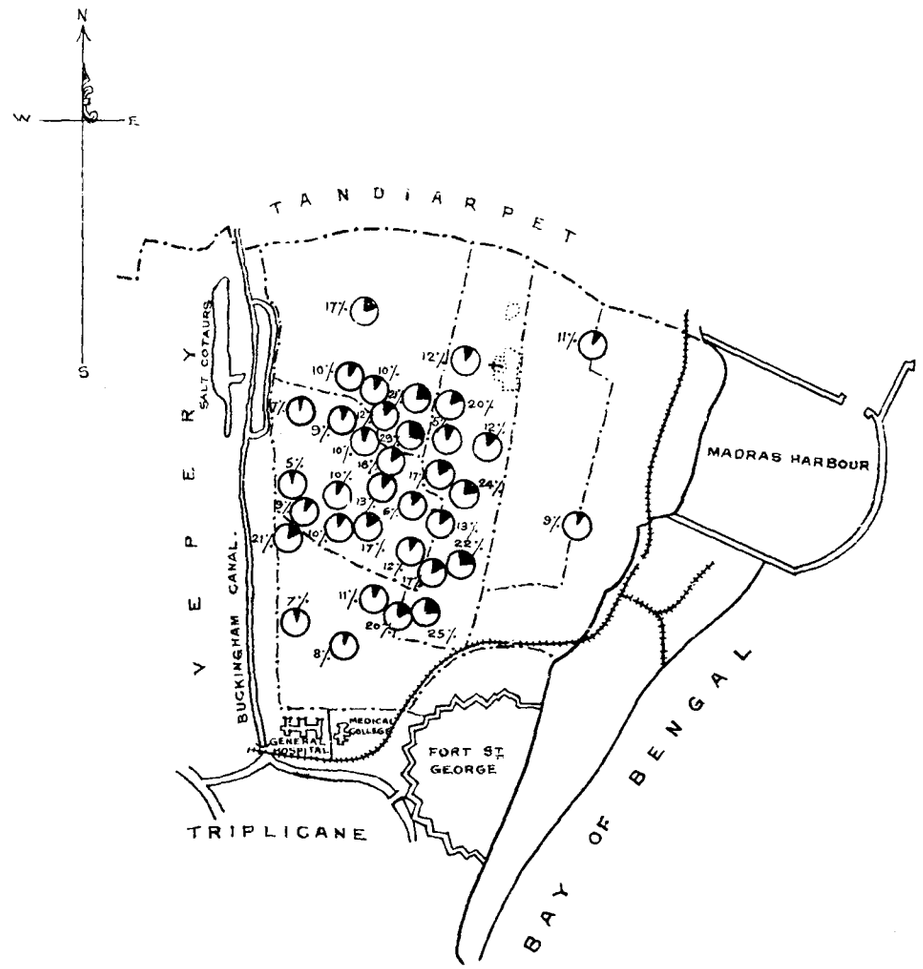

MAP
OF
INFECTED AREAS
IN TANJORE AND TRICHINOPOLY DISTRICTS.
VRIDDAGHALAM
CHIDAMBARAM
PERAMBALUR
MUSIRI
LALGUDI
UDAIYARPALAIYAM
COLEROON
KUMBAKONAM
TO MADRAS & MAYAVARAM
MAYAVARAM
NANNILAM
FROM ERODE
RIVER
TRICHINOPOLY
TANJORE
PAPANASAM
S.I.RY.
TO MADRAS & NEGAPATAM.
KULITTALAI
TRICHINOPOLY
TANJORE
MANNARGUDI
FROM MADURA
S.I.RY.
PUDUKKOTTAI STATE
GANDARVAKOTTAI ZAM
PATTUKKOTTAI
REFERENCE.
INFECTED AREA.
RAILWAYS.
INFECTED TOWNS & VILLAGES.
ROADS.

MAP OF GEORGE TOWN

SHOWING THE SPLEEN RATES.

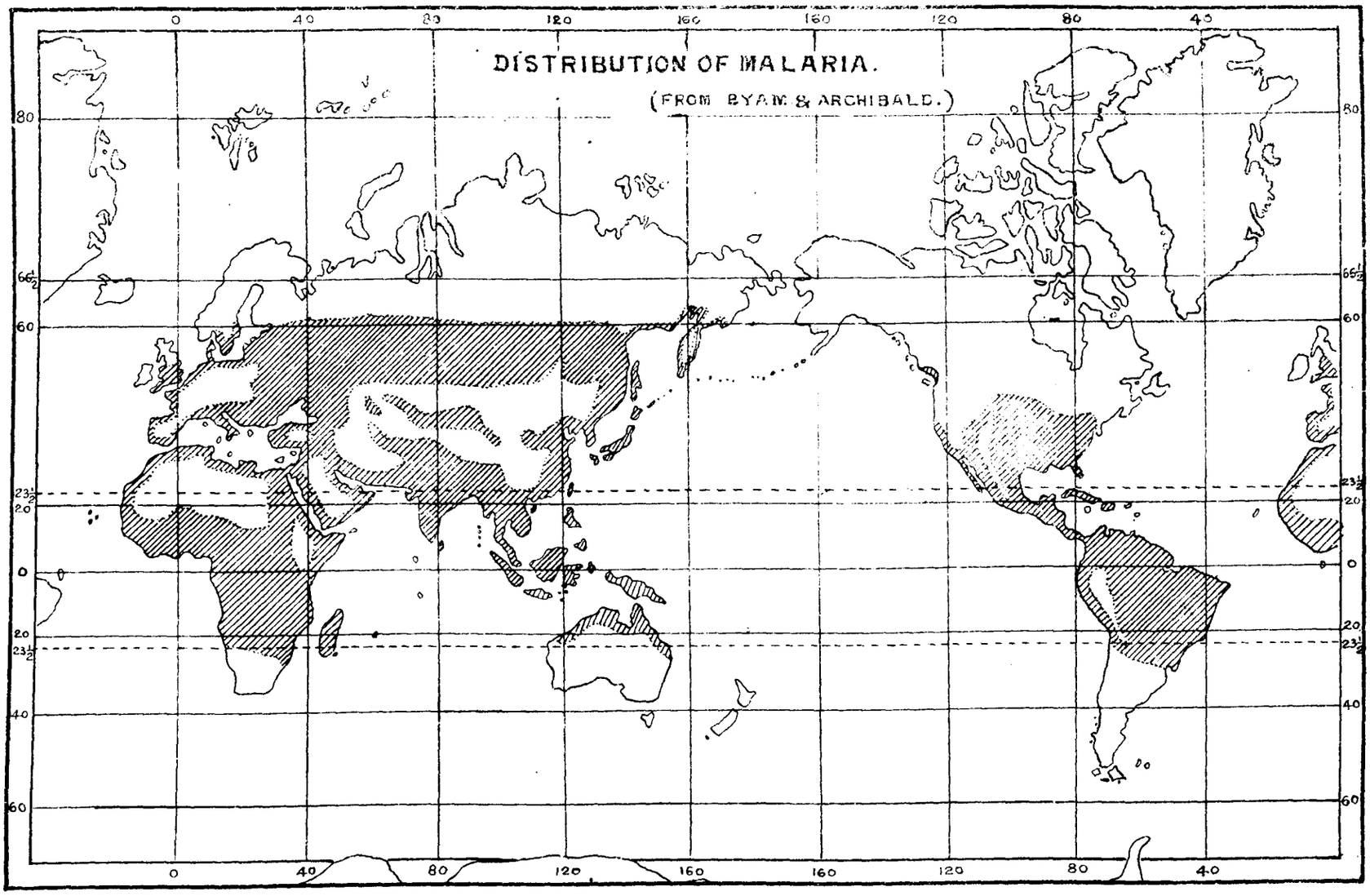
SCALE.

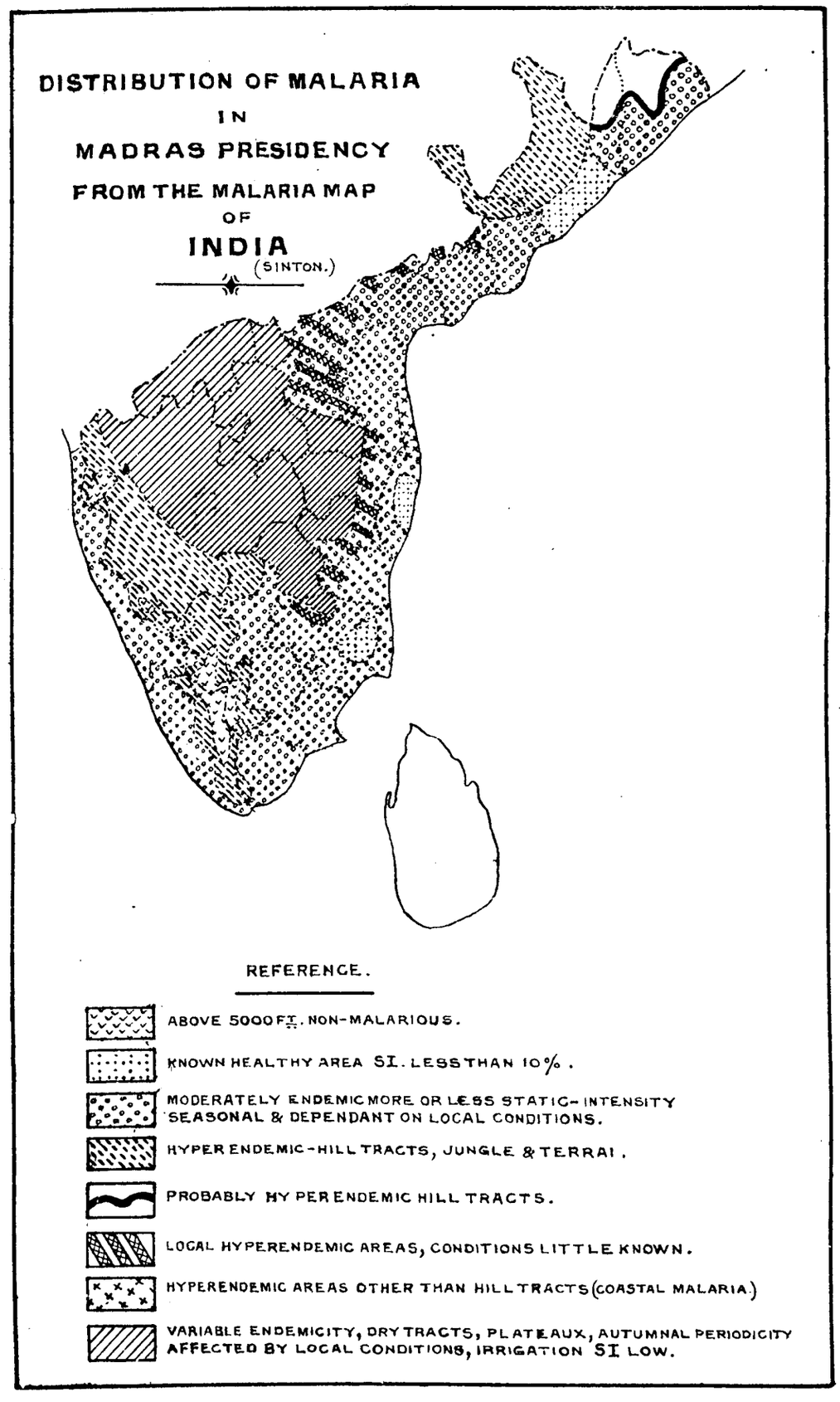
0 1 2 3 4 5 6 7 8 FURLONGS
ONE MILE.



