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Anthropology and Medical Science

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I. What is Anthropology

"ANTHROPOLOGY" is rather an unfortunate word. In the first place it looks and sounds ugly, in the second places it means too much nothingless than the "Science of Man." Such a science should include an exhaustive survey of such subjects as literature, history, philosophy, religions and languages. But the anthropologist is content with the study of a more limited aspect of humanity. Inspired by the curiosity which is the source of all scientific enquiry he attempts to explain the mental, moral and physical activities of Man in the light of what preceded them, to ascertain in their correct sequence the stages by which the complex, which we call civilisation, is evolved. For evidence of the past, he is not content merely with the written records of history and the unwritten records of archælogy, but seeks illumination in the life lived by communities whose advance on the path of civilisation has been arrested, and in the survival among civilised, peoples of practices and modes of thought derived from earlier stages of their development.

It is one of the functions of modern science to present in one view the results of several different lines of enquiry. Take, for example, the growth of medical science. Sickness and death are always with us. In the belief of primitive man there is no such thing as 'natural death.' A death which is not due to violence must be due to the malignant activity of a devil or witch, and the devil can be controlled by the witch. So also with sickness. The only remedy is to enlist the services of a witch-doctor to counter-

act the malign influences or, in the event of death, to trace out the person who bewitched the deceased. The witch-doctor in fact, is the prototype of the modern physician. He possesses a knowledge of the effects of certain substances on the human body that will produce abnormal conditions, such as purging or vomiting, coma or wild excitement. He has a pretty shrewd knowledge of the workings of the human mind and the potency of mental suggestion. His methods are empirical ; his theories often absurd, and many of his drugs are mere rubbish or filth. The theories of the primitive medicine-man are forgotten by his modern representative. His hypnotism and exorcism are viewed with suspicion, but he has, at least, the credit for laying the foundations of the drug trade.

The art of surgery is of yet more humble origin. Not only in India, but elsewhere also, the barber represents the senior branch of the profession, with his wife as a midwifery expert, and in Western Europe his prestige lasted well into the Middle Ages. In one-setting however, it was the potter who won pre-eminence.

The arts of the witch-doctor, the barber, and the potter have been improved out of recognition during the past 2000 or 3000 years, by some of the ablest brains civilisation has produced, and all sorts of new sciences have been made to subserve the healing art. With the growth of knowledge the scope of medical science has enormously widened. The bacteriologist and the bio-chemist are its servants, and, in spite of Shakespeare's pessimism, it is once again recognised that the doctor's skill should "minister o a mind diseased."

Similarly with the science of anthropology, though it has not yet advanced very far, and has not earned full recognition as a science. A few generations ago certain amiable persons, dabbling in the myth and legends of modern savages, found in them a replica of the grotesque and immoral stories of the gods of the Greeks, which the Greeks themselves viewed with disgust but could not explain. Compare folk-tales gathered from all corners of the earth and you will find that, in theme and thought, they are so strikingly alike that they must be the result of a common cause ; either they are of common origin or they are the outcome

of mental processes that operate exactly in the same manner among all races. At present, opinion is divided as to whether these themes were 'spontaneously generated' in many different places at the same time, or whether they are all traceable to a single source and have been handed on from man to man and race to race throughout the ages and throughout the world.

Again, with the discovery of affinities between Sanskrit and the languages of Europe, men jumped to all sorts of conflicting theories as to the 'original Home of the undivided Aryans', quite forgetting that a common language is not evidence of a common racial origin. The Negroes of Liberia speak English but they are no more English by race than the French-speaking negroes of Haiti are French. A common language may, however, be evidence that at one time the ancestors of the races speaking it were in contact with each other, either directly or through the medium of one or more other communities. On no other principle can we explain the amazing fact that the language spoken by the Mundas of the Chota-Nagpur plateau is one of a family spoken, not only in South-East Asia, but also as far west as the Mediterranean, and as far east as Easter Island, to say nothing of New Zealand and Fiji.

The law of inheritance through females of matrilineal succession or *marumakkattayam* as it is called—among the Nayars and other communities of Malabar and South Kanara came as a shock to lawyers nurtured in Anglo-Roman law. And along with *marumakkattayam* goes a delectable freedom in conjugal relations which the rest of India (and for the matter of that the rest of Asia and Europe too) may envy but not enjoy. Now *marumakkattaym* is part of a well-defined system of social organisation of far more ancient standing than the system of inheritance from father to son. It was known to the Greeks and Romans 2000 to 2500 years ago in the Mediterranean and in Western Europe. It survives and thrives (or did till recently) in parts of Africa, America, Australia and the islands of the Pacific. It is associated frequently with that system of relation-ship terms which so puzzles the Europen on his first arrival in South India, a system which classes my father's brothers as my fathers, their sons as my

brothers, and my mother's brother as my father-in-law (*maman*) whether I marry his daughter or not. It is the function of the anthropologist to understand and unravel the structure of human society and the lines on which it has evolved.

Again the peaceful contact of the great religions of the world, Hinduism, Buddhism, Islam and Christianity has roused interest in the study of comparative religion and discloses the fact that, while the great religions possess much in common with each other, they retain, in various local areas elements of an earlier stage of religious culture, survivals of practices and beliefs which existed among the masses before their conversion. Even within living memory, persons have been roasted to death in Ireland, in the honest belief that they were possessed of an evil spirit which could be driven out by fire, and cases of human sacrifice are still reported from time to time in India. Even the reconstruction of the Willingdon Bridge in Madras City was marked by a panic among the ignorant classes inspired by the belief that a child must be sacrificed to render the bridge-foundations secure. A comparison of such folk-tales with the beliefs of uncivilised people throws a flood of light on the evolution of religious ideas. Such studies too are the domain of the anthropologist.

Another sphere of enquiry stimulating to scientific curiosity is the origin of arts and crafts. Time was when man knew nothing of the art of working metals, and archaeology has proved that he was able to attain a high level, not only of manual skill, but also artistic merit, with the help of implements of stone, multitudes of which can be found within a few miles of Madras. Then came the discovery of copper, then, that of the superior merits of bronze and later still the use of iron, each stage of advance being marked by distinctive culture. The discovery of fire marked an epoch in human history, and fantastic tales are told by all peoples of its miraculous origin. Some people still depend for their fire on silica and steel, others adhere to various forms of friction between two pieces of wood, planing, sawing or drilling. It is easy to conjecture how the discovery was made. Later came the art of making pottery, and the fact that some of the earliest pots bear the impressions of woven baskets suggests that pottery,

took its rise in the burning of baskets which had been puddled with clay to make them capable of holding water. Agriculture, too, has an evolution of its own: wild men dig for roots with a pointed stick hardened by fire ; the "digging stick" broadened in course of time into the spade on the one hand and developed on the other into the plough. How obvious it must have been to attach a cord to the lower end of a digging stick and draw it along the surface of the ground, making a furrow instead of a series of holes, but it took the primitive man a long time to think out this invention.

In this and other fields of human activity the scientific curiosity of individual workers gathered together a fund of knowledge, and gradually it came to be realised that these studies are closely related to each other and that the results attained in one branch must be scrutinised and interpreted in the light of knowledge gained in other spheres. And so, by the fusion of many lines of enquiry, a new science is being built up.

II. Physical Anthropology

Folk-tales, Philology, Religion and Arts and Crafts do not come within the scope of medical science. But there is another branch of anthropology which medical men have made their own.

The publication of Darwin's "Origin of Species" set men in quest of missing links between ape and man. In this quest the services of anatomy, zoology, geology and embryology have played a leading part.

The riddle has by no means been solved, but the discovery of certain fossil skulls, jaw-bones and teeth which present characters intermediate between those of man and those of the ape, or some characters distinctive of each, has suggested many interesting (and hotly debated) theories regarding the physical characters of our ancestors. It has even been contended that the human race is of dual or multiple origin, the Negro and the Mongolian (and perhaps other varieties,) being descended from different species are prototypes.

The problem of the physical character of pre-historic man is highly technical, and need not be here discussed. Those who wish to study it further will find much of interest in the writings

of Sir Arthur Keith and W. L. H. Duckworth. A problem of more immediate interest in India is the problem of racial distinctions.

At the outset a word of caution is necessary against confusing 'races' with 'nations.' I have pointed out already that identity of language is not proof of identity of race. Nations on the other hand ordinarily possess a common language, a common culture and a common political organisation, though there are, of course, exceptions, as in the case of Switzerland, some of whose citizens speak French, some German and some Italian. On the other hand, a nation is almost invariably composed of several races. In England, for instance, we find the tall, white, blue-eyed northerner, the *Nordic*, of which Norwegian is the classic type, mingled with a shorter and somewhat darker race akin to the peoples of the *Mediterranean*. In France, the Nordic and Mediterranean types are mingled with a third, the *Alpine* type, which is short, dark, and with rounder head than either the Nordic or the Mediterranean. Germany, on the other hand, is divided between Nordic and Alpine races.

In distinguishing bstween race and race the criteria generally recognised by scientists are :—

I. Head form, II. the Nose, III. the Eyes, IV. the Hair, V. the Skin and VI. Stature.

It is necessary to consider these criteria and their applicability to India in some detail.

I.—*Head form.*—The "*cephalic index*" represents the percentage proportion of the maximum length of the head, measured 'from the most prominent point in the mid-line of the forehead between the eyebrows to the most distant point on the mid-line of the back of the head,' to the maximum breadth. A head with an index of 75 or less is considered "long" and a head with an index of 80 or more is considered "round," and a head with an index between 75 and 80 is considered "medium." The technical terms used are—

for a long head	Dolicho-cephalic,
for a medium head	Mesati-cephalic,
for a round head	Brachy-cephalic.

It must be pointed out that the cephalic index is useful only to establish racial *differences*. Similarity of indices is not a safe test of *identity* of race. The Negritos of the Andamans, for instance, are broad-headed, like the Alpine race, but the actual length and breadth of their skulls is much less than the actual length and breadth of an Alpine skull. and in other characters the Andamanese differ completely from the Alpine race.

II. The Nose.—The percentage proportion which the maximum breadth of the nose bears to the height measured from the nasion to the subnasal point, or angle between the septum of the nose and the upper lip, is called the *nasal index*. If the proportion is less than 70 % the nose is considered "narrow." If it is more than 80 % it is considered "broad." The technical terms used are

for a narrow nose	Leptorhine
,, medium ,,	Mesorhine
,, broad ,,	Platyrhine

The significance of the nasal index in South India will be dealt with anon.

III. The Eyes.—The eyes may be useful as a test of race in two ways ; (*a*) their pigmentation and (*b*) their shape.

In colour, the iris varies in different races from light (blue or grey) through intermediate shades, (green, yellow, yellowish green, greenish etc.) to dark, (brown or dull brown or balck). This criterion is of little use in India, as the eyes of Indians are with a few remarkable exceptions dark.

In the Mongolian the shape of the eye differs in a remarkable way from the eye of other races, notably in that the upper-eyelid, which turns down at the inner angle, instead of being free is folded towards the eye-ball, forming a fixed fold in front of the movable ciliary ridge, and towards the inner angle of the eye the eyelid forms a fold covering more or less the caruncula, and sometimes extending far below it. These peculiarities occur in the children of all races, but only transitorily. Their occurrence in adults in South India has not, so far as I am aware, been observed.

IV. The Hair.—Hair is of value as a test of race in three ways;—(*a*) its pigmentation (*b*) its texture and (*c*) its quantity and location.

In Europe, the colour of hair varies from a fairness, which is almost white, to black. In Indians the colour of the hair is almost universally black. Hair colour is therefore of little value as a race test in South India.

In texture, the hair ranges from the "woolly," (the "peppercorn," knobs of the Negroes and Andamanese) through "frizzy" and "wavy" to "straight". Straight hair is circular in transverse section. Wavy and frizzy hair is more or less oval, while the section of woolly hair is almost flat, like a ribbon. The hair of European and Indian races alike is normally "wavy" and its section oval, but the hair of certain jungle tribes in South India exhibits a curliness which is possibly due to a strain of Negrito blood, derived of a vanished race.

The quantity of hair on the bodies of Europeans and Indians varies remarkably. Some Indians are "glabrous" and have very little body hair, while others, (notably some of the higher South Indian castes such as the Nambudri Brahman) have their bodies rather fully covered. Whether this hairiness is due to racial influences is not known. The subject requires investigation.