REFERENCE.

MONSOON CONDITIONS


DISTRIBUTION OF MALARIA.
(FROM BYAM & ARCHIBALD.)
0
40
80
120
160
160
120
80
40
80
66½
60
23½
20
0
20
23½
40
60

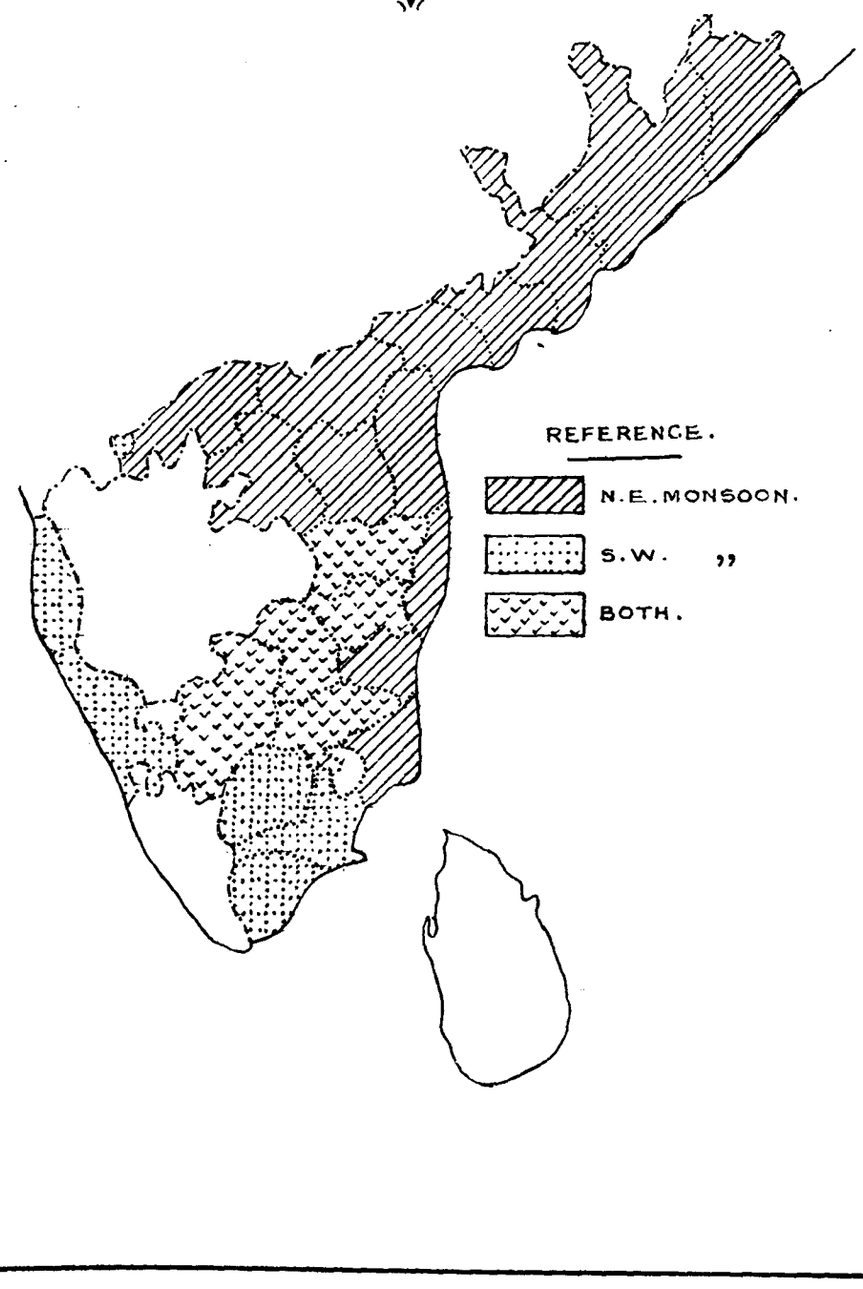

DISTRIBUTION OF MALARIA
IN
MADRAS PRESIDENCY
FROM THE MALARIA MAP
OF
INDIA
(SINTON.)
REFERENCE.
ABOVE 5000 FT. NON-MALARIOUS.
KNOWN HEALTHY AREA SI. LESS THAN 10%.
MODERATELY ENDEMIC MORE OR LESS STATIC-INTENSITY SEASONAL & DEPENDANT ON LOCAL CONDITIONS.
HYPER ENDEMIC-HILL TRACTS, JUNGLE & TERRAI.
PROBABLY HYPERENDEMIC HILL TRACTS.
LOCAL HYPERENDEMIC AREAS, CONDITIONS LITTLE KNOWN.
HYPERENDEMIC AREAS OTHER THAN HILL TRACTS (COASTAL MALARIA.)
VARIABLE ENDEMICITY, DRY TRACTS, PLATEAUX, AUTUMNAL PERIODICITY AFFECTED BY LOCAL CONDITIONS, IRRIGATION SI LOW.

DISTRIBUTION OF CHOLERA

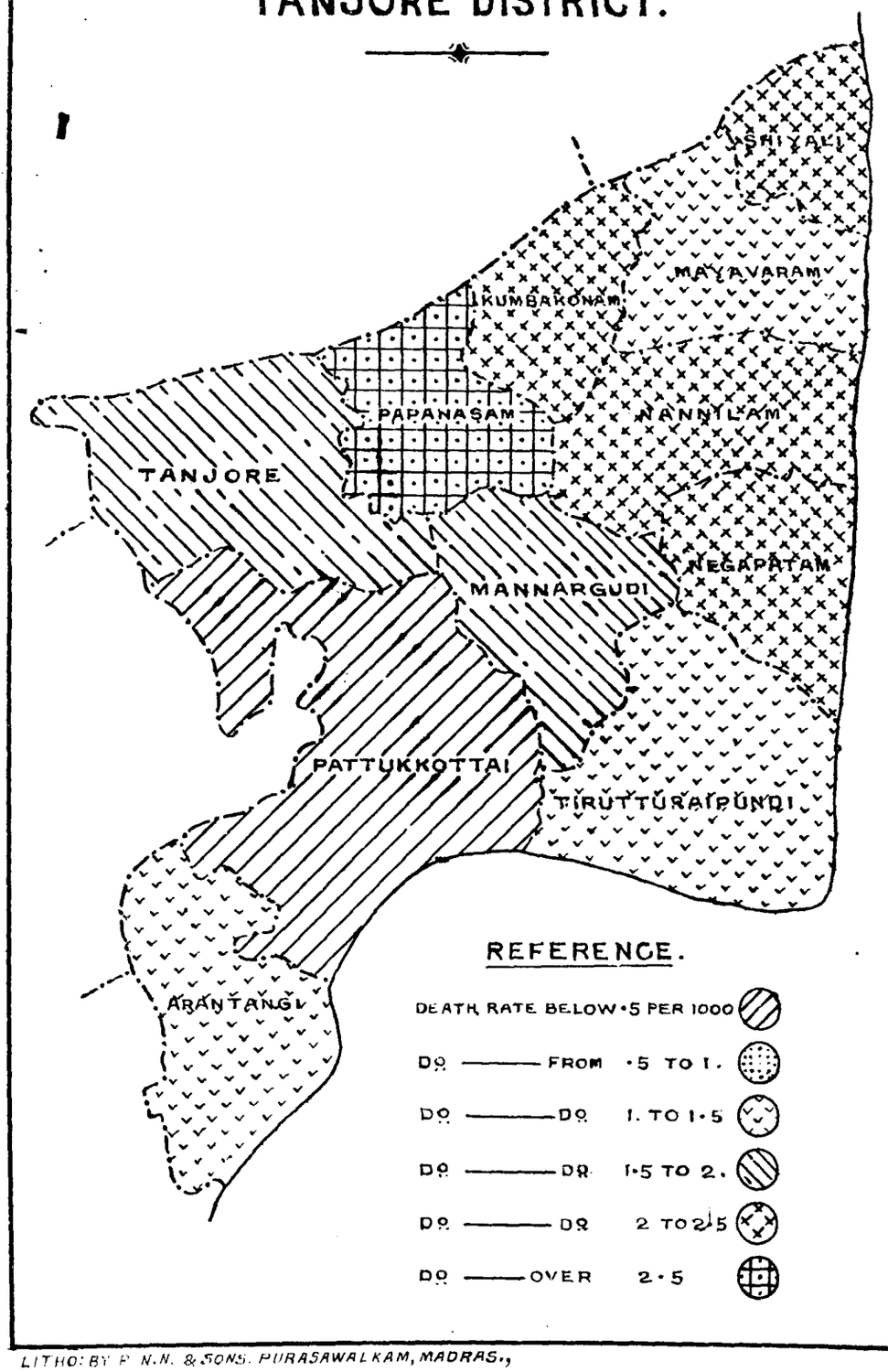
IN

MADRAS PRESIDENCY.

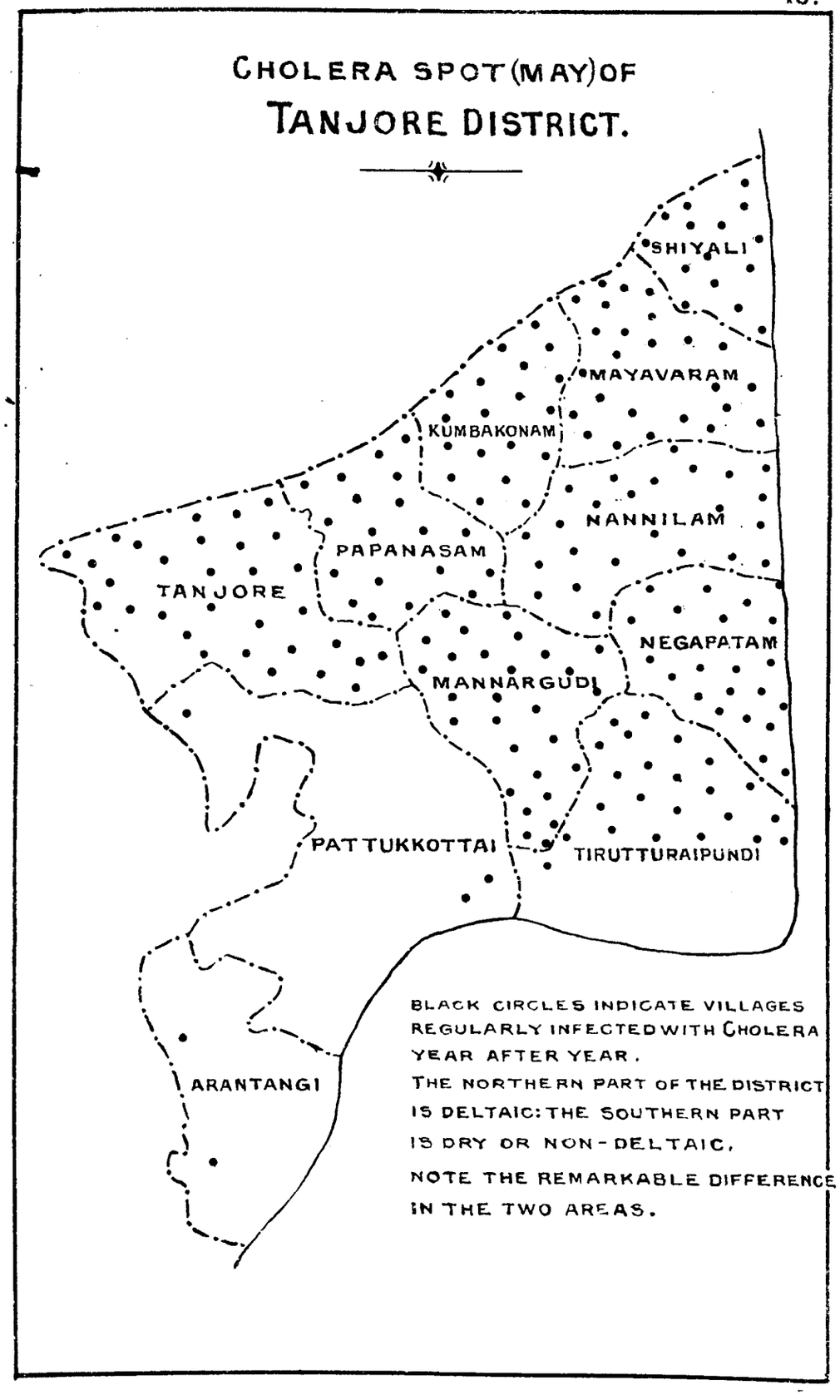
ACCORDING TO MONSOONS.



DISTRIBUTION OF CHOLERA
TANJORE DISTRICT.



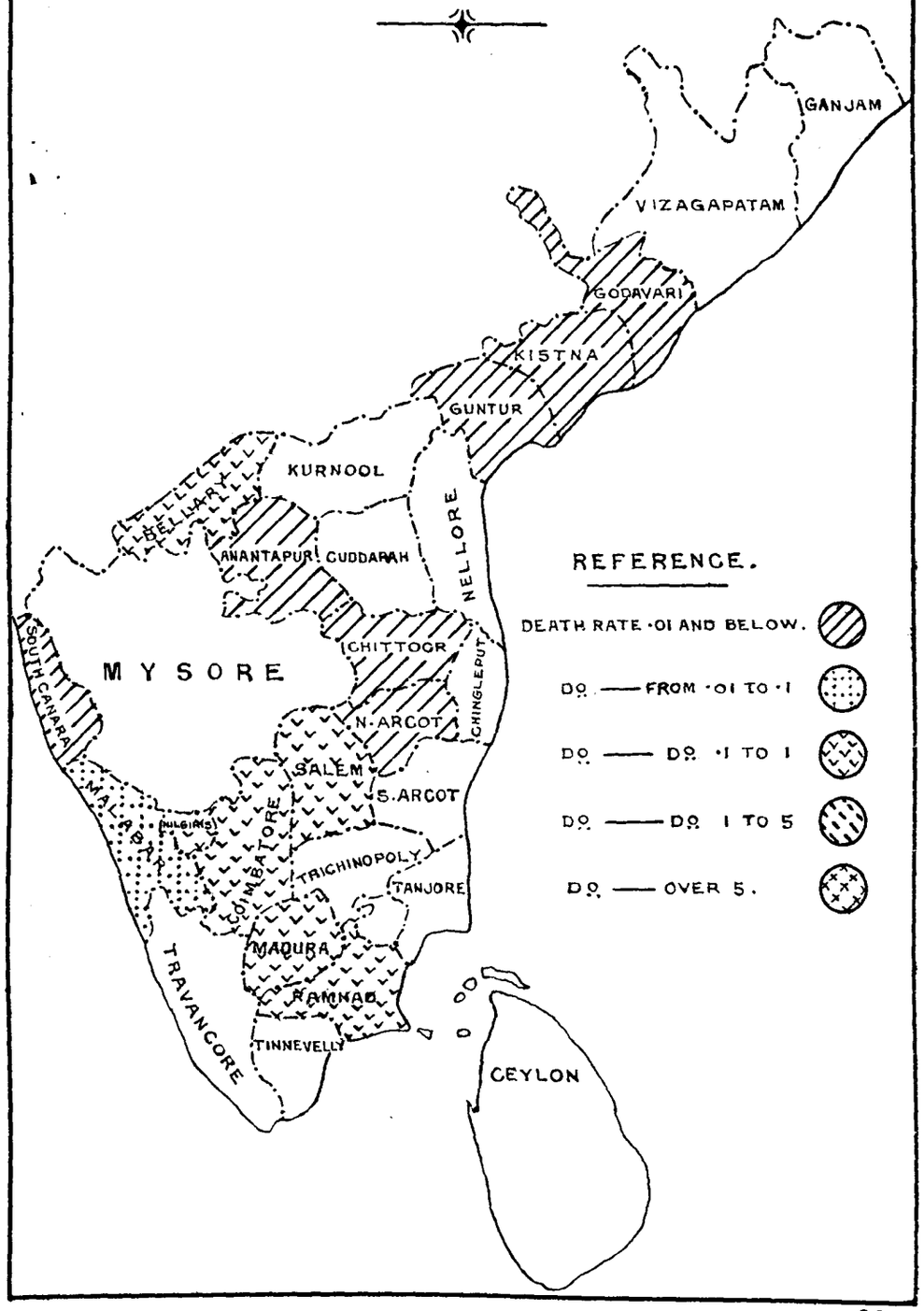
LITHO: BY P. N.N. & SONS. PURASAWALKAM, MADRAS.,


CHOLERA SPOT (MAY) OF
TANJORE DISTRICT.
SHIYALI
MAYAVARAM
KUMBAKONAM
NANNILAM
PAPANASAM
TANJORE
NEGAPATAM
MANNARGUDI
PATTUKKOTTAI
TIRUTTURAIPUNDI
ARANTANGI
BLACK CIRCLES INDICATE VILLAGES REGULARLY INFECTED WITH CHOLERA YEAR AFTER YEAR.
THE NORTHERN PART OF THE DISTRICT IS DELTAIC: THE SOUTHERN PART IS DRY OR NON-DELTAIC.
NOTE THE REMARKABLE DIFFERENCE IN THE TWO AREAS.

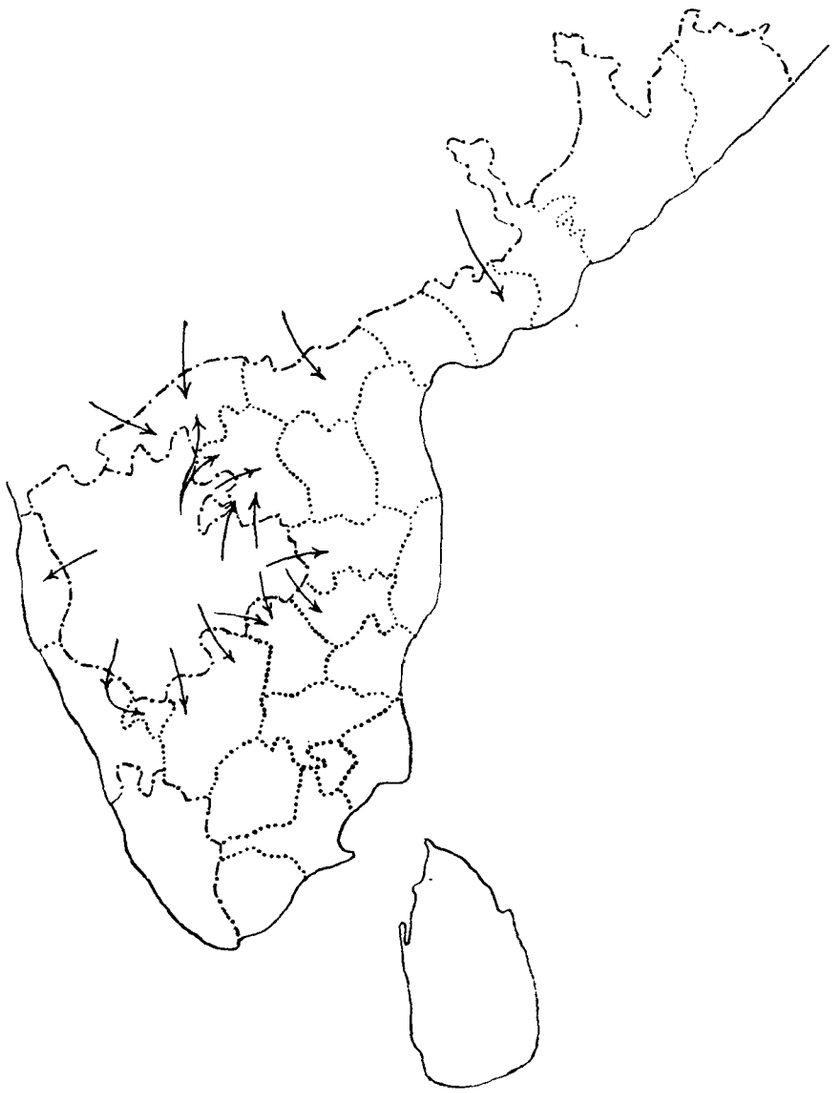
MADRAS PRESIDENCY

DISTRIBUTION OF PLAGUE.