V. The Skin.—The pigmentation of the skin of European races varies from the purest blonde to brunette or what in India would be called a "fair" or "red" man. There are very few Indians, however, who are as fair as the darkest European, and skin colour ranges through all shades of brown to black. Attempts have been made to establish a scale of colour, shades, but the results obtained are too vague to be of value. It would seem that skin colour in India depends almost as much on the mode of life and the amount of habitual exposure to the sun, as on racial influences.

VI. Stature.—Stature is a criterion to be used with caution as it is undoubtedly influenced by environment. A race living in a favourable environment, with abundant food and healthy habits, is likely to produce taller men and women than it would if it lived under conditions less favourable. A man of over 170 centimetres in height is considered "tall." One of less than 160 centimetres in height is considered "short."

In Western Europe the cephalic index, the pigmentation of eyes, hair and skin, and stature suffice to establish the existence of three races. The Nordics resemble the Mediterranean type in long-headedness, and are distinguished from them by their greater height and fairness. The Alpine race is distinguished from both the others by its round-headedness.

The peoples speaking Dravidian languages are generally speaking, long-headed, but in the North-West as they approach the Mahratta country, and in the North-East as they approach Orissa round-headed element makes its appearance and raises the cephalic index. The origin of these round-headed strains is a matter of controversy. It is a notable feature among the Coorgs. In nasal index and stature there is little difference between these South Indian round-heads and the long-heads which form the bulk of the population. But the jungle tribes of South India give evidence of a different racial factor, the distinctive feature of which is an excessive broadness of the nose ; the index of some tribes ranging as high as 95, and in some individuals the nasal organ is actually broader than it is long! Mr. Hornell reports the existence of a round-headed strain among the Parava fishermen of Tinnevelly, a phenomenon which requires further investigation. Generally speaking, the broad nosed jungle-folk are shorter in stature than the ordinary Dravidian.

Thus we have evidence in South India of three racial strains :—

(1) medium height, mesorhine long-heads, the normal type of the Dravidian speaking peoples;
(2) medium height, Mesorhine round heads, and
(3) short, broad nosed-long heads

It is possible that the round-headed element of the north-west of the Peninsula is different in origin to that of the north-east, and it is possible also that in the jungle-folk two racial elements exist, one of them, with lank hair, akin of the Veddas of Ceylon and the aborigines of Australia, and a second, as

already suggested, with a curliness derived from a vanished race of Negritos.

The evidence for South India cannot unfortunately be considered conclusive. In Europe the number of subjects examined amounts to tens of thousands. In South India the indices are rarely based on more than 30 or 40 observations. Apart from the splendid work of Mr. Thurston, hardly any systematic observations have been made. The measurement of heads is a simple matter. All that is required is a pair of callipers, method and a little patience. The only real obstacle is indolence.

The indices tabulated by Mr. Thurston in Vol. I of his *Castes and Tribes of South India* are based on *averages*. An average, however, is not always a safe guide. In the first place particularly if only 20 or 30 subjects are examined, the inclusion of one or two persons with an abnormally long or round head, or an abnormally narrow or broad nose, or abnormally tall or short stature, will bring down or raise the average of a community, and give a false impression of the type. Mr. Thurston was fully aware of this, and has been careful so to tabulate the measurements taken in some of the more important communities as to show clearly the number of individual measurements falling under each unit or degree of the scale. For instance, the cephalic indices of ten subjects examined may be in order, 74, 75, 75, 75, 76, 76, 77, 79, 81 and 82. The average of these would be 77, but the most frequent type would be 75, and thus 75 and not 77 would be the *typical* index. Or again, the series might run 74, 75, 75, 75, 76, 79, 80, 80, 80, 81. Here the average would be 77.5, a figure which answers to no single individual of the series. If the figures be plotted in a curve, this 'curve of seriation', as it is called, would have two "peaks". The reason for this is simple enough, viz., two distinct types (i. e., two racial strains) are included in the series measured, a fact which can only be detected by this "seriation" test.

If only one racial strain is present, as in the first series above, the error between the *average* index and the *mean* index can only be serious if the number of observations made is few. If the number of subjects examined is sufficiently large, the

abnormalities of one or two individuals, which would otherwise affect the average, will be eliminated. It is unlikely that our Indian data already on record will command the confidence of scientists unless Mr. Thurston's results are checked by at least 10 times the number of observations which he was, single-handed, able to make.

In Europe society is not split up into innumerable small communities debarred from mutual inter-marriage. It is possible there to plot out on a map the observations taken within a specified area, and to certify with reasonable accuracy that, in the population of a given area, there are, say, 80 per cent with long heads, 15 per cent with medium heads and 5 per cent with short heads. In India this convenient device would be misleading, unless a large number of measurements were taken in each and every community resident within the area, and even these results would not be of much value, as they would represent the average or mean of all the communities, a figure which might not necessarily correspond with the index of any particular community. Mr. Thurston has therefore set a sound precedent in examining communities separately and tabulating the results separately, and it is interesting to note that, in spite of multiplicity of social units, the indices prevalent over a given area do not differ widely; in other words, there is reason to believe that, in spite of social differences, the races of South India are more closely united by ties of blood than is generally supposed, and the gulf between one community and another, however wide socially, is racially insignificant.

Mr. Thurston wisely concentrated attention on a limited number of criteria, leaving it to others to supplement his work. There are many other factors in human anatomy which require exploration. The cephalic index, for instance, by no means exhausts the evidential value of head-form. There are a number of other head measurements, such as the *facial height*, the distance between the opposite zygomatic arches from which the *facial index* is derived, and the maximum diameter between the outer margins of the orbital openings. In organising his ethnographic survey the late Sir Herbert Risley prescribed an *orbito-*

nasal index to gauge the relative flatness of the face. This test was not applied in South India. The *shape* of the head is also a factor to be considered. Some heads, for instance are pentagonal when viewed from above, others are oval or egg-shaped.

The relative proportions of the limb-bones are also of interest, and these can be estimated by standard measurements on living subjects. Variations also exist in the features of the bones themselves. For instance, the shaft of the tibia is sometimes flattened transversely in the upper-third of the diaphysis of the bone, so that its posterior side becomes transformed into a border; a condition, technically called *platycnemia*. It has been suggested that this condition is a result of the habit of squatting on the hams adopted by people who do not ordinarily use chairs to sit on. About 2400 years ago Herodotus, the Greek historian, commented on the peculiarity of the Egyptians, in that males micturate in a sitting posture, unlike the Greeks who do so standing. This difference in habit between eastern and western races is thus of ancient origin. It would be interesting to plot out on a map of the world the areas in which standing and sitting postures prevail, but I doubt whether sufficient data are forthcoming. Whether *platycnemia* is rare or common in South India is a matter for future enquiry. I find no record of its frequency of occurance.

In connection with the Census of 1911, information was called for regarding the occurrence of 'blue pigmentation' on the skin of very young children. These blue patches, which appear usually in the lower sacral origin and disappear within the first year of life, are supposed to be evidence of Mongolian blood. Unfortunately 'this quest failed to stir the imagination of Madras doctors,' and no evidence is forthcoming from this Presidency. Blue patches do occur in Madras, although they are not very common. Two interesting drawings were prepared of such patches by Col. C. Donovan, I. M. S., and are now in the Royapettah Hospital. It is to be hoped that steps will be taken to wipe off this slur on the scientific enthusiasm of the "Madras doctors" and to maintain in future a careful record of all blue patches observed, their percentage to the total number of

observed births, and information as to the community to which the infants so marked belong.

Another line of investigation is the occurrence of colour-blindness. Whether colour blindness is hereditary or not is still a matter of dispute. The late Dr. Rivers of Cambridge hoped to use it as a test of race, but before we can accept it as a test, its hereditary character must be proved.

It is clear, from what I have said, that a vast amount of work has yet to be done before physical anthropology in South India can be placed on a scientific footing, and that advance is impossible unless the medical profession interests itself in the subject as it has in other lands. Even such a simple matter as the relative frequency of grey-eyes and curly hair in specific areas and communities is unknown, while on the subject of the physical measurements of females our knowledge is completely blank, and is likely to continue so unless and until the interest of our lady doctors is aroused and their services enlisted in the cause of science. Opportunity and material are abundant, and the labour is not great. What is needed is organisation and method.

III. Other Lines of Research

In the previous section I have dealt with Physical Anthropology properly so called. I shall now proceed to suggest other lines of research open to the medical man which would be of value to the anthropologist.

In his book "The Races of Europe" W. Z. Ripley discusses the relative immunity and susceptibility of certain races to certain diseases. Ripley wrote at the close of the nineteenth century, and, in the light of subsequent discoveries, much that he has said must be rewritten. He points out that the Negro races are pre-disposed to elephantiasis and tetanus, while the Negro's liability to sleeping sickness is peculiar to him alone. He is prone to skin diseases in general, but immune from cancer, yellow fever, and bilious disorders. The Mongolian is likewise free from inflammatory diseases, to some extent from cholera, and also from beri-beri. The Polynesians are immune from

scarlet fever and it is said that tbe Japanese cannot even be inoculated with it, their immunity being ascribed to a strain of Polynesian blood in the Japanese race. It has been asserted also that the Alpine race of Europe is immune from trachoma or epidemic granular conjunctivitis.

In liability to tuberculosis, the European race stands midway between the Negro and the Mongolian, climatic conditions being equal. The Mongolians in fact seem almost immune to its ravages. The original home of syphilis is unknown, a fact astonishing enough, seeing that its spread throughout the civilised world dates from comparatively late historic times, following shortly after the discovery of America. Syphilis, which was probably introduced by Europeans to America and New Guinea and Polynesia, is said to be yet unknown to any extent in Central Africa where "it dies out naturally" even when introduced, while it "kills the American aborigines at sight". The Chinese are especially immune from syphilis, and, if contracted among them, it speedily becomes benign. The Malays, on the contrary, are terribly susceptible, and this susceptibility persists when Malay blood is crossed with Japanese or Negroid.

How far the above summary can be accepted as correct in the light of present day knowledge is a matter which I must leave to doctors to discuss. It is remarkable that, as regards India, Ripley's summary is blank. The subject, as applied to India, would provide an interesting thesis for discussion. Some interesting investigations were carried out some years ago on the relative susceptibility of blondes and brunettes in London. The conclusion arrived at tentatively was that consumption, nervous disorders and cancer are commoner among brunettes than among blondes, the latter being more susceptible than brunettes to rheumatic tonsillitis, chorea, and rheumatic fever, and heart disease derived therefrom.

The relative susceptibliity of the two racial types was also examined in different age periods. In the first 10 years of life blondes are more susceptible than brunettes to digestive and respiratory disease. Between the ages 10 and 15 mortality is remarkably low. Brunettes still maintain better health than

blondes, and their incidence is at a minimum. Similar proportions are maintained between the ages of 15 and 20, while in the next quinquennium, between 20 and 25, consumption begins to ravage the brunettes; half the deaths among them occurring in the age period 20 to 40 being from consumption. But early marriages are more prolific than late marriages; brunettes marry earlier than blondes, and hence brunettes preponderate between the ages of 20 and 30. These inference are no doubt inconclusive. But the method and classification of the facts are suggestive, and it should be possible for the medical men of the Madras Presidency to follow up this cue, and establish conclusions which may be not only of great scientific interest, but also of high administrative and practical value.

In such investigations it is of course necessary to determine how far race is responsible for the light or heavy incidence of any particular disease. There are other factors to be examined, such as the influence of climate and temperature on the skin in various races, and the effects of altitude (which appears to render people peculiarly liable to goitre and, I believe to cretinism), and food, which plays an important part, for instance, in the incidence of beri-beri and diabetes.

Another interesting line of investigation is the effect of miscegenation or the crossing of different races. Mr. Thurston has touched on this subject in connection with the crossing of Indian and European blood, and also with the progeny of a small colony of Chinese settlers on the Nilgiris. In such enquiries it might be possible to establish evidence of the operation of Mendelian laws of heredity in the transmission of selected characteristics while the principles of *selection* both natural (the results, of environment, particularly of food and climatic adaptability) and artificial, (the result, *inter alia*, of sexual and social preferences and of urbanization) could doubtless be determined.