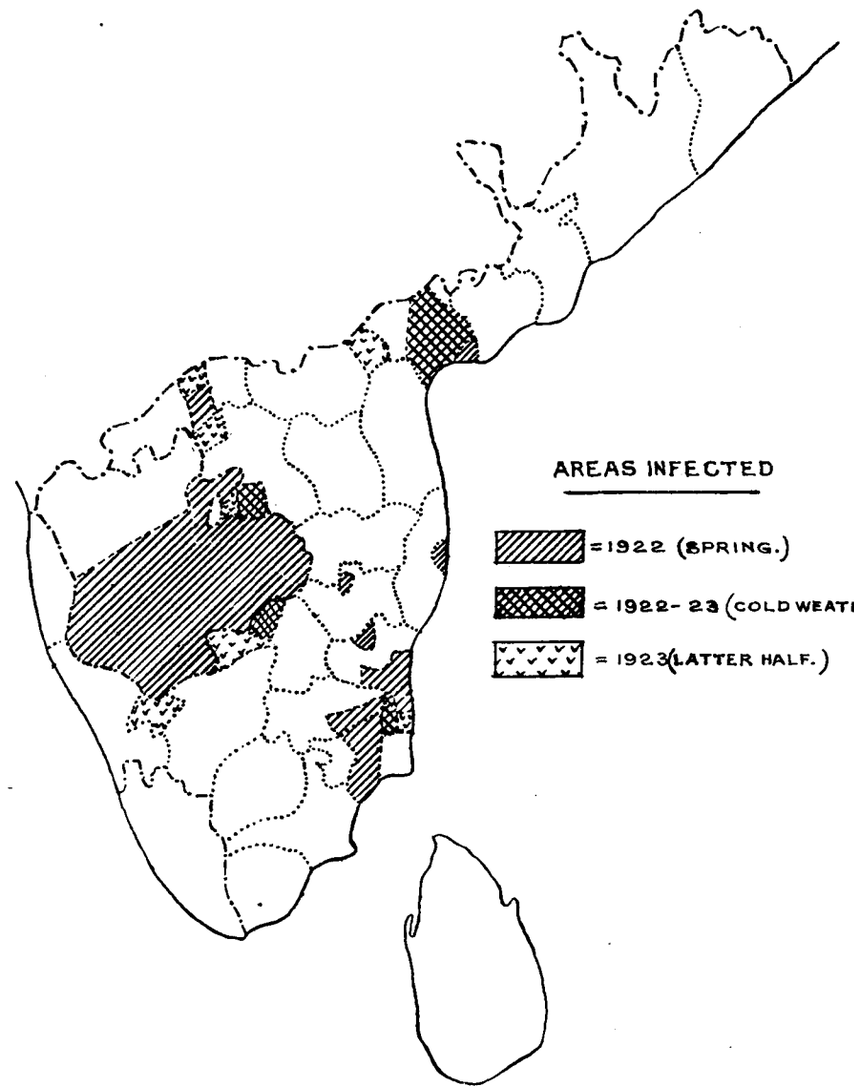
1926.



INVASION OF PLAGUE
IN
MADRAS PRESIDENCY.



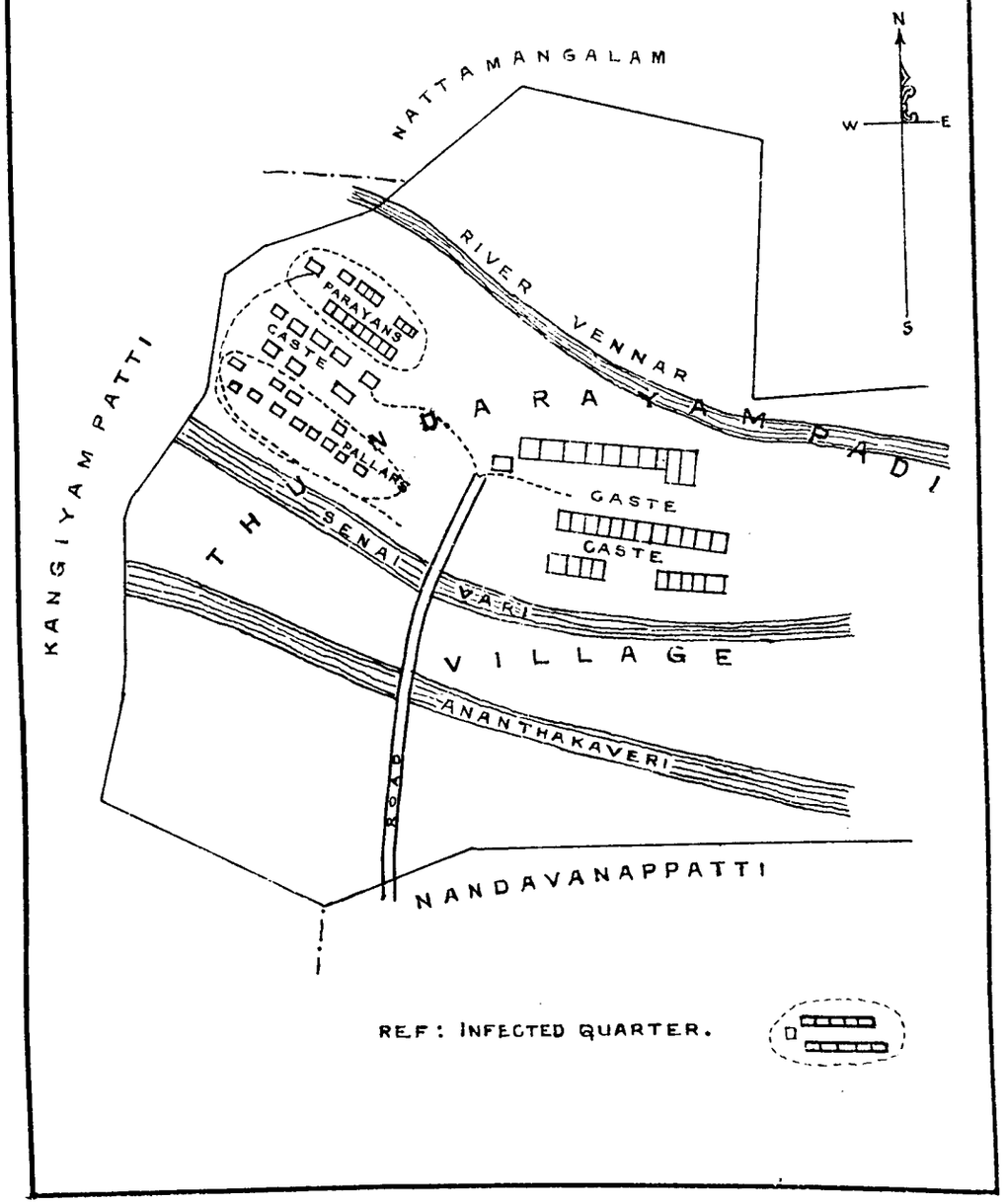
RELAPSING FEVER
IN
MADRAS PRESIDENCY
1922-1923.



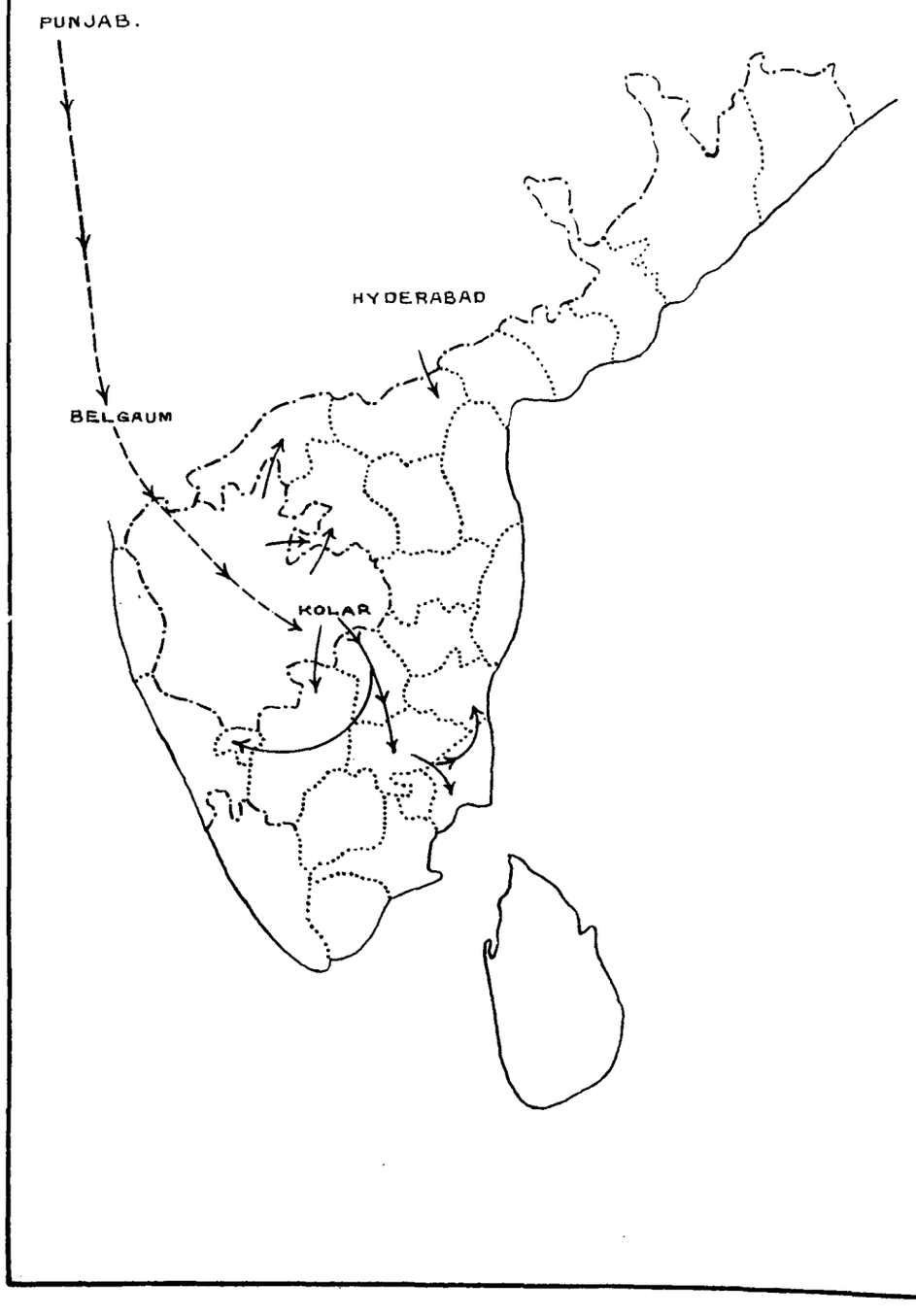
DISTRIBUTION OF RELAPSING FEVER

CASTE QUARTERS ESCAPED INFECTION.

(FROM. PUBLIC HEALTH CODE.)



INVASION OF RELAPSING FEVER - 1922-24.

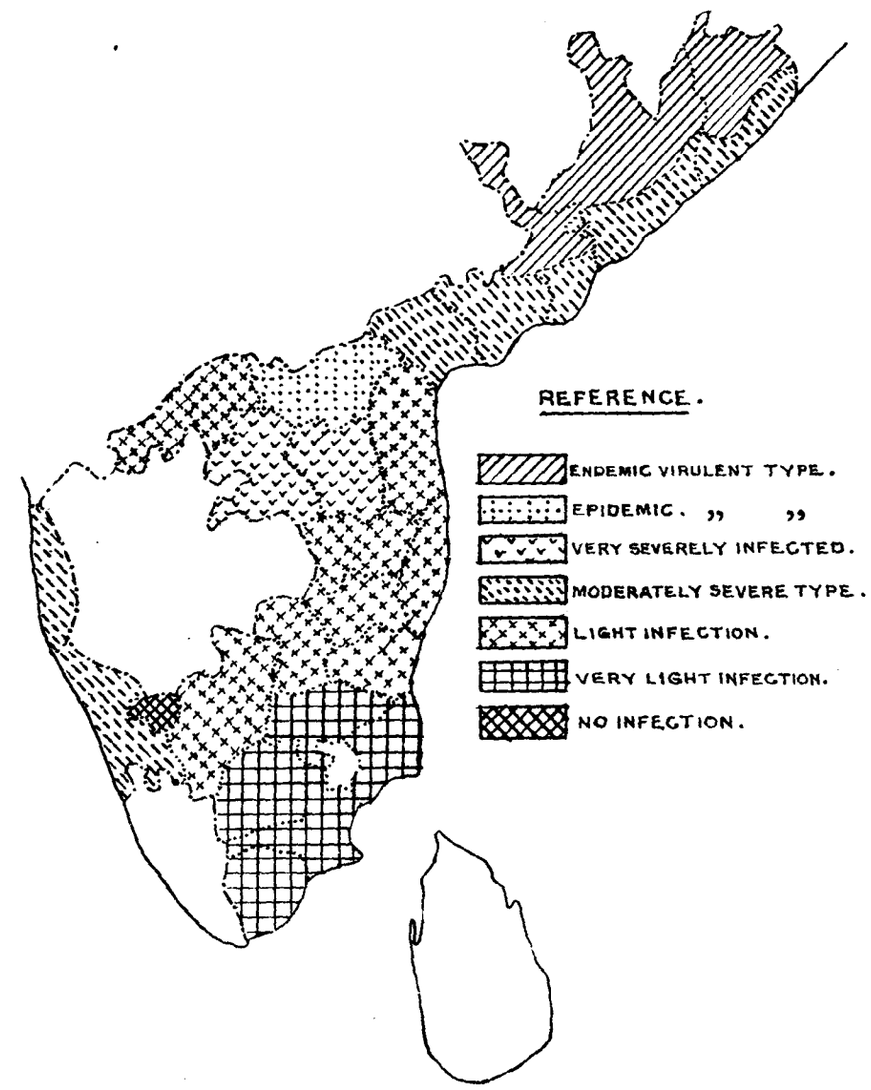


DISTRIBUTION OF MALARIA

1927 - 28.

(FROM HOSPITAL REPORT.)

ORIGINAL.

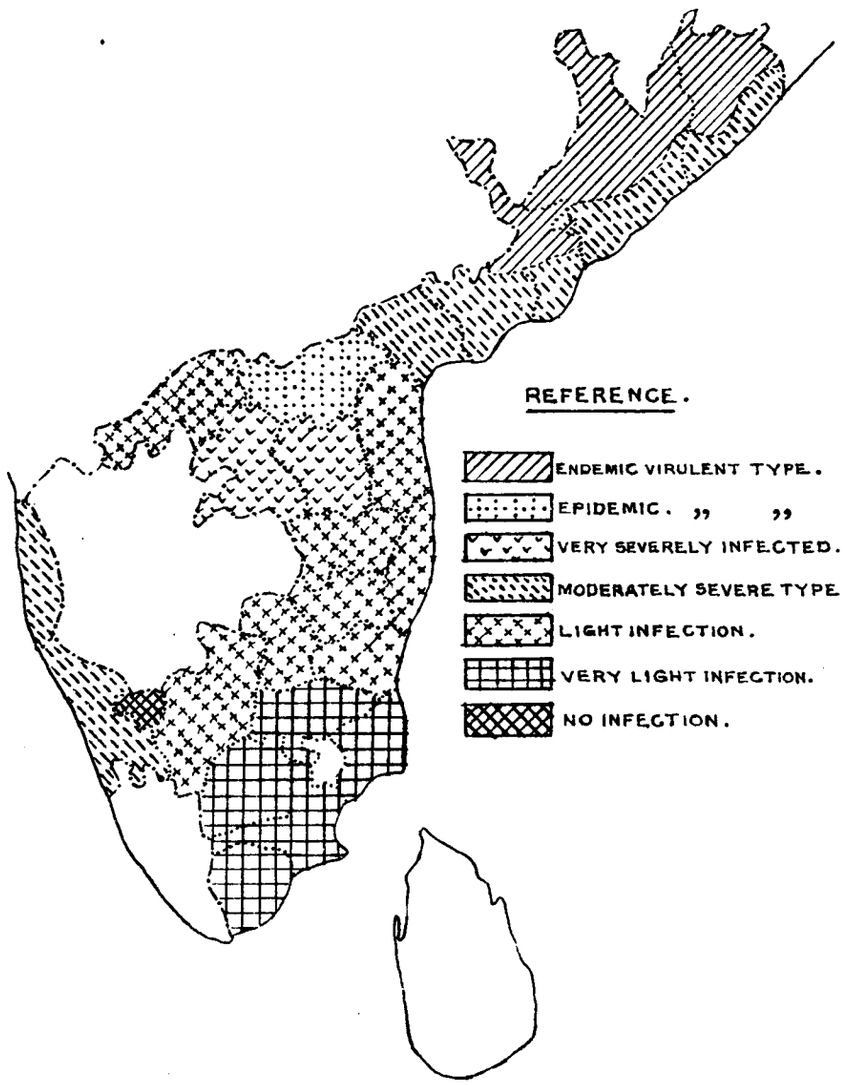


DISTRIBUTION OF MALARIA

1927 - 28.

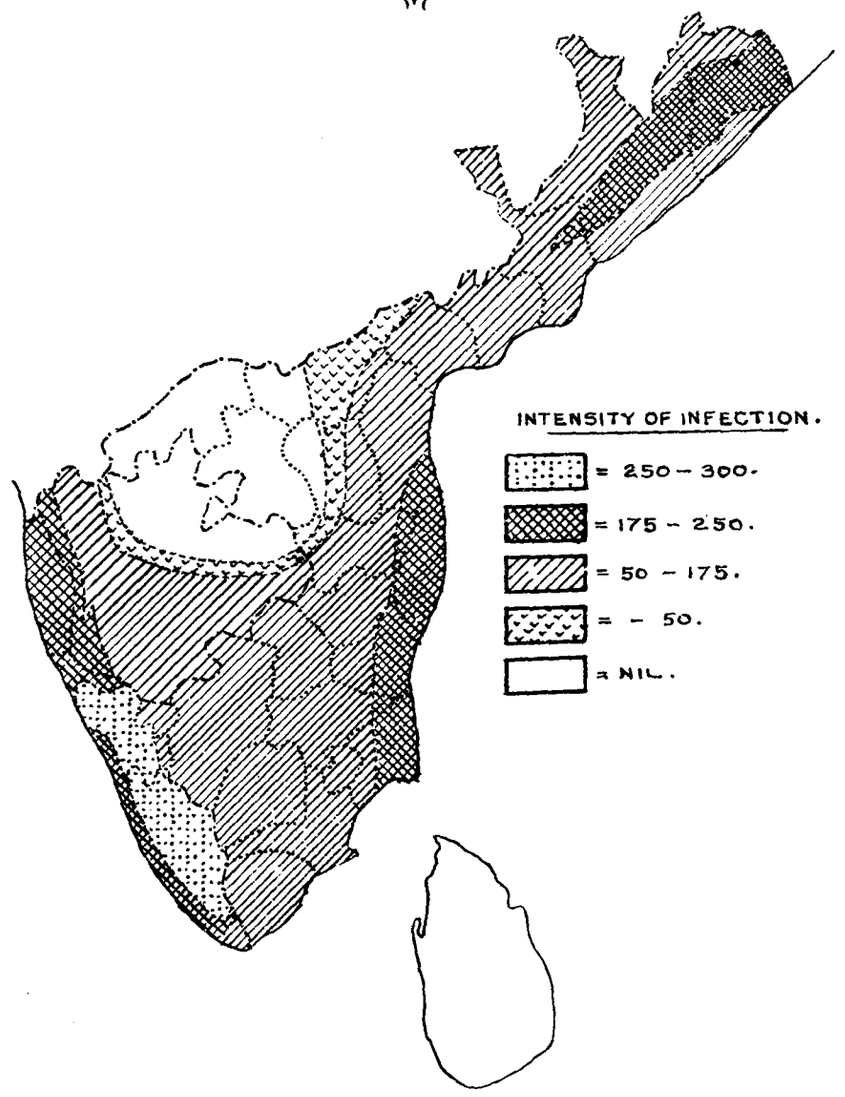
(FROM HOSPITAL REPORT.)