In dealing with the physical differences of races Sir Arthur Keith has suggested that racial differences may be traced to differences in the activities of the glands which control growth, particularly the pituitary, pineal, supra-renal and interstitial glands. It is doubtful whether the influence of these glands in determining

racial characteristics is capable of proof. But Sir Arthur Keith's brilliant suggestion as to the influence of these factors and the hereditary transmissibility of peculiarities is well worth investigation.

Another branch of medical science of growing importance, which has a very direct bearing on anthropological studies, is that which deals with mental diseases. Psychology, unfortunately, in the Middle Ages has been over-laid with thick accretions of religious and irreligious dogmatism, and it is only in recent years that the study of the mental faculties of animals and children and of abnormal, subnormal and supernormal minds has raised the study of psychology to a scientific level. The influence of mind over body is increasingly recognised by medical men, and the mentality of the patient is a factor to reckon with in restoring him to and maintaining his health.

The subject is one of general importance wherever two cultures clash. Only too frequently the dominant culture, by destroying the foundations of the culture with which it comes in contact, destroys also the joy of life for those whose culture is undermined. To many an Englishman, his golf, his billiards, his club, his daily newspaper, and, perhaps, his church are an integral part of his life. Post him to an up-country station in India where none of these amenities are accessible to him; and, unless he has other interests in his work, his reading or his surroundings, he will go sick. Similarly a savage, whose joy in life centres in the pleasing pastime of head hunting, pines away and dies if he is deprived of this recreation by a civilised administration. It is this loss of interest in contact with civilisation that is responsible primarily for the extinction of many peoples who have worked out their own mode of living in isolated seclusion. The whole of Melanesia and Polynesia are suffering from this malady. The Tasmanians have already disappeared. In this Presidency too, contact with civilisation has destroyed the whole of the economic and social system of the Todas, and, unless something can be done to restore their vitality and counteract the effects of alcoholism and vice, they, too, within a few more generations, will vanish. It is doubtful whether the adoption of Europe an methods

and modes of living is beneficial to the educated classes of India. It is extraordinary how completely some English educated Indians have cut themselves adrift from the culture in which they have been nurtured, and, incidentally, from communion with their more conservative countrymen. One of the most remarkable features of Indian society is that, although it is split up into myriad communities mutually water-tight, it is pervaded by an amazing unity of spirit. The adoption of European modes of living threatens to establish a line of cleavage between the privileged few who are "English educated" and the great mass of the people. We know from our experience in Great Britain how completely all memory of folk-culture is destroyed by higher education, and, although healthy recreations such as cricket and tennis are perfectly harmless, it is doubtful whether Indians can absorb the spirit of life in Western Europe, without the help of its traditions, sufficiently to fill the vacum left by the abandonment of their own religious and domestic festivals and rites. Even if these rites and ceremonies are distasteful to those who have benefited by "English education," it is incumbent on them to view them with a certain amount of respect and sympathetic understanding, in the interests of those in whose life they still constitute an important factor.

Again, a knowledge of the mentality of his patient is essential to the Doctor, a knowledge, that is, of his beliefs, prejudices and practices. Still more so is such knowledge necessary in preventive medicine. It is hopeless to convince a village, full of illiterate persons of the utility of measures to counteract infection or cure diseases, unless their point of view is understood. The recent outbreak of relapsing fever among the depressed classes of Tanjore and Trichinopoly districts was attributed by them to the pollution by a Pariya of a sacred tank in Kumbakonam. This belief explained to them the fact that the disease was limited to 'untouchables' only. No useful purpose would be served in trying to persuade these Paraiyans and Pallars that their belief was wrong and to substitute for it a learned lecture on bacteriology. Had a prophet arisen with divinely inspired message that to expiate the pollution, the Paraiyars and Pallans should

dedicate their hair to the village deity, it would have been a grave disservice to the sufferers to denounce such prophecy as a lie. Plague-striken villagers will be much more amenable to preventive measures if they believe that disinfectants are of magic potency than if they are compelled to listen to a discourse on the aetiology and epidemiology of plague.

There are, I believe, few ailments more difficult to deal with than hysteria. The phenomena of 'demoniacal possession' are frequent in South India, particularly in connection with the worship of folk-deities. The Todas, for instance, hold regular *seances*, at which professional diviners become possessed and denounce the sins of individuals. At almost every village festival a number of devotees become inspired. It is astonishing that, hitherto, men of science have given little attention to this interesting field of research, although opportunities for research are abundant. Incidental to these phenomena of religious inspiration is the anaesthesia which it can induce. Fire-walking as practiced at Moharrum by Muhammadans and at the Dharmaraja festival by the Vanniyas and other Hindus, and the forms of torture, such as piercing the tongue and the cheek with silver needles and "jaw-locks," to say nothing of the mental and physical effects of fasting, demand enquiry by scientific men, and medical science must be considered defective until it takes cognisance of such facts of every day life.

Another branch of anthropological studies which requires closer attention on the part of medical men is the practice and relief associated with the so-called "indigenous systems" of medicine. It is unfortunate that controversy on this subject, which has afforded material for political agitation for the past many years, is conducted, as political agitations so often are, without sufficient knowledge on either side. The Unani and Ayurvedic systems of medicine can trace back their pedigree to the same source as the medical science of Western Europe, though in the course of ages the systems have so altered that their cousinship is not at first sight recognisable. The fact remains that they have a great deal in common, and it is the duty of medical science to ascertain the common elements, the points of

contact and points of agreement, and to examine the points of difference with the impartiality of scientific research. To abuse plaintiff's attorney is a symptom that your case is weak, and appeal to sentiment or passion is incompatible with the dignity of science. Medical practitioners of the coming generation will be at a great disadvantage if they are not equipped with a knowledge, of, at least, the elements of Unani and Ayurvedic practice and belief, to say nothing of the methods of the barber, the barber's wife and the potter. The patient's illness may have been aggravated by wrong treatment, and a knowledge of what that treatment may have been, is or should be, a guide to diagnosis and cure. It is hopeless to expect an illiterate patient or his friends to give an accurate history of his case, and the medical officer will generally find it necessary to supplement from his own knowledge the information given, and draw inferences of his own. A knowledge of indigenous practice and the indigenous pharmacopaea should enable the doctor to diagnose with greater speed and accuracy than is possible if his knowledge of such things is blank.

IV. Conclusion

A question frequently asked of the anthropologist is "of what practical value are your researches ?" In these days of high prices and insufficient funds it is unlikely that anthropology will attract rupees, but a scientific man whose sole object in life is the accumulation of rupees degrades the ideals of science to the level of that expressive Tamil word "சுரண்" and is false to his scientific training. I would appeal to the medical student to interest himself in anthropology for three reasons.

(A) A knowledge of anthropology will help him to a more efficient practice of his profession by giving him understanding and insight into the mentality of his patients and a wider and clearer view of the possibilities of his case and its treatment. It will aid him in diagnosis and will safeguard him against prescribing remedies which are incompatible with the patient's mode of life and thought.

(B) From the point of view of science a medical man should

be inspired with a desire to contribute to scientific knowledge, and the consciousness that he is doing something more than merely "carrying on" and accumulating rupees will add to his interest in life. One of the worst evils of civilisation is that most men are bored with their daily task, and happy is the man whose profession is also his hobby.

(C) The national prestige of India is on its trial. In the sphere of anthropological research India is discreditably backward. The work done so far is slight and superficial compared with the enormous field for enquiry which remains still unworked. Unfortunately lassitude in such research is exceptionally pronounced in the "benighted" Presidency, where the possibilities are the greatest, where the culture of the vast Dravidian population is overlaid and obscured by an alien culture from the North. It was from Dravidian India that Hinduism drew the inspiration of the great reformers, Sri Sankaracharya, Sri Ramanujacharya, and Sri Madhvacharya. Yet Dravidian India seems unaware that it possesses a culture of its own. Mr. Molony, in his Census report for 1911, tells us, on the authority of one of his Indian correspondents, that the 'ambition of every South Indian is to be mistaken for a Brahman or to be told that he resembles a Brahman.' The lower castes are endeavouring to raise their social status by introducing child marriage and abandoning the marriage of widows, while at the same moment a reform movement among the higher castes is aiming at a return to adult marriage and the remarriage of widows. It is impossible for the educated few to do justice to the millions of the depressed and backward communities, unless they understand the conditions and beliefs in which they live. As already pointed out education tends to obliterate the culture on which it is imposed. I contend that a knowledge of the elements of anthropology will enable educated Indians, and particularly medical men, to view the storm of conflicting forces let loose by the Reforms in true perspective, and work out the salvation of their country on lines which will give stability and satisfaction to all.

Aetiology of Filarial Swellings
(Elephentiasis)

By K. RAMAKRISHNA PILLAI, M.B. & B.S.

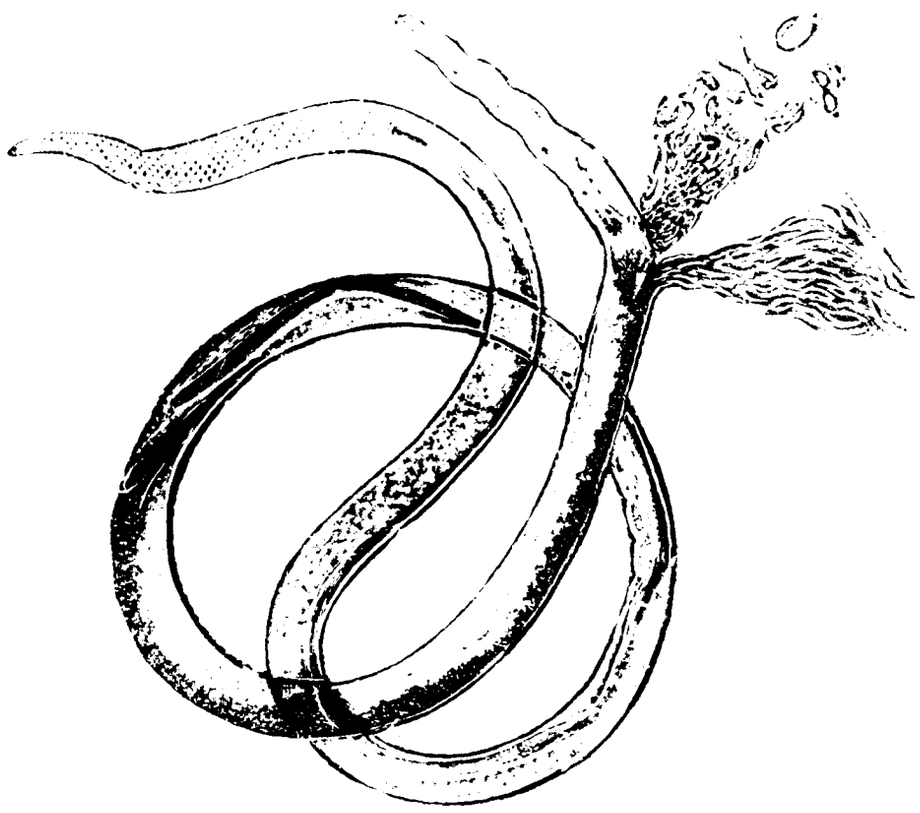
I WAS ever of opinion that the incidence of elephantiasis and probably some other filiarial manifestations, more or less depended on the water supply of a place. As it is, there is no proof existing to show that mosquitoes are the only means of dissemination of the disease. That elephantiasis and other filarial diseases occur more along the sandy coast districts or are confined to certain particular areas as in certain localities of Calicut where the water supply is suspicious, being derived from shallow wells and tanks in humus soils, and the gradual disappearence of the disease on the improvement of the water supply in place where it was formerly prevalent are note-worthy facts which could not be overlooked. Whether the influence is direct by the water in those localities being suitable for the developement of the filarial germs in the water itself under certain unknown conditions, or in some aquatic animals present in those localities or whether it is indirect as by exerting some changes in any of the recognised hosts is still to be realised. The presence of microfilaria and ova in some cases in lymphatic discharges (as from lymph scrotum) at all times, might be a clue to the existence of some other mode of developement for the escaping germs probably in water, as in the case of F. Medinensis.