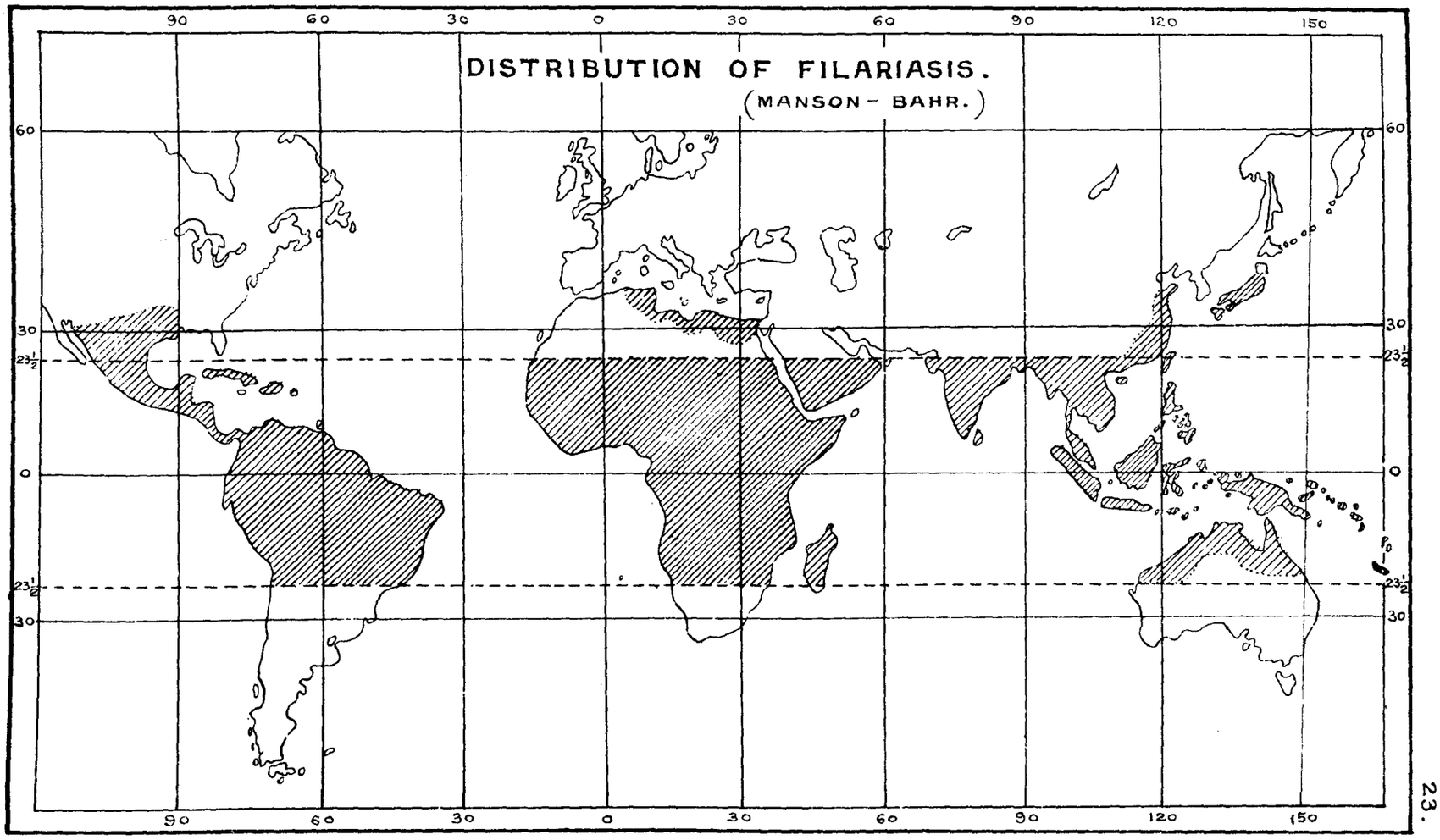
ORIGINAL.

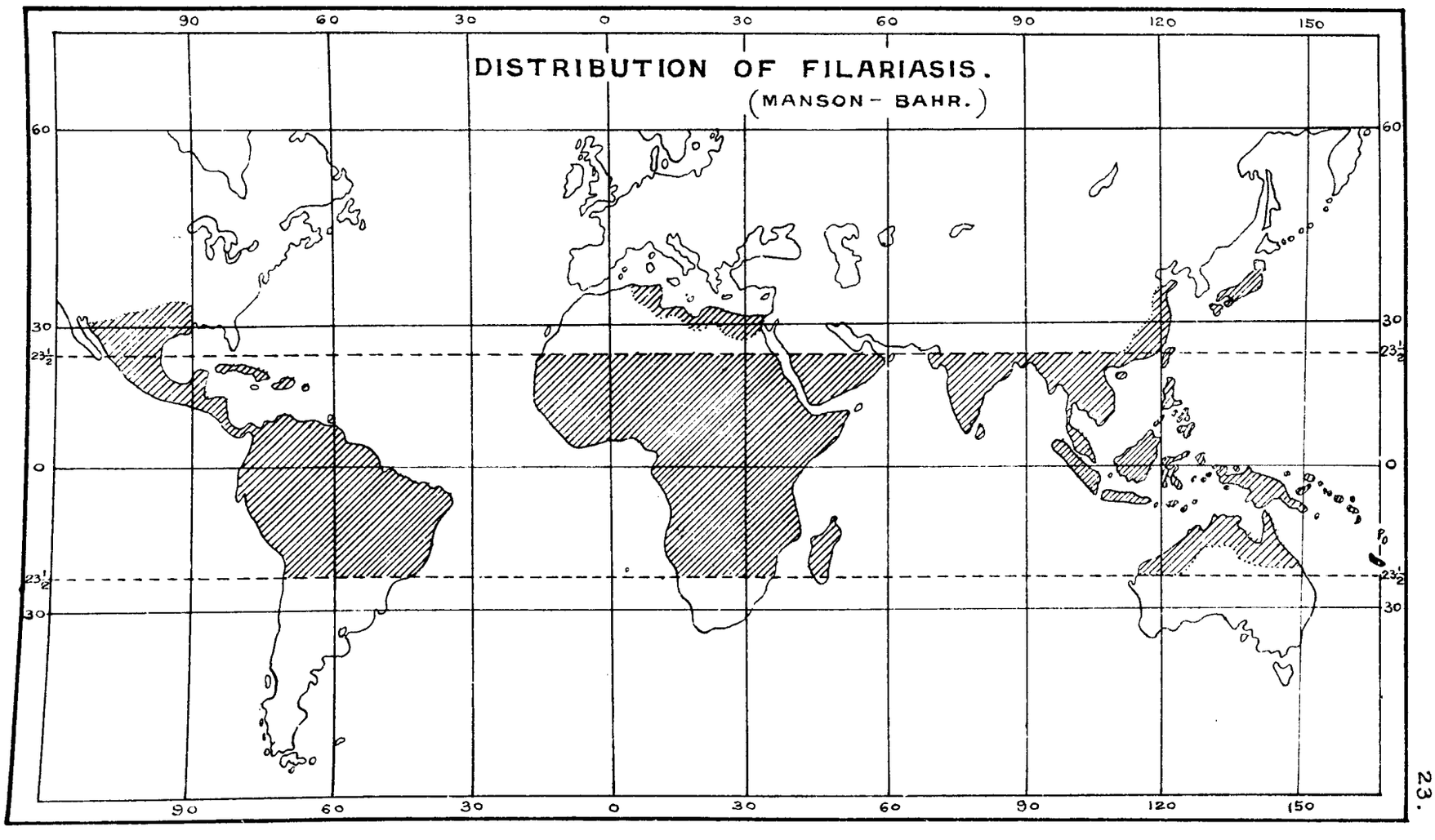


DISTRIBUTION OF HOOK WORM
IN
MADRAS PRESIDENCY,
MYSORE, TRAVANCORE & COCHIN.

(CHANDLER-1927.)

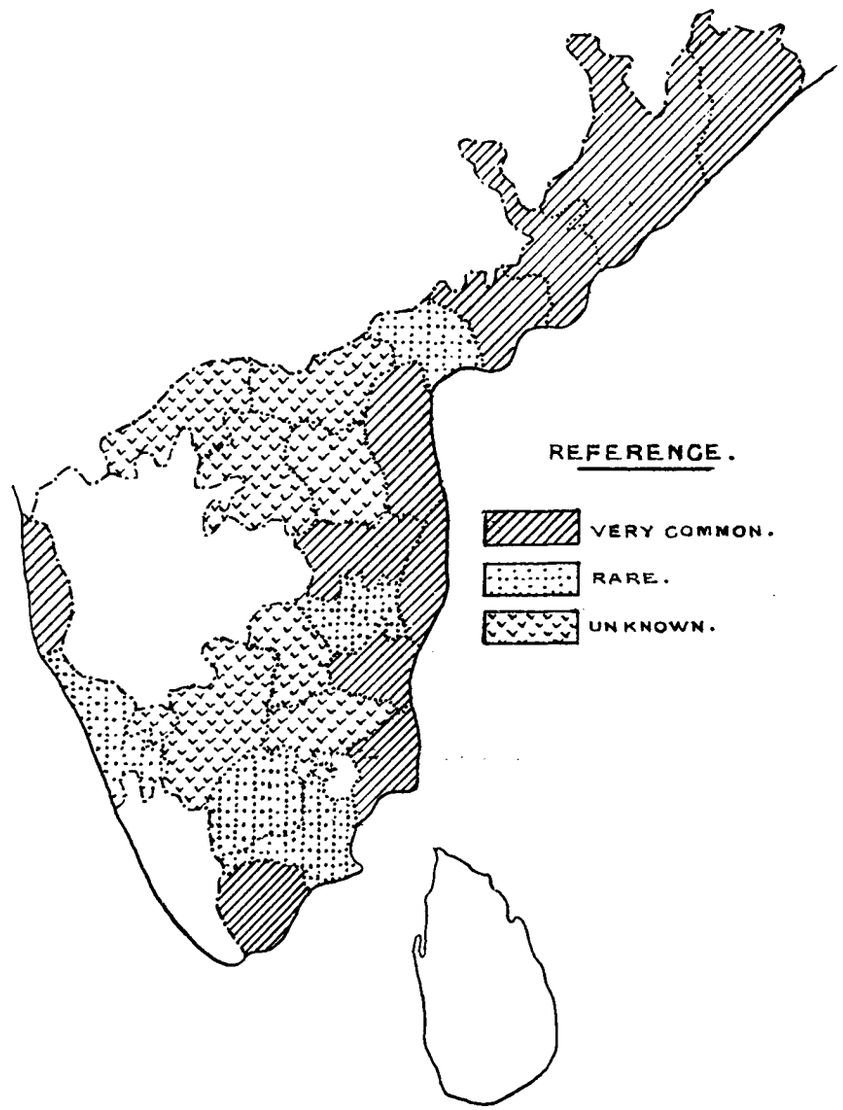



DISTRIBUTION OF FILARIASIS.
(MANSON - BAHR.)
90
60
30
0
30
60
90
120
150
60
30
23½
0
23½
30

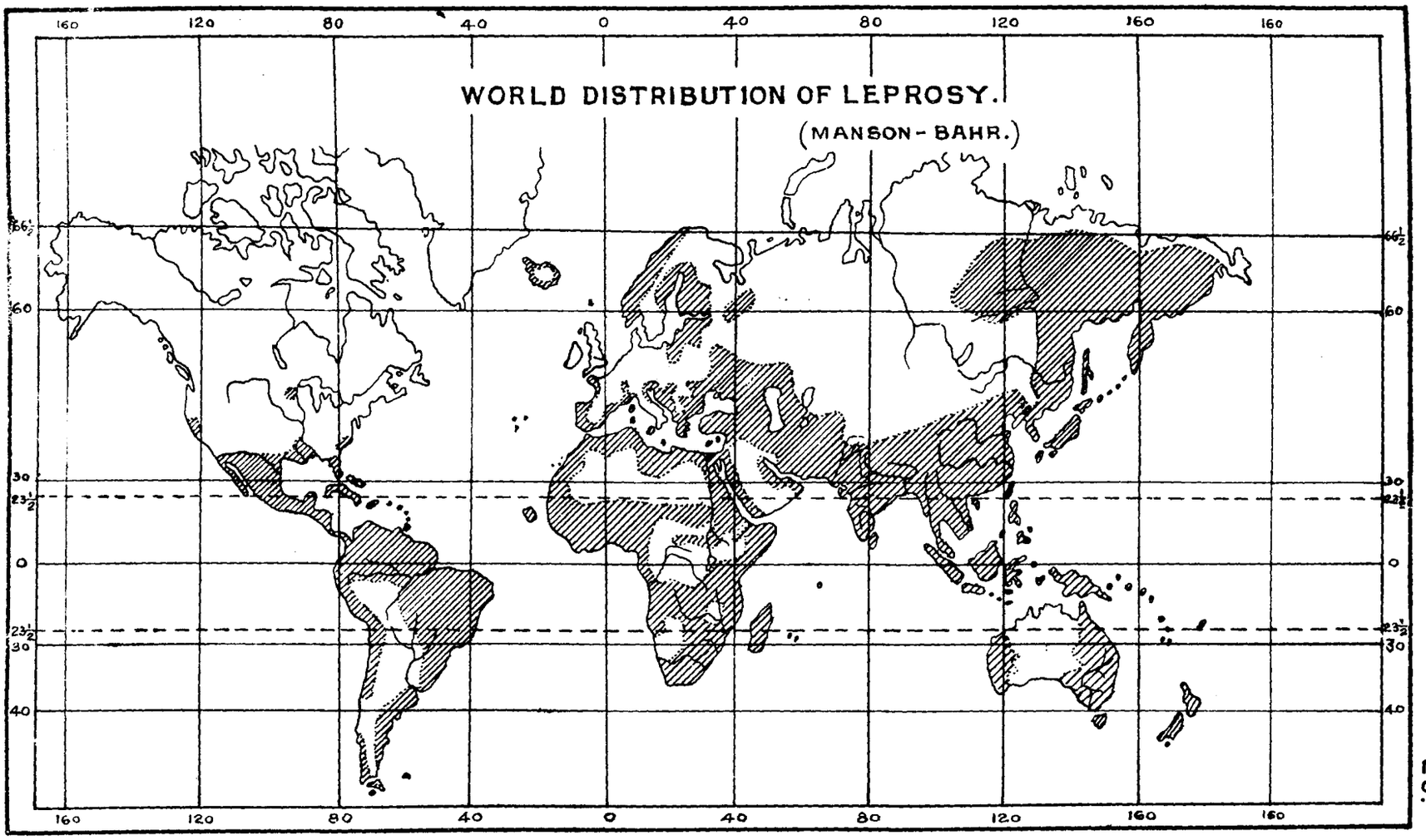

DISTRIBUTION OF FILARIASIS.
(MANSON - BAHR.)
90
60
30
0
30
60
90
120
150
60
30
23½
0
23½
30

DISTRIBUTION OF FILARIASIS.
IN
MADRAS PRESIDENCY.

(FROM MEGAW-1927.)