Adult parent filariae seem to inhabit the superficial lymphatics of the body rather more commonly than recognised. Those that possess them might subject themselves to some loss of resistance either due to privation, injury or hard labour or sudden change of bodily temperature, which telling upon the rather sensitive worm inside, stimulate it to abort (as described by Manson). In this process the naturally viviparous worm gives rise to myriads of ova, discrete as well as in cast forms (a point not mentioned by Manson) which cause obstruction to the lymph circulation giving rise to lymph stasis and swelling. Along with this, varying amounts of a toxic substance either as asecretion or an excretion is also given out by the parent worm. This either

directly acting or by setting up inflammatory changes in the lymphatices cause tissue absorption resulting in constitutional disturbances as fever etc., In many cases have I noticed of first attacks being ushered in with slight painful swelling of the glands and tenderness along a lpmphatic trunk, then swelling of the extremity affected, fever following a day or two later only. In others the lymphangitis and adenitis may be masked, the swelling alone appearing with or without fever which comes on later, if at all. This swelling usually disappears in a few days probably due to the clearing up of the lymp spaces in the glands as a result of disorganisation and absorption of the obstructing ova or casts of ova. But the lymphatics of the area in some cases, owing to the super congestion and inflammatory process might have lost a greater part of their tonicity and thus accounting for the gravitational variation in the swellings for a few days. Attacks of this nature recur in the course of months or years, each time undermining the tonicity and resistant power of the lymphatics. When once impaired, the lymphatics very seldom are seen to regain their former powers of resistance and any slight injury or change in bodily conditions become sifficient enough to determine an attack of inflamation which, often repeated, naturally tends to lymphatic dilatation and fibrosis.

At Shertallay, a sea-side tract on the West Cost of Travancore notorious for its elephantiasis, a popular notion prevails that the disease is caused by people walking in the hot sand and when still their body temperature is high, dipping their limbs suddenly in cold tank water. This should not be discarded altogether as it was formed on real observations by the populace through ages. It is probable that in these people parent filariæ might be present in the superficial lymphatics and due to the stimulation produced by the sudden contact of cold water on the skin, the uterus of the parent worm is reflexly contracted, causing extrusion of multitudes of ova in cast forms (which either mechanically or causing inflammatory thickening of the mucous membrane of the lymphatics and gland areas obstruct lymph circulation).

The above observations are mainly based on the results of certain experiments carried out by me in Cochin.



ADULT FILARIA (Female)

Notice the two protrusions from the genital pore. The one proximal to the head shows ova in different stages of development and the other a cluster of microfilariae.

To face Page 22

While examining the pus from a case of superficial abscess in the left Scarpa's tringle in a Hindu male about 32, a slender white thread like structure 2½-3 " long was noticed lying straight and motionless. On transferring it to a slide and adding a drop or two of cold water it showed signs of life, wriggled violently, coiled and uncoiled itself and finally assumed a form as shown in books. During its active movements the worm extruded slender white masses which on examination under low power of the microscope were found to consist of clusters of immature ova aggregated into casts of 1 cm length. The breadth was that of 4 or 5 ova placed side by side. Besides these casts there were numerous discrete ova floating in the fluid. While the extrusion of the ova was going on it was noticed that the water became turbid (the toxic secretion or excretion referred to abve)

A similar case came to my notice a month later. The patient this time was a Cochinite Christian woman of 20. She reported for an abscess in the popliteal region, of 8 days duration. In the pus was discovered a parent filaria. On examining it under low power in the medium in which it was lying viz. pus, no movements or ova or mf. could be seen. But on transferring it to another slide and adding 2-3 drops of cold water, vigorous movements as before were manifested and it finally assumed the form shown in the diagram. As in the previous instance, it ejected a small quantity of turbid fluid. Near the head end 2 protrusions appeared side by side. The one proximal to the head consisted of clusters of ova in various stages of development (as represented in diagram). The other protrusion consisted of a cluster of microfilaria entirely appearing like small transparent wavy lines over a slightly yellowish back ground. No ovum was identified in this. From a study of the embryos and mf. as seen in these 2 protrusions (probably proceeding from the double chambered uterus) the development of the mf. from the earliest stages could be made out. In this connection also the following interesting observations might be made.

1. The presence of living adult filaria in superficial abscesses; such abscesses being found in places of lymphatic confluences as Scarpa's region, popliteal space, axilla, etc.,

2. Any sudden change in the body temperature is a sufficient stimulus to cause reflex contractions of the uterus of the worm thereby discharging ova in cast forms and in all stages of development and microfilaria, not fully developed.

3. The turbid secretion that is thrown out by the parent just before and during the act of abortion probably causes lymphangitis.

4. Lymph obstruction probably caused in most cases by these casts of ova, which are unable to pass through inflamed lymphatics and glands.

5. Filaria can be ovivivipar ous, being viviparous only under normal conditions.

6. The different stages in the development of microfilaria take place in the uterus of the parent filaria.

A Prize Essay

On "Village Sanitation in Malabar."

AN honararium of Rs. 50 will be given to the best paper on "Village Sanitation in Malabar." Qualified medical men who have an idea of the rural parts of Malabar are invited to send in practical suggestion for the improvement of the sanitary conditions of the district. Practical methods of cheap and efficient disposal of night-soil and avoidance of water and soil pollution, which the rich and the poor can adopt, should merit special attention.

The essays must be as brief as possible, written legibly only on one side of the paper, and should be sent to the following address on or before 31st August 1923.

Dr. M. L. Kamath, B.A., M.D. has consented to be one of the Judges.

By V. KRISHNA MENON,

Medical Practitioner Chowghat, S. Malabar.

The Vaccine Treatment of Tubercular Affections

By RAO BAHADUR Dr. M. KESAVA PAI. M. D.

THE subject is a rather complex and technical one and falls more within the scope of the specialist than of the general practitioner. Specialists have each their own way of treating cases of tuberculosis. The advocates of sanatorium treatment have little confidence in curative measures beyond open air, nourishing food and rest. The tuberculin therapist has such great faith in his own methods of treatment that he finds few cases of tuberculosis pulmonary or otherwise that are not fit for treatment with one preparation or another of tuberculin. The general vaccine therapist places great stress on the importance of secondary infections in cases both of medical and of surgical tuberculosis and urges, the necssity of dealing with the "secondary" organisms before attempting to combat the tubercular infection. The general practitioner has a host of remedies which his experience has taught him to believe are of definite curative value in the disease. The "white plague" has in fact so firmly resisted the efforts of the human race to combat its ravages that the help of X-ray therapy, radio therapy, Hetrotherapy etc have also of late been requisitioned. It cannot however be said that a truly specific and definitely curative treatment has yet been discovered for the disease. In this short article an attempt will be made to give an idea of the part played by tuberculin and 'seco•dary' vaccines in the treatment of different types of tuberculosis.

As a result of the discovery of the tubercle bacillus by Koch and the researches of Pasteur and later workers in the treatment of bacterial diseases by their respective vaccines, the treatment of tuberculosis by tubercle bacillus vaccines has engaged the attention of numerous workers. The initial attempts in this direction ended in failure, for, unlike other bacterial vaccines it was found that tuberculin when administered in doses similar in weight to other bacterial vaccines produced very severe reaction

often ending disastrously by causing breaking down of the affected tissues and spreading of the infection. Tuberculin treatment consequently fell at first into disrepute, until some later workers both in England and on the Continent discovered that the earlier failures were due more to overdosage than to the inapplicability or non-specificity of tubercular vaccines in tubercular infection. It was further found out that the mode of action of tuberculin was not in every way absolutely identical with that of other bacterial vaccines in their respective diseases but was partly on the principle of Bier's treatment by the induction of blood to the affected parts.

Tuberculins

In no kind of bacterial vaccine has such a large variety of bacillary products been prepared and used as in the case of tubercle bacillus vaccines. In the first place the organism has been differentiated into the two main types, the human and the bovine. From each of these two types a variety of products have been prepared and used, each kind of tuberculin differing from the other in its toxicity and immunizing vlaue. There are 3 different groups of tuberculins differing from each other in their composition and method of preparation (1) The exotoxic products or extract tuberculins which are filtrates from the growths of the tubercle bacillus in liquid media like bouillon (2) The endotoxic products which are extracted from the bodies of the tubercle bacilli themselves. (3) Mixed products containing both the endotoxic and exotoxic principes of the bacillus.

Of group I the main varieties are (1) Koch's Old Tuberculin, the original preparation which is a glycerine broth culture of the human bacillus concentrated to 1—10 of the original volume and filtered through a pasteur candle. T. O. T or T. A)

(2) Bovine old tuberculin, the same as the above but prepared from the bovine bacilli (P. T.)

(3) Albumose free tuberculin, prepared the same way as T.A but in a medium free from proteins (T. A. F)

(4) 'Tuberculin-original- alt' which is the same as T. A. but not concentrated by evaporation (T. O. A.)

(5) 'Perlsucht tuberculin original, the same as T.O.A but made from the bovine bacillus (P.T.O.)

(6) Vaccum tuberculin, which is the same as T.O.A but evaporated to 1/10 volume in a vacuum (V.T.)

(7) Bovine vacuum tuberculin the same as V.T but made from the bovine bacillus (P.V.T)

(8) 'Tuberculin Oberer' the supernatent upper portion of an aqueous extract of tubercle bacilli (T.O.)

To Group II belong the following 5 varieties of tuberculin

(1) 'Tuberculin Ruchstand' which is the insoluble lower portion left after the removal of T.O (T.R.)

(2) 'Perlsucht tuberculin Ruchstand' the same as T. R. but made from bovine bacilli (P.T.R.)

(3) Bacillary Emulsion (T.B.E.) which is an emulsion in glycerine and water of titrated tubercle bacilli of the human type.

(4) The same bacillary emulsions as above but of the bovine type (P.T.B.E.)

(5) Sensitized tubercle bacillary emulsion (S.B.E.) fixed with the specific immune bodies.

Group III is practically the same as a mixture of group I and II. The only common preparation belonging to this group is Beraneck's tuberculin (T.B.K.) which is a mixture of equal parts of germ filtered culture of Tubercle bacilli in an albumose free medium + an extract of bacillary bodies.

Each Tuberculin therapist has his own method of tuberculin administration. Some employ T.B.E. exclusively for all their cases, of whatever type they may be. Others begin with the milder tuberculins like P.T.O. and than gradually change into O. T. and finally end the treatment with T.B.E. Whilst some tuberculin therapists do not go beyond a certain limit in tuberculin dosage in the treatment of their cases, others make it a point to carry the patient on to the very maximum with the idea of giving the maximum of tolerance.

In tuberculin therapy much more than in other kinds of vaccine therapy it is very essential that severe reactions should be avoided. Such reactions may lead to spread of the area of infection, breaking down of the tubercular areas and generali-

zation of the infection. Perhaps no kind of vaccine therapy has been so unpopular and dreaded during recent years as tuberculin therapy not only by the layman but by the medical practitioner as well. It is a very potent vaccine whose judicious use has given undoubtedly favorable results in different types of tubercular infection, but instances are unfortunately too common wherein an indiscriminate use of it either in the way of a wrong method of administration in properly selected cases or even a cautious dosage in unsuitable cases, has led to complete disaster, so much so that there is still one class of physicians who refuse to admit that tuberculin therapy is anything but a dangerous method of treatment.

The greatest care should therefore be taken not only by a proper choice of the cases for tuberculin administration but by the adoption of the most cautious and judicious dosage in cases that are selected as suitable.

The following are some important contra indications for the employment of tuberculin.

1. Advanced conditions marked by debility and emaciation wherein no vaccine can make the system respond to such stimulation.

2. Tendency to haemoptysis. The focal reactions which tuberculin invariably sets up are apt to increase the tendency to haemoptysis.

3. Cardiac or renal disease co-existing with tubercular conditions, is not by itself a contra-indication, but where the constitution has been so thoroughly run down as a result of the underlying organic disease that the system may not respond to the tuberculin stimulation or the response may be so severe as to upset the patient in his general debilitated condition, tuberculin should be scrupulously avoided.

4. Highly febrile cases should as far as pcsaible be avoided. When the temperature is due to secondary infection with other organisms such as pneumococcus, streptococcus etc, the rational procedure is treatment with the sccondary vaccine, but when the high temperature is purely a tubercular toxaemia it is much wiser not to use tuberculin.

5. Nervous diseases like hysteria, epilepsy, etc., have been considered as contra indications but opinions differ on this point.

The Technique of Injection.

The subcutaneous mcthod is the most commnn one employed in tuberculin injections. The upper arm is no doubt a convenient spot but injection in the back between the shoulder blades or in the front of the chest below the clavicles is preferable as there is more connective tissue space in these localities and local reactions are apt to be less severe.

The tuberculin syringe should have a long and narrow barrel on which 1/10 or 1/20 o. c, can bc casily read. Thorough sterilisation of the syringe is more essential in tuberculin injections than in the case of other vaccine injections, as the formation of abscesses is more apt to result on account of the local reactions,

The intravenous method of tuberculin administration, however good it might look theoretically, is, for evident reasons, adangerous one in practice.

In trabronchial and inhalation methods of administering tuberculin are unscientific and irksome and the oral and the rectal administrations have not been proved to be of any appreciable value.

The percutaneous method is perhaps more scientific and rational than the last few and has still its advocates. The absorption is slow and mild. In hypersusceptible subjects this might be considered the only method applicable and can be tried. An ointment made with old tuberculin is used for inunction and the absorption take splace through the hair follicles and sweatg-lands.

The System of Dosage.

The initial dose should be the absolute minimun. The increase of dosage can be graded roughly on the following scale—1, 1. 5, 2, 2. 5, 3, 4, 5, 6, 8, 10, 15, 20 &c, the dose being increased roughly by 20 to 50% each time.

The initial dose varies for the different tuberculins

The following can be fixed as the initial doses for the common tuberculins.

P. T. O.	....	....	O. 2 c. mm
O. T.	....	....	O. 02 c. mm
T. B. E.	....	....	$\frac{1 \text{ m. gm.}}{1000000}$

The experienced tuberculin therapist might often commence with larger doses but it is always safer to begin with the absolute minimum.

The maximum dose to be ultimately reached depends on the tolerance of the patient, the response elicited by him and upon the administrator. Some workers for instance do not exceed 1/100 mgm T. B. E. whilst others insist on runing the dose up to 1/10 mgm, 1 mgm or even 10 mgm.

Severe reactions should be cautiously avoided in tuberculin therapy and whenever such occur the patient should be given a rest from the injections until such time that the reaction has completely subsided and the next dose should be either a repetion of the previous dose or a smaller one still. A rational method of fixing the dosage and the interspacing of the doses is by the estimation of the opsonic index of the patient between the injections, but the method is so laborious and unreliable in the hands of even expert workers that it is not now generally adopted. The clinical observation of the progress of the case is quite the best basis on which to adjudge the dosage. In spite of all care it is not possible to avoid reactions of some severity during some part of the treatment and whenever it is observed that a patient has never given any reaction during the whole course of the injections runing up to a maximum dose, it is very likely it is not a case of tuberculosis unless the presence of tubercle bacilli has been demonstrated microscopically. The diagnosis of tuberculosis by a V. Pirquet's reaction is not always a sound procedure and instances of patients treated with a full course of tuberculin as a result of diagnosis by this test are so common, that the benefit of tuberculin therapy has very often been unduly exaggerated and over estimated.

The total period of treatment depends on the extent of the disease and its duration and on the response made by the organism to the tuberculin. Recovery or improvement as a result of tuberculin therapy is after all a natural process helped by an artificial stimulus and a treatment of several weeks or months, if not of years will therefore be needed.

Tuberculins in Pulmonary Tuberculosis.

The applicability of tuberculin therapy in pulmonary tuberculosis has been questioned by a few workers, but experience and observation bear ample testimony to the fact that suitable cases give a satisfactory response. The following are amongst the cases which are fit for tuberculin treatment.

1. Pulmonary tuberculosis in the primary stage, afebrile and 'torpid' *i.e.*, not responding to ordinary treatment or natural powers.

2. Slightly more advanced cases where fibrosis and signs of natural repair are very evident.

3. Patients who have made an apparent recovery, but are apt to relapse.

4. Even certain advanced cases which are afebrile and stagnant in their course.

5. Advanced cases in the stages of breaking down and cavitation are considered by some to be not unsuitable, but it is wiser to avoid tuberculins in these cases.

Amongst unsuitable cases are 1. The galloping types 2. The acute relapsing type where the previous history shows acute exacerbations alternating with partial remissions. 3. Febrile cases with low bodily power 4. Visceral implication especially of the liver and the kidneys 5. Haemoptysis 6. Highly nervous and hysterical subjects 7. Persistent tachycardia in spite of low temperature 8. Marked dyspnoea following the injections 9. Profound cachexia or extensive implication of the lungs.

The choice of the tuberculin depends on the administrator. It is always desirable to begin with the weakest preparations. P. T. O. is the best to commence the treatment and can be followed by O. T. and T. B. E. Some workers prefer T. R. to start with even when the cases are febrile as this preparation is not so apt to cause reaction as T. B. E. Others advocate the bovine tuberculins as being milder and less toxic. Of late serum tuberculins and preparations made from specially non toxic strains of B. Tubrculosis have been highly spoken of.

Indications of improvement in tuberculin therapy. When the temperature comes down towards normal, when the patient gets

less easily tired and less susceptible to adverse external conditions, when the digestive functions improve and the weight increases, when the physical signs show improvement and fibrosis of the affected areas, when the tubercle bacilli lessen in number or disappear in the sputum, when in a few words the progress in the general conditions keeps pace with the advance of the treatment, it is no doubt a definite indication that tuberculin therapy is doing good. The reverse conditions are a warning against the further administration of the vaccine.

The following figures are taken form the reports of some of the recorded cases treated by me or kept under my observation during the last few years.

Table showing results of Tubeculin Therapy in T. P.

Total number of cases treated.	Number of cases that improved.	Number of cases that were arrested	Number of cases that did not benefit.	Remarks.
87	35 =40%	24 =28%	28 =32%	The cases included different stages of the disease febrile and afebrile.

The above figures include some febrile cases treated during the earlier part of the period, which in the light of later experience would not have been subjected to the treatment. It is evident that better results could have been obtained if a better choice could have been exercised from the beginning.

Tuberculin therapy in tubercular Adenitis. Perhaps in no type of tubercular infection can tuberculin administration be said to be so highly effective as in adenitis. Some workers like Petruschky consider every case of adenitis, febrile or afebrile, as suitable for tuberculin therapy. Even when caseation has set in the administration of tuberculin promotes the healing and scar formation. A little operative interference is no doubt necessary in such late cases.

Table showing results of Tuberculin Therapy in Tubercular Adenitis

Cases Treated.	Cases that recovered.	Cases that improved.	Cases in which there was no effect.	Remarks.
34	17 50%	17 50%	nil	The series includes cases in all stages.

The above figures form the recorded portion only of the cases * treated. They include a number of cases where caseation was far advanced and surgical assistance had to be given. The absence of cases that did not benefit at all is very significant.

*Tuberculin therapy in other tubercular affections.** In tubercular bone disease tuberculins are of definite value, improving the general condition of the patient and thus promoting the healing of the carious parts. Surgical help is of course necessary. Lupus is known to be benefitted and tubercular affections of the eye have been successfully dealt with. In the case of the eye which is a highly delicate and vascular structure it is essential that the utmost precautions should be taken to exclude reactions.

Tuberculosis of the kidney and urinary organs, though obstinate in their character are amenable to tuberculin treatment. The milder forms as P. T. O., T. R. and Beraneck's tuberculin are preferable in such cases.

On the Use of Secondary Vaccines in Tuberculosis

It is a matter of common experience that in the later stages of tuberculosis pulmonary glandular, or otherwise, secondary invasion by other organisms almost invariably takes place leading to the onset of hectic. The part played by these organisms in the clinical progress of the disease is very important and the results of 'secondary' vaccine therapy go to confirm the view that a majority of cases are victimized as much to the secondary infections as to the tubercular toxaemia. There are several of these secondary organisms which invade the tubercular tissues, their nature varying with the individual and with the seat of the disease. Variations at different periods in the same individual

its injudicious use, the tuberculins can be given the same high place in the rational treatment of tubercular affections, as other bacterial vaccines in their respective infections.

(2) The use of Tuberculins cannot be advocated in each and every case of tuberculosis. There are cases where they can with reasonable certainty be expected to do definite good and others where they are quite inapplicable. There are other cases again in the borderland between the above two classes wherein the individuality of the tuberculin therapist comes into play in judging as to whether tuberculins can be used or not.

(3) Whilst an improper use of tuberculin is apt to bring discredit to the doctor and to the treatment and work harm on the patient, the application of the treatment to non tubercular cases sometimes brings in undeserved credit but will in the long run excite distrust and suspicion. A conscientious choice of cases is therefore essential in the interests of Professional morality.

(4) In fixing the doses during a course of injections with tuberculin it is wiser to avoid reactions than to risk their occurrence. The more successful worker is the one who errs on the side of low doses.

(5) Tuberculin should not be considered as a "cure" in the sense of specific drugs like quinine, salicin, salvarsan etc., and consequently in the best treated case relapses are apt to occur in later life. Tuberculin by itself is insufficient in treatment. The general, dietetic and hygeinic treatment is equally important.

(6) Hectic and general constitutional disturbance in tubercular conditions, especially in the later stages, are usually the result of secondary infection and autogenous vaccines made from the secondary organisms have a distinctly beneficial effect in treatment.

(7) The Pneumococcus, B. Influenzae, M. Catarrhalis and Streptococcus are the common secondary organisms found in pulmonary tuberculosis and autogenous vaccines made from these are useful in treating the hectic and facilitating the employment of tuberculin in the later stages of the treatment.

(8) Streptococci, Staphylococci, B. Coli etc., are the common organisms found in the secondary infection of tubercular adenitis osteitis, arthritis etc and the corresponding autogenous vaccine can be used with benefit.

(9) General medicinal, dietetic and sanatorial treatment is necessary in the medical cases and surgical interference in a number of the surgical cases Tuberculin therapy and autogenous vaccine therapy are adjuncts and very often valuable adjuncts to the other treatment.

Blood Transfusion

By Dr. A. VASUDEVAN, M.B., B.S.

THIS article is meant to give in brief an idea as to how blood grouping and blood transfusion is done and hence I do not propose to go any length into the history or indications for blood transfusion. Every one is aware of the marvellous results given by blood transfusion in grave haemorrhages and in anaemia and in combating shock. The method of combating shock after haemorrhage by saline transfusion or even by gum saline has not given encouraging results chiefly because no attempt is made to supply the oxygen carrier (haemoglobin) while the volume of blood is increased—these resulted in a temporary amelioration of the condition but without sustained results. "Provided haemorrhage has been controlled blood transfusion may be regarded as an absolute specific for the sanguineless condition and its accompanying shock."

The most important precaution to take before blood transfusion is to be sure of the compatibility of the blood and hence a few words of about "blood grouping" are necessary. It has been found that the blood of all individuals can be classified into four groups—every person belonging to one of four groups which is constant throughout his life. The accepted table is that of Moss.

(5) Stored Corpuscle method.

Blood is stored in the following manner

850 c. c. of 5·4 per cent glucose solution

350 c. c. of 3·8 per cent Sodium citrate

500 c. c. of blood

Before use the supernatant fluid is syphoned and the corpuscles mixed with 700 to 1,000 c. c. of normal saline and used. This is not a good method for the leuccoytes break down and a tryptic ferment which haemolyses is set free.

(6) Citrate method. This is a good method.

Blood is received into a reservior whose capacity is from 500 to 1,000 c. c. and which contains some 2 per cent sodium citrate solution in it. The proportion of the citrate solution is about $\frac{1}{3}$ of the total blood used. This fluid is injected into the recipient vein through a canula which is at the bottom of the vessel.

Kimpton's Method

The method most frequently used is by means of Kimpton's tube which is merely a graduated bottle holding about 500 c. c. the bottom of which is drawn out into a fine horizontal canula. At the neck of this bottle there is a small side tube leading into it, to which is attached a rubber tubing. The interier of Kimptons tube is coated with sterile paraffin by dipping the canula end in molten paraffin and exhausting from the side tube and rapidly rotating the tube so that paraffin is in the form of a uniform coating before it hardens. Now the canula end is inserted into the distal end of the exposed vein of the donor when blood fills into the tube. When enough blood has been collected it is taken out of donor's vein and the canula end directly inserted into recipients exposed vein and blood transfused. This process is assisted by gentle presure by a sterile syringe attached to the air tube.

A Case of Angeitis Obliterans.

By Major K. G. PANDALAI, F.R.C.S. (*Eng*) I.M.S.

THIS condition variously known under the names of endarteritis obliterans, presenile gangrene. intermittent claudication and intermittent limp has been considered to be due to a hyperplasia either of the intima of the arteries and less frequently of the veins or of tunica media as a result of vaso-motor overaction. Others have thought it to be of an inflammatory nature resulting from the action of toxins. Syphilis, cold, alcohol, tobacco, diabetes. mineral and organic poisons have been cited in turn as causative agents. The exact cause of the condition is unknown and its pathology far from certain. The case, here presented cannot be attributed to any of the reputed causes, its treatment though unsuccesful presents interesting lessons on the negative side and most important of all the appearances at the P. M. examination are unique and have not as far as I am aware been recorded by others.

A Hindu male shop-keeper aged 30 was admitted for dry gangrene involving the 4th and 5th toes of the left foot on 3rd January 1923. For a similar complaint the right leg had been amputated elsewhere 2½ years before just above the knee-joint.

He had not done much walking since previous operation as even with crutches he easiliy felt tired in the remaining limb. Twenty days before admission a small crack appeared in the cleft between 4th and 5th toes of left leg. This gradually extended to the adjacent sides of the toes wich soon became black and dry. Shooting pains were occasionally present in the toes and feet. The slightest movement caused pain and he spent day and night sitting with his back against a wall and hugging his knee to prevent any movement of the limb. He had very little sleep at night. There is no history of syphilis. He is a nondrinker and smokes cigarettes in moderation.

Condition on admission:—An emaciated individual with hollow cheeks and careworn expresion, tongue coated, heart, lungs, and

digestive systems normal. Urine and motions nothing abnormal. The right lower limb has been amputated at the level of the lower 1/3 of the thigh. Femoral pulsation present on this side. The left lower limb is atrophied. The knee is kept semiflexed and any movement is resisted by muscular spasm. Pulsation of femoral felt as far as the lower part of the Hunter's canal. But no pulsation of any vessel present below this level. The fourth and fifth toes are dark and shrivelled. The discoloration extends to the dorsum and sole of the foot for a height of one inch from the root of the toes and sweeps round the outer border of the foot. A faint line of demarcation with a slight purulent and offensive discharge limits the area of the gangrene. The skin of the remaining toes is purplish and glossy. The nails are atrophic and overhang the tip of the toes. The skin of the dorsum of foot is in a similar condition besides being somewhat oedematous. The part is hypersensitive and the gentlest touch is resented. A burning sensation at night is felt and extends to slightly above the level of ankle. The Tibial, Peroneal, and Popiteal arteries do not pulsate. There is no loss of sensation. The pulse rate is 80. respiration 22, Wasserman reaction : negative.

From the history and clinical findings a diagnosis of endarteritis obliterans is made and as patient has only one leg left it was proposed to try conservative measures and save as much as possible of the remaining limb.

Treatment: *Periarterial sympathectomy.* (Leriche's operation.) The foot was sterilised with alcohol and wrapped in dry wool and elevated on pillows for a few days. A hot air cabinet surrounding the limb was improvised but on account of the constrained position necessitated thereby the patient was unable to bear this treatment for more than a few hours and as no benefit either in relief of pain or arrest of gangrene was manifest it was decided to operate under chloroform. On 6th January 1923 through a vertical incision six inches long along the line of the artery in the Scarpa's triangle the femoral artery was exposed and its sheath opened. There were no adhesions to the sheath. The artery pulsated but feebly and in size it was

no larger than an average profunda femoris artery. Its walls were pliant and in no way abnormal. The adventitious sheath of the artery was dissected off carefully for a distance of half an inch all round. There was no change of any description immediately manifest in the condition of the artery as a result of this step. The femoral sheath and skin were closed in layers. There was practically no shock after the operation and the patient stood it well.

The day after the operation the patient stated that the pain in the limb was relieved and it appeared to me that the skin of the dorsum of the foot was less purple and hypersensitive than before. There was no further improvement after this The wound healed by first intention. The gangrene was slowly extending beyond the original line of demarcation. The operation was thus unsuccesful and after waiting some further time to make sure that no more benefit was to be expected it was decided to make another attempt to save the limb by performing Arterio-Venous suture in Hunter's canal. This was carried out under spinal analgesia (using apothesine in 5 per cent solution) on 3rd February 1923. Through an incision six inches long in the line of the artery in the Hunter's canal, the femoral artery and vein were exposed for a distance of 4 inches. A few small twigs of the artery were tied off and the artery and vein were clamped seperately above and below using long bladed rubber guarded clamps lightly applied for the purpose. No more force was employed than was absolutely necessary to arrest the blood flow. The artery and vein were divided at the same level in the centre of the portion between the clamps. There was slight retraction of the cut ends but this was so slight that by gentle manipulation of the clamps the cut ends could be easily approximated. The proximal end of the artery was united to the distal end of the vein and the proximal end of the vein was united with distal end of the artery by interrupted silk sutures which had been boiled in oil. The finest round bodied semicurved intestinal needles and ophthalmic silk, the finest that I could obtain were used. The intima of vessels was closely approximated thus producing a very slight raised collar on the surface of the vessel at the suture

line. There was no special difficulty in applying sutures as the artery and vein were practically of the same size. On gently loosening the clamps after the completion of the sutures pulsation was vivible in the distal segment of the vein. One or two additional sutures were inserted to arrest slight oozing which was easily controlled by the additional aid of gentle gauze pressure. As a part of the same operation the obviously gangrenous portion of the foot was removed in order to assist nature in recuperation. On section into these tissues there was no bleeding with the exception of some slight venous oozing. The foot was dressed with dry gauze.

Immediately after the operation slight pulsation could be felt in the Popliteal artery but not lower down. There was no improvement in the condition of the leg as regards the return of warmth or arrest of the gangrene. The wound healed by first intention. Unfortunately after this operation the patient suffered for seven days from intractable retention of urine for which a catheter had to be passed every eight hours. A low grade infection of the bladder occured and lavage of the bladder was employed. The gangrene continued to ascend and no line of demarcation appeared. It was therefore decided to amputate through the lower third of the thigh. This was carried out under chloroform on 13th March 1923. No tourniquet was applied. There was free bleeding from the skin and muscles but none from the femoral vessels which appeared to be completely thrombosed. The patient stood the operation well. On dissection of the amputated limb a thrombus occupied the popliteal artery and vein up to a few inches below its division into the tibials. The wound healed by first intention.

Unfortunately the vesical infection could not be controlled in spite of irrigation. Death took place on 28th March 1923.

A post-mortom examination was made and the follwing appearances were noted. The heart and aorta normal ; no atheroma present. Coronary arteries normal. At a distance of one inch below the bifurcation of the abdominal aorta the common iliac arteries became markedly narrowed and were of the same size as the femoral arteries. This condition was bilateral. At the site of

the 1st operation (Sympathectomy) no change in size or consistency of the artery was present. The intima at this part was normal. Lower down at the site of the arterio-venous anastomosis the vessel trunks had been converted into fibrous cords, the thrombus inside being fairly well organised. This condition extended upwards to about 3 inches above the line of suture and downwards to the end of the amputation stump. The recent amputation wound was soundly healed. The nerves were normal in appearance.

The kidneys, ureters and bladder were the seat of extensive infection and full of pus. The immediate cause of death was septic pyelonephritis.

Conclusions :—It might have been possible to save the life by an early amputation through the thigh and the case brings home to me the hopelessness of outlook in any attempt to save these limbs by conservative treatment. On a reference to the literature on the subject sympethectomy appears to have been but rarely employed in cases of Angeitis obliterans. The same may be said of arterio-venous anastomosis. The results of treatment have never been encouraging in this condition. In the light of these facts I do not think that Samson Handley's substitute for sypathectomy (alcohol injection into the adventitia) would be of any avail in these cases. The reputed successes of the surgery of bloodvessels in the treatment of gangrene have been in cases of senile gangrene. In these terrible cases of Angeitis obliterans occuring in younger patients no known method of treatment excepting early high amputation holds out any prospect of success. The abrupt narrowing of the common iliac arteries soon after their origin may have been a congenital condition or the result of sympathetic overaction ; in any case it appears to be closely related to the pathology of the condion.

A Case of Retroperitoneal Cyst.

Audikesavulu, Hindu Male, Aged 30. .

Occupation-Painter. Residence-George Town.

Admitted to S.3 Wards on 23—5—23.

Complaint-Swelling in the abdomen.

Duration 3 months.

Family History—Nothing bearing on the case.

Previous illness or injries—Nil.

History of present illness—Three months back the patient noticed a Swelling in the abdomen which gradually increased to the present size of an adult human head. He has no symptoms except the discomfort caused by the size of the tumour. During these three months he attended the hospital twice but refusing a operation, was not admitted.

Condition on admission—General condition poor. Patient is much enaciated, eyes sunkun, anaemic, cheeks hollow, lips slightly cyanosed, teeth clean and no P. A. Tongue clean. spleen and liver cannot be palpated. Respiratory and circulatory systems normal, but he has an occasional cough with no expectoration, appetite good. Bowels regular. Quantity of urine and frequency of micturition normal.

Local Condition..

Inspection—A globular tumour of the size of a man's head is seen in front and to the lateral aspect of the abdomen. The margin is distinctly lobulated on the right side. A band about two inch broad is seen running downwards and forwards from the direction of the spleen and sinking down in the pelvis. The tumour does not move with respiration. The supurficial veins in the abdominal wall are dilated and prominent.

Palpation—A fluid globular tumour extending from the spleen down to the pelvic cavity and involving most of the left half of the abdomen and part of the right half. The circular lobulated

outline of the right margin of the tumour can be easily felt. The right flank is resonant. There is a distinct resonant are a between the upper margin of the tumour and the liver dulness.

Percussion—The whole area is dull. Fluid thrill elecited.

Rectal Examination—Nothing abnormal.

Diagnosis.

(1) The emaciated condition of the patient and the localised fluid swelling originating from the pelvis may suggest a case of *Encysted ascitic variety of tubercular peritonitis*. But the age of the patient (tubercular peritonitis almost limited to the young ?) absence of fever, tenderness and rigidity and absence of history of constipation or vomiting are against it.

(2) A fluid encysted swelling of large size, lobulated and with well defined margins, with no other symptoms except the discomfort may suggest a *hydatid cyst* growing from the spleen, left kidney or omentum. But then the absence of eosinophelia and hydatid thrill are against it.

(3) An encysted fluctuating swelling, apparently growing from the site of the left kidney suggests cystic kidney. And the flank is dull in every position of the patient. But since the tumour does not move with respiration, there are no urinary symptoms, no history of attacks of pain and no variation in the size of the tumour, hydronephrosis is out of the question.

(4) It may be one of those rare retroperitoneal cysts, the only objection to it being that it is too superficial.

Treatment—Operation on 24—5—23.

Laparatomy—A large cyst containing about four pints of clear fluid, extending from the diaphragm to the floor of the pelvis, occupying the entire left half and more of the abdomen. On anterior incision the descending colon (the band referred to above) presented. The cyst was tapped through the outer side of the colon. A drainage tube was introduced behind in the lumbar region and the anterior opening closed except for temporary drainage.

The Patient is doing well. N. P.

A Case of Primary Sarcoma of Pluera and Mediastinal Glands

A PATIENT, B. aged 18 years was admitted into the IV physician's wards on 22-11-'22.

Complaint.—Localised bulging in the left side of the chest.

Duration.—2 weeks.

Family history.—No history of Tubencle, gout or malignant disease running in the family.

Previous history.—Nothing particular.

History of present illness.—About two months back, the patient accidentally fell into a trench at night time and got extensive bruises in the left axillary and infra-axillary regions. After careful antiseptic dressings for a week these healed up. But while playing outdoor games he notices a sort of throbbing pain in the left side of the chest, below the armpit. Gradually he noticed tenderness and swelling in this region. A private doctor was consulted and he, noticing fluctuation in the swelling opened it and found that it was a blood-cyst and that it had no connection with the surrounding structures. The swelling subsided and reappeared in about ten days. Another doctor was consulted and he aspirated a small quantity of blood. Subsequently he got admitted into the G. H.

Condition on admission.—The patient is a well nourished man of 18 years, not anaemic, tongue coated. Spleen palpable about 2 inches below the costal margin in the nipple line. Liver is slightly palpable.

Respiratory System

Inspection.—Diminished movements on the left side of the chest.

Palpation.—Diminished movements; No rhonchial fremitus; No vocal fremitus on the left side.

Percussion.—Wooden dulness up to the 3rd rib in front in the left side. Behind it is dull right up to the apex; obliteration of the Traube's space. Grocco's triangle of dulness well marked to the right of the median line.

Anscultation.—Breath sounds inaudible in the back. Audible in front and bronchial in character. The propulsive movements of breath sounds are conducted but not the spiral vibrations of speech.

Circulatory system.—The heart is considerably displaced to the right of the sternum. Boundaries and sounds not distinct.

Differential Diagnosis

1. On a superficial examination, the bulging may be suspected to be a Cold abcess or Lipoma. These are reliminated on account of the short duration and the finding of the blood cyst.

2. Aneurism of the Aorta—The points against this are the age of the patient and the absence of respiratory distress.

3. Pleurisy with effusion or Empyema—The bloody effusion excludes these as also do the absence of loculation and displacement of heart.

4. **Haemorrhagic pluersy.**—Due to Para-Typhosus A, B or C. The points against it are :—the presence of bulging externally and the presence of displacement of heart.

5. Therefore the history of trauma, the age of the patient, the blood cyst, the rapidy developed haemorrhagic pleurisy, the marked displacement of the heart and the dilated veins around the local swelling point to a focus of *primary malignant disease* X-*ray*, shows that the mediastinal glands are affected.

Notes by the Fourth Physician

A case of Abscess lung secondary to suppuration in the Antrum of Highmore

DURING the last week of April 1923, a patient from Chidambaram was admitted into S 3 wards for a painful swelling over the right cheek with a purulent discharge from the nose. He was a Hindu male aged 35 years. On inquiry the patient gave a history of a severe blow over the part about two months ago. For this he was treated in moffusil hospitals for about four months.

On examination there was intermittent discharge of offensive pus from the right nostril. The swelling was painful and tender with signs of distention of the antrum. On palpation, a crackling sensation was elicited. Patient was having a septic temperature with a rapid pulse. Teeth were loose and tarter coated. P. A. present.

The case was diagnosed as suppuration of the maxillary antrum for which he was operated upon. The mucous reflection from cheek to gun was incised and the cheek elevated. The anterior wall of the antrum was opened and thick pus let out and cavity plugged with iodoform gauze the end of which was brought out of the nostril. Daily irrigations of the antrum with a lotion containing carbolic acid and H_2O_2 was carried on.

The local condition improved under the treatment but the temperature persisted and signs of respiratory trouble were noticed. Consequently he was transferred to M 4 wards on 12-5-23.

Physical examination showed a distinct loss of resonance in the left base and in the left supra-scapular area. In these areas breath sounds were diminished and bubbling rales were present. On the right side also there was loss of resonance over the base. Broncho vesicular breathing was present over the suprascapular area and a compensatory type of breathing was present in the other areas.

Blood	Leucocytosis
Pulse	120—130
Temp	Varying from 101-103
Respns	30-40

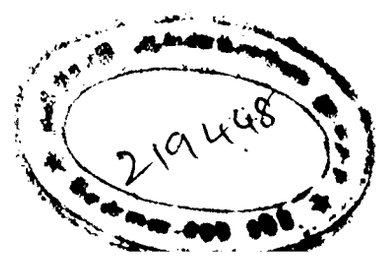
Treatment: He was put on Mist Hexamine. Turpentine stupes were applied to the chest. Chlorine gargle was ordered for the mouth. Patient's condition was not improving and his breath became very offensive, and the expectoration profuse and purulent. Then intravenous Hexamine in 7grs doses was administered with continuous inhalation of a mixture containing equal parts of Tr Benzcoin Co, Tr Iodine, Eucalyptus and creosote.

On examination: Local condition became more marked. There was absolute dulness over the left base and left suprascapular area with absence of breath sounds over these parts. Loss of resonance with coarse rales over the right base and crepitations all over were noticed.

Patient's general condition became worse day by day. There was severe cough and severe dyspnoea. Large masses of yellowith granular viscid sputum were expectorated. Microscopic examination;—Staphylococcus, Streptococcus and Pneumococcus. When he was put on stimulents and oxygen inhalations, the case was diagnosed to be Abscess lung, and the X Ray examination carroborated the physician's diagnosis. He was put on Calcium sulphide pills and Mist Senega. Inhalations were continued. Creosote was given also internally in 2 minim doses 3 times a day. Patient's conditions rapidly improved under the treatment and in a fortnight, his lungs cleared up completely and he was discharged on 21-6-23.

Antral irrigations through the nose were continued in the medical wards also.

Dr. K. SATHYANARAYANAN



The U. T. C. Camp

IT is for the 1st time in the history of the Madras University thata batch of about 400 Students including the Medicos, Engineers and Lawyers with their professors encamped in the Agram plains Bangalore for the annual camp. The way how there students stood the hardships of the camp fighting against Scorching Sun and biting cold sandstorm and heavy rains without a murmur do them credit and reveals the real stuff they are made of.

The camp commenced on Sunday the 27th May under very unpleasant and inauspecious circumstances. On the very first evening the heavy rains completely washed the tents leaving them entirely unfit for sleeping. So after eating our supper standing—the dining all was one big lake—we were made to fall in at 9 p. m, and march to a distant barracks about 3 miles away. The very sight of the place intented for our first nights rest was repelling and the men were quite right in calling them " Mule's palace." These were a number of narrow dark unventilated and unswept halls which were leaking at several places with small pools of water at intervals. In spite of all we slept soundly and early next morning the 'Retreat' in varied and fantastic dress, was very amusing to the spectators.

The camp is naturally a place where a recruit can learn anything which will make him a soldier. To most of our men who were used to the luxuries of home the rigours of the camp with its crude and monotonous meals taxing drills and heavy work were rather too much, but they bore them cheerfully. Early to bed and early to rise was insisted. The reville at 5-45 A, M. found us all out of our warm beds and at 6-15 we were all ready for our morning coffee. The work of the day commenced at 6-30 A. M. The first half hour was spent in what is called P. T. (Physical Training) a series of running about and very interesting games. The next two hours were taken up by the drill both with and without arms. These drills called squad and company

taught in gradations, are a set of movements to effect various formations—line, coloumn, close coloumn. mass and so on and a set of march past, marching in fours with all sorts of shouts ringing in the ears as stand still. change steps, by the left, left reject, Left which are more confusing that the most confusing portions of Anatomy. This parade being over we were marched off for breakfast at 10-15 A. M. After breakfast we were differently engaged some writing letters, others playing cards, a few others repairing their tents, till 11-30 A. M. when we were again marched off for lectures.

These lectures were a series of interesting instructions on camp sanitation, musketry, tent pitching. military law, the use of guns and many other such subjects. After tiffin at 1-15 p.m. companies held their own voluntary parades : Some did arms drill others practised guard mounting : but during the lateral half of the camp we had Battalion parades with arms every evening.

Games of football, hockey and badmington formed the interesting programme of the evening. It needs no mention that our men too quick to the heavy booted teams of Bangalore regements, secured good many wins in football and hockey. The day's work being over the bugle sounded at 7-15 p.m. for supper and at 9 p.m. the talto and 9-45 last post and lights out being sounded not a whisper afterwards. On several nights we had concerts, and musical entertainments and boxing tournaments.

During our stay in Bangalore for 16 days the Battalion was inspected by several distinguished officers. Magor Bremner D. A, D.A. and T.F, of the Madras district had the first visit. Colonel Commander Jackson C.S.I. D.S.O. visited the camp on the 8th. And on the last day, 11th June Major General Ponsenby inspected the Battalion and he was very much impressed and pleased by the arms drill and march past.

The cross-country race, the Battalion sports and the competition for the best guard mounting were some of the important events during the camp. The Presidency College won the cross-country cup, the Medicals the sports and the the Pachaiappa's the gouard mounting cup.

A certain amount of military discipline was enforced in the camp. In every company there were some who were known as "state guests" who had heard of Bangalore and went there to see the place. Barring all these the great majority of men, in spite of the difficulties that beset the path of pioneers, worked very hard to keep high the name of U.T.C. and also to add fresh lusture to the company to which they belong.

The morale of the men was so splendid that though they had to manage with about a gallon or two of water per day for all purposes, though they had to squat on dusty floor and partake of their food from leaves spread out on sand the taste of which they used to know whenever it pleased the God of wind to blow a lillte harder—they never grumbled, and took every thing whether the wind or the rain, the sand or the want of water in fine sportsmanlike spirit.

Our Late Patron—Major General Sir Gerald Giffard

K. C. I. E., C. S. I., M. R. C P., L. R. C. P.. K. H. S., I. M. S.

EVERY student of the Medical College had, in the person of General Giffard, an inspiring example of what a medical man ought to be. A massive figure, perhaps lacking in polish, full of kindness and sympathy, shrewd and of Judicial temperament,—he was a man cut out to rise in any profession he chose. If he had taken to farming he would have revolutionized the art of agriculture ; having taken to Medicine and teaching he could not help changing the outlook of the young men that came under his influence. Who can deny that the boys trained by him have been taught to rely more on themselves than on textbooks for was he not dinning into them that the mistakes of one author are mechanically copied by another. Whether as the energetic R.M.O. or as the budding 4th Physician or as the capable First Surgeon of the General Hospital or as the masterful

OUR LATE PATRON

MAJOR GENERAL SIR GERALD GIFFARD

K.C.I.E., C.S.I., M.R.C.P., L.R.C.P., K.H.S., I.M.S.

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Superintendant of the Government Maternity Hospital or as the resourcesful head of the Hospitalship—he was found to be fully able to cope with the exigencies of his position. So satisfactory was his carreer of usefulness that the Minister in charge of the Medical portfolio was able to get him his Kinghthood, which came like the crowning glory towards the end of his official career. This distinction is indeed unique—for he is the First Surgeon General with the Government of Madras to be decorated with this distinction. We wish him and Lady Giffard all happiness in their retirement and hope they will live for many long years to enjoy the rest they have so richly deserved. For the benefit of the budding medicos of this College a short sketch of Sir G. G. Giffard's life is given below from the pen of one who knew him well.

Born on the 9th of February 1867; entered the Indian Medical Service by competition, underwent a probation of 6 months at Netley, was in regular Military service for 3½ years and was transferred to Civil and was posted to General Hospital, Madras as additional Medical Officer in April 1894. In June 1895 he became Resident Medical Officer, General Hospital and Professor of Pathology, Medical College Madras.

While R. M. O. he showed his keenness for Surgery by requesting Col. Brown. the then Senior Surgeon of General Hospital to allow him to operate on a case of Malignant upper jaw, and he did the excision so well that every one was highly satisfied. It was about this time that a butler from Poona was admitted one night into General Hospital with an ulcer on foot and a bubo in the groin and died before day break. Captain Giffard in his eagerness to have a correct diagnosis performed a postmortem examination on the body and found that the case was one of Plague. Unfortunately he contracted the disease while doing the Post Mortem, but to the joy of all who knew him he recovered. Very shortly after this, he married Miss. Gross, the daughter of the Hon'ble Mr. Gross, First Member of Council. His fame as a successful Surgeon spread among all classes of people, and after a successful operation on a practically mori-

bund case of empyema thoracis (the patient being the son of a high Brahman official) there was no other Surgeon so popular as he in Madras for some years. This popularity of his was nothing compared to what he obtained when in charge of the Government Maternity Hospital. He extended the building and increased its usefulness to such an extent that students, who had seen the Hospital in its ancient mediocre respectability, when they saw the new buildings in their aristocratic grandeur and when they went in and had a look at the Giffard School and Clinical Theatre, could scarcely believe that that was the self-same institute where they had kept their vigil and learnt their lessons. It was the personality of General Giffard that brought about the transformation and gave to Madras a place of unequalled preeminence for maternity work. So long as the Giffard School lasts, so long will Giffard's name live in the memory of the world—I advisedly say "the world" for his Hospital has a world-wide reputation already.

In his case, the Government took the extraordinary step of appointing him Principal of Medical College, while he was Superintendent of Maternity Hospital. During the short time he was Principal, he left his mark in the internal working of the Medical College—the most useful of which was the conversion of the then main theatre of the Medical College into an excellent Library and reading room where students were given the facility of studying till 9 P.M. Some other changes he introduced such as the changing of General Hospital attendance (which was 6-30 to 10-30 A. M. 10 to 1 P.M.) may or may not have been found helpful to students, but he was actuated in every thing he did for the students by a desire to do the best for them.

When the war broke out and there was a call on the services of all medical men he took charge of the naospitalship and did great service for the wounded and the sick. His ship was famed for its comfort and luxury which again was simply due to his extraordinary powers of persuasion.

When later on, the war being over, he returned after an additional short Military service, he was appointed Surgeon-General with the Government of Madras. A strong personality, alwavs accustomed to carry his point, found himself in the throes of the Montague reforms. Though he recognized the justice of the cause and tried his best to work the reforms smoothfy, it was not without a struggle that he could accomodate himself to the new angle of vision. Justice demands that it must be recorded that he worked the reforms well and did a good deal for the Provincial service men except when the interests of his own class of officers clashed. And in this he was but human. The Sub Asst. Surgeons as a class had no greater patron than he.

Insulin, the New Treatment for Diabetes:

Its Discovery, Development, and Present Position

The Prescriber June, 1923.

THAT a relation exists between the pancreas and certain forms of diabetes has long been recognized. The subject was studied as long ago as 1889, when von Mehring and Minkowsky[1] made the discovery that extirpation of the pancreas from dogs was followed not only by digestive dirturbances due to absence of pancreatic secretion, but also by glycosuria and all the symptomps of diabetes mellitus. Confirmation by other workers was soon forthcoming, and much work has since been recorded. It was found, for example, that the severity of the diabetic symptoms was in direct ratio to the amount of pancreas tissue removed: if a portion of the organ were left *in situ* the symptoms were relatively slight.

Nearly twenty years elapsed before it was realized that this phenomenon might be due to the presence in the pancreas of an internal secretion; but it was eventually proved beyond doubt that such a secretion was produced and that the islets of Langerhans were responsible for its production. These islets of Langerhans are themselves minute ductless glands, situated in, but apparently independent of, the pancreatic gland; they are scattered throughout the ordinary acinous cells of the pancreas, each being surrounded by a network of capillaries. The hormone which they elaborate is carried through these capillaries direct into the blood stream, where it regulates the formation of blood sugar by controlling in some way the carbohydrate metabolism. Further proof of this hypothesis was afforded by the fact that ligation of the pancreatic duct caused atrophy of the acinous cells while the islets of Langerhans were not affected.

1. Von Mehring and Minkowsky: *Centr. f klin. Med.*, 1889, 303; *Arch f. exp. Path.*, 1889, 371.

The discovery of an internal secretion having such a function led to the natural assumption that administration of pancreatic extracts might be serviceable in treatment of diabetes. Such a hope, however, proved elusive. Extracts prepared in various ways were tried; some gave good results, others quite failed to have any effect. Zuelzer,[2] for example, prepared an alcoholic extract which proved very efficatious in six cases; but when the same extract came to be manufactured on a large scale it was found to be useless. Pancreatic therapy in diabetes, while perhaps of a certain value in isolated cases, never came into general use, and the hope that diabetes might be cured at the source was not realized.

Researches at Toronto.—The reason for the failure of pancreatic therapy lay in the dual secretory function of the pancreas. The coexistence in the organ of one or more external secretions in the form of digestive enzymes renders removal of the hormone a difficult matter, for during extraction the hormone is destroyed by the enzymes. It occurred to Banting, of Toronto that if some method of extraction could be found in which this difficulty was overcome, it might render practical the pancreatic therapy of diabetes.

Reference has been made to the observation that ligation of the pancreatic duct caused atrophy of the acinous cells without injury to the islets. Banting,[3] in November 1920, conceived the idea that by this means he might be able to prepare an active extract of islet tissue. Six months later he and Best were at work under the direction of Professor J. J. R. Macleod in the Physological Laboratory of the University of Toronto. The first experiments were made on dogs. The pancreatic duct was ligated for ten weeks; the degenerated gland was then removed and extracted with ice-cold Ringer's solution. This extract was injected intravenously into dogs from whom the pancreas had been removed, and which showed the symptoms of diabetes con-

2. Zuelzer: *Deutsch. med. Wochenschr.*, 1908, **32**, 1380.

3. Banting, F.G,. and Best C.H.. *Jout. Lab. and Clin. Med.*, 1922, **7**. 251; Feb.

sequent on such removal. The result was that the blood sugar returned to normal and glucose disappeared from the urine. The life of the animals was prolonged to ten weeks: a depancreatized dog seldom lives beyond two or three weeks at most.

These experiments, which were carefully verified and controlled, showed conclusively that the hormone of the pancreas had been isolated. For practical application, however, it was necessary to improve the process of extraction. Further research[4] showed that the pancreas of foetal calves of under five month's development did not contain proteolytic enzymes, and that such tissue yielded a highly potent extract. Later it was found that the pancreas from a full-grown ox would, if treated with alcohol in a certain way, yield up its hormone free from trypsin, and finally this comparatively simple process of fractionation by solution and precipitation has been adopted in manufacture. The digestive enzymes are insoluble in alcohol and the proteins are precipitated by it, and both are thus kept out of the extract. The final product represents the hormone of the islets of Langerhans and has therefore been called *Insulin*.

Preparation and Properties.—In the manufacture of insulin on a large scale the fresh pancreas of the ox is used. This, after careful dissection, is first extracted with weak alcohol: strong alcohol is added to precipitate the enzymes and the liquid is filtered at a very low temperature to inhibit the action of the enzymes until they have been entirely removed. The filtered liquid is concentrated *in vacuo* at a low temperature; fatty substances are removed by washing with ether; the extract is evaporated to a thick consistence and finally treated with strong alcohol and centrifuged. Various further processes of purification follow, so that the final product is practically a solution of pure insulin free from proteins.

Insulin is a white powder, soluble in water (except at P_H 5 to 6) giving a laevorotatory solution: it is soluble also in alcohol.

4. Baning and Best: *J. Lab. and Clin. Med.*, 1922, 7, 464; May. Banting, Best, Callip. Campbell, and Fletcher: *Canad. Med. Assoc. Jour.*, 1922, Mar., 141.

It is not a protein : it may be heated on a boiling-water bath for ten minutes in faintly acid solution (P_H 5 to 6) without appreciable reduction in strength, but actual boiling destroys it in three minutes.[5]

The dose of insulin is estimated in *units*, not by weight or measure. The unit is the amount in c.c. of the extract which, on subcutaneous injection into a normal fasting rabbit of 2 kg. weight causes a lowering of the blood sugar to 0·045 percent. (about half normal) in from one to three hours. The unit adopted in Britain is the same as in America, that is about one-third of the original unit as fixed in Toronto. The effective dosage is about 20 such units daily given by subcutaneous injection, in doses of 10 units, 15 to 30 minutes before meals. Each unit should enable the patient to take with the ensuing meal from one to four grammes additional carbohydrate without excretion of sugar. Dosage must be controlled by the carbohydrate tolerance, the aim being to keep the blood sugar at or just above normal level.

Therapeutic Action.—The results of the original clinical trials of insulin were referred to in these pages a year ago.[6] In a subsequent article Banting, Campbell, and Fletcher[7] recapitulate the results of their researches and give a full account of the therapeutic action of insulin. In patients not otherwise amenable to treatment, insulin has the following effects :—

1. Glycosuria is abolished.
2. Ketones disappear from the urine and from the blood.
3. Blood sugar is reduced and kept at normal level.
4. In acidosis and coma the alkali reserve and alveolar CO_2 return to normal.
5. The respiratory quotient shows evidence of increased utilization of corbohydrates.

5. Moore, H.F. : *Lancet*, 1923, Apr. 7, 715.

6. Prescriber, 1922, July, p. 241. An account of Banting's early researches was given in our Abstract Review on Diabetes before it appeared anywhere else in this country.

7. Banting, F.G., Campbell W.R., and Fletcher, A.A. : *B.M.J.*, 1923, Jan. 6, p. 8.

6. The cardinal symptoms of diabetes mellitus are relieved and patients show distinct clinical improvement.

It has been found further that insulin is a specific in treatment of diabetic coma.

So far there is no evidence that insulin has a curative action. The improvements which it effects are the result of reduction of blood sugar, and to maintain this at proper level constant treatment, usually twice a day is necessary. It is possible that the rest given to the islets of Langerhans may allow them to recuperate, but this is not yet known. So far reports indicate a return of hyperglycaemia and glycosuria on withdrawal of insulin. This is an important point : insulin ought not to be given unless there is a clear prospect of continuing the administration for an indefinite period.

An interesting feature of the action of insulin is that it not only removes hyperglycaemia, that is reduces blood sugar to normal, but actually induces hypoglycaemia, a fact made use of in connexion with its physiological standardization. (As already shown, a unit of dosage is the amount which reduces the blood sugar of a normal rabbit to half.) Too large a dose, therefore, will produce hypoglycaemia in a patient, and the same may happen if insulin be given too long before a meal. Weakness, nervousness, and sweating are observed ; and these may be followed by unconsciousness which my end fatally. It is most desirable, therefore, to keep the blood sugar at or slightly above normal level. When it falls below, the symptoms may be relieved by administration of carbohydrate and by injection of adrenaline. Patients should have some form of sugar handy to take should symptoms of hypoglycaemia show themselves. There is little chance of it developing after the fifth hour.

For this reason insulin must never be given in case of so-called renal glycosuria or *diabetes innocens*, in which the patient is already in a condition of persistent hypoglycaemia. By still further reducing the blood sngar, insulin will aggravate this condition, and the symptoms just described will manifest themselves.

4. Care must be taken to avoid its use in non-diabetic cases, such as renal glycosuria.

Some Comments and criticisms.—The widespread interest aroused by insulin has led to numerous comments and to not a few criticisms. Several workers claim to have worked on lines similar to those of Banting. Among these is R. L. Mackenzie Wallis[10] who has prepared and used a stable pancreatic extract capable of oral administration. In 1920 he published a paper[11] dealing with diseases of the pancreas and showing the relation of the gland to diabetes His pancreatic extract is prepared by extraction with alcohol at 60° C. and evaporation to dryness. It is a brown powder, soluble in water, and can be kept dissolved in sterile saline. It consists of a polypeptide, plus a small quantity of lipoid, and contains no proteins, poptones, or cholesterol. The smallest trace of alkali destroys the active principle, but this is very stable in 0·2 per cent. hydrochloric acid. Wallis describes several cases in which his extract was tried clinically, and he sums up his conclusions thus :—

1. A preparation of the pancreas obtained by alcoholic extraction *in vacuo* has been made.

2. This extract, when given by the mouth, is capable of reducing the blood sugar in certain cases of diabetes mellitus.

3. By reducing the blood sugar it is possible to increase the patient's tolerance to carbohydrates.

4. The pancreatic extract is therefore useful as an adjuvant in treatment, particularly in cases of diabetes mellitus with complications—*e.g.*, gangrene, threatened coma, etc.

5. The duration of treatment as well as the actual dosage is determined by the general condition of the patient, the blood sugar, and the actual tolerance to carbohydrates.

P. J. Cammidge[12] points to Zuelzer's (1908) results with an alcoholic extract of the pancreas, and remarks that insulin is no more than a reversion to the original process of Zuelzer. The propriety of the name 'insulin' for such a preparation is there-

10. Wallis, R. L Mackenzie : *Lancet*, 1922, Dec. 2, 1158.
11. Wallis : *Quarterly J. Med.*, 1920, 14, 57.
12. Cammidgh, P. J. : *B.M.J.*, 1922, Nov. 18, 997.

fore open to question. He thinks that stress should be laid on its value in tiding patients over crises rather than as a curative remedy for diabetes. The wide circulation of its virtues in the lay press has raised exaggerated hopes not likely to be fulfilled in the case of many diabetics.

A. E. Wright[13] suggests that the trypsin in the pancreas might be got rid of by pounding up the gland with serum, which he has already shown to have a powerful antitryptic action.

Reference is made by Achard[14] to experiments, similar to those of Banting, conducted at his school in 1919 and never made public. He is of opinion that as only a transient suppression of glycosuria is effected, the treatment, though valuable, is not a cure for diabetes.

W. M. Grofton[15] calls attention to articles published by himself in 1909 and 1910 in which he described a new pancreatic extract for treatment of diabetes. The extract was made by Messrs. Fairchild from the expressed juice of the gland, proteins and digestive ferments being removed by heat. He