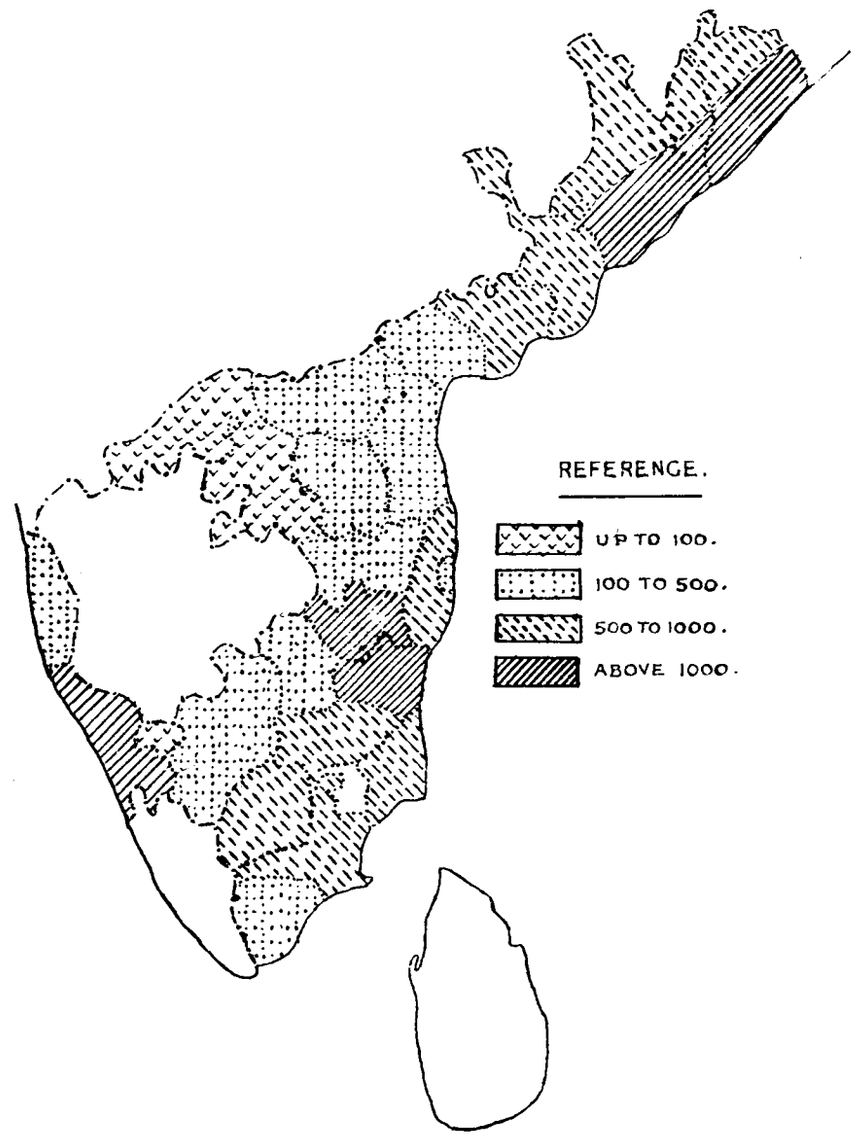


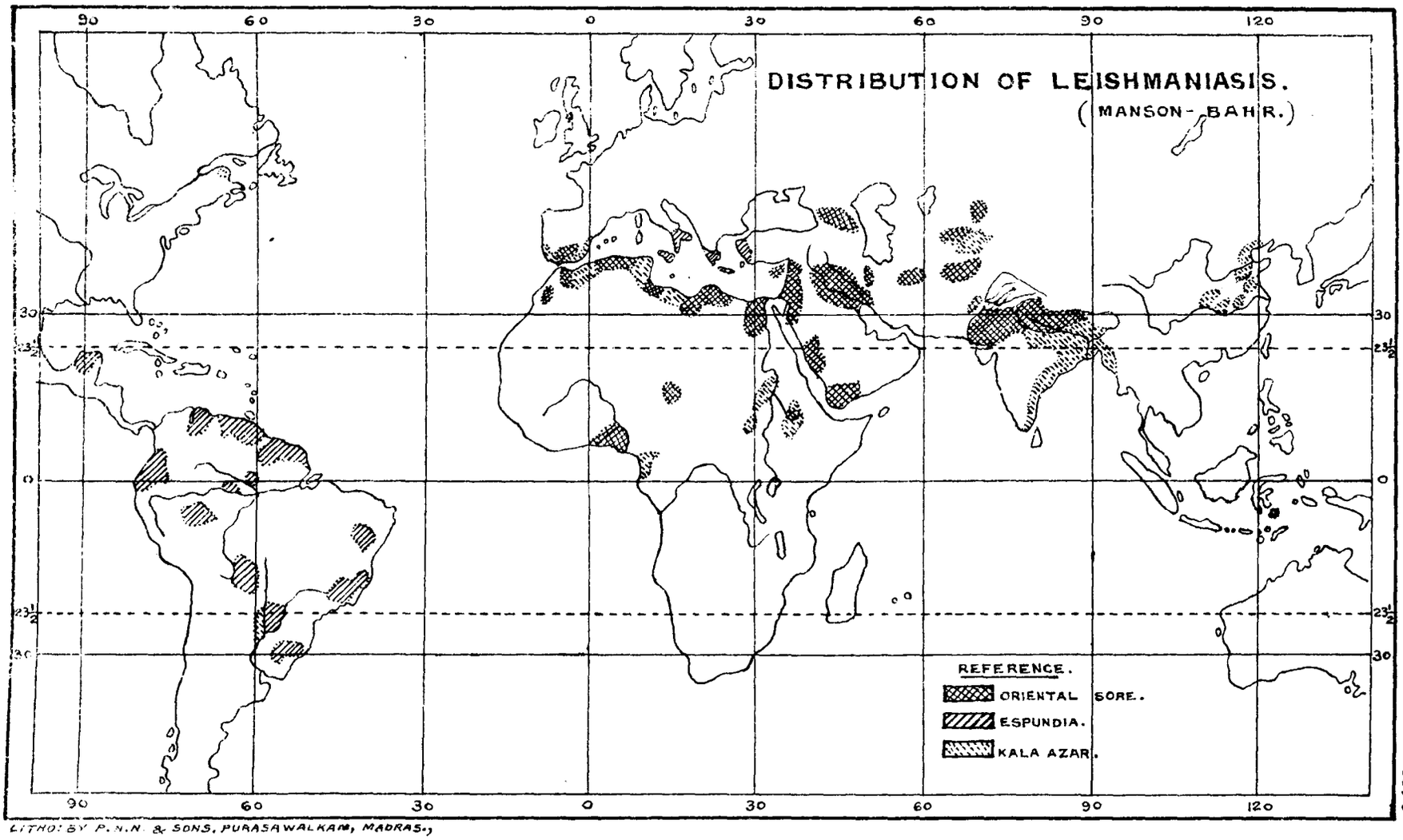
LITHO: BY P.N.N. & SONS, PURASAWALKAM, MADRAS.,


WORLD DISTRIBUTION OF LEPROSY.
(MANSON-BAHR.)
160
120
80
40
0
40
80
120
160
66½
60
30
23½
0
23½
30
40

DISTRIBUTION OF LEPROSY
IN
MADRAS PRESIDENCY.

(CENSUS 1921.)
(ORIGINAL.)

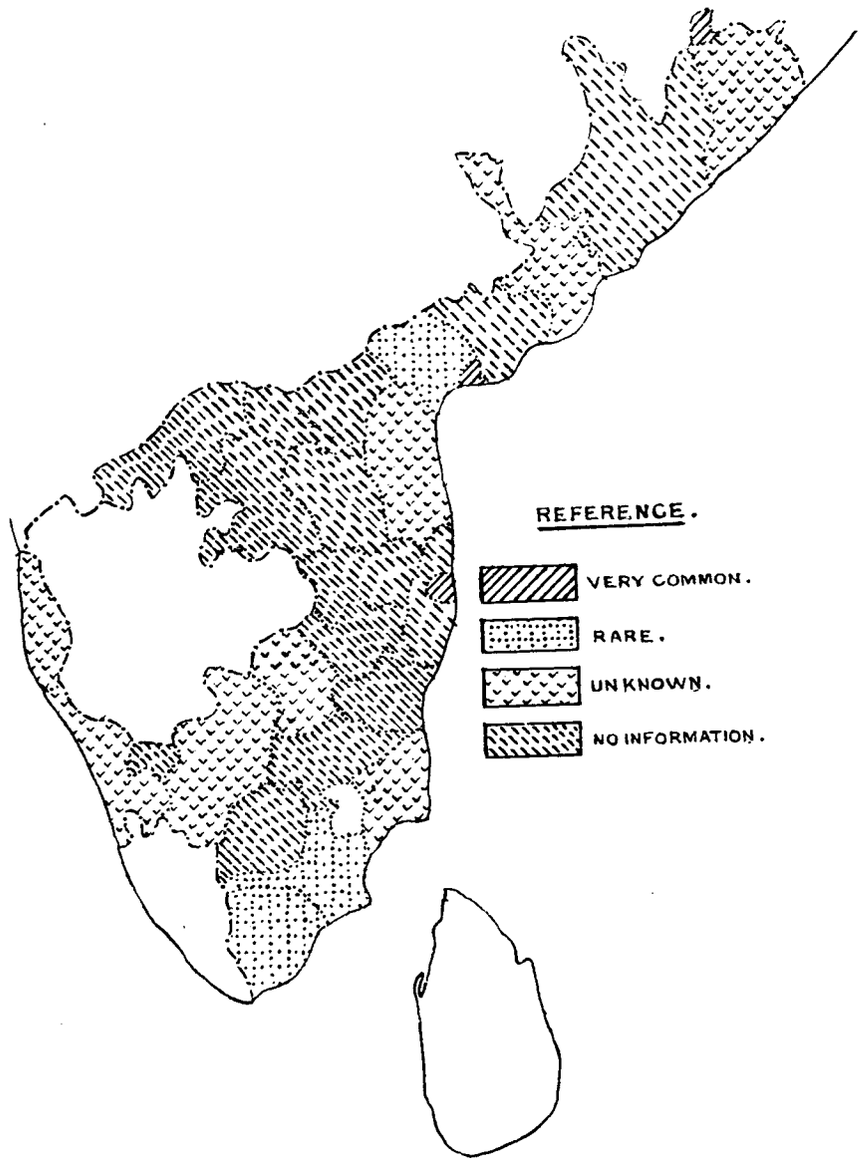




LITHO: BY P.N.N. & SONS, PURASAWALKAM, MADRAS.,

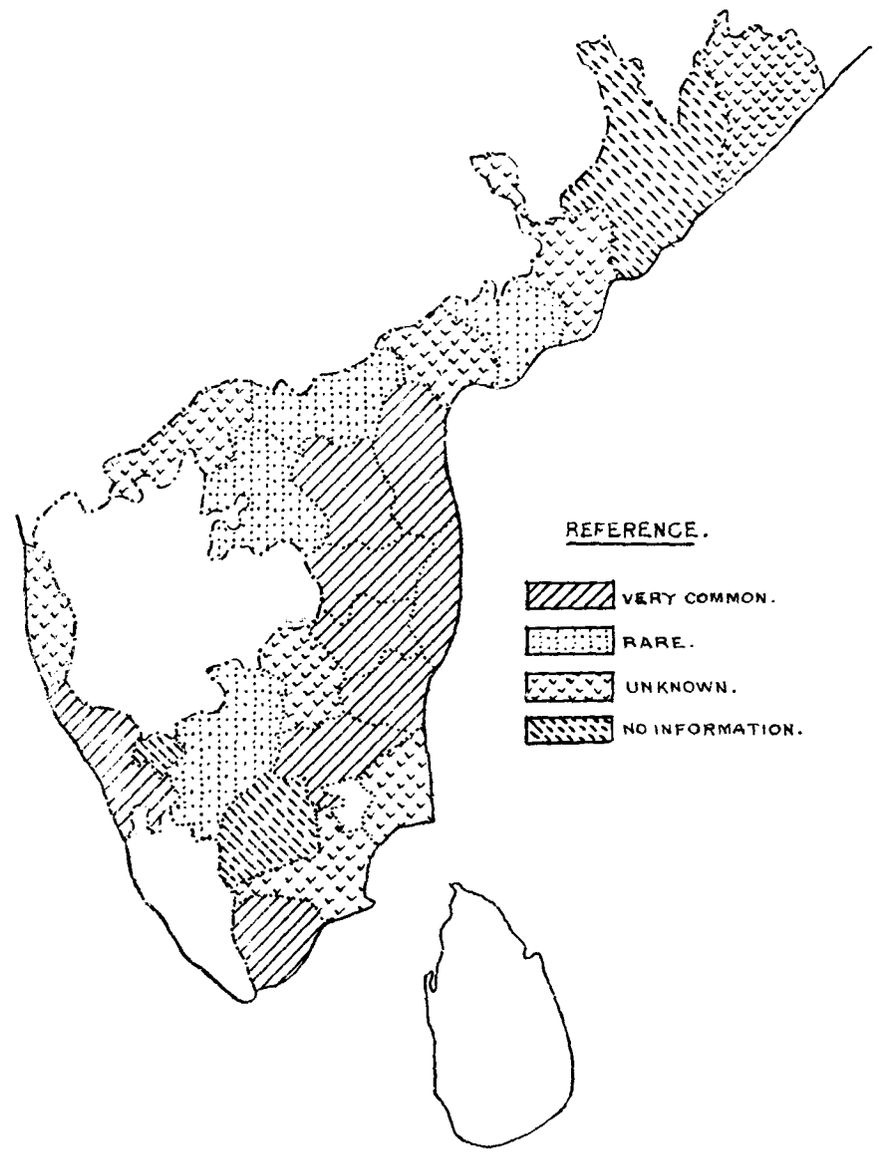
DISTRIBUTION OF KALA AZAR.
IN
MADRAS PRESIDENCY.

(FROM MEGAW-1927.)



DISTRIBUTION OF DENGUE.
IN
MADRAS PRESIDENCY.

(FROM MEGAW 1927.)



DISTRIBUTION OF GUINEA WORM DISEASE IN MADRAS PRESIDENCY

(FROM MEGAW 1927.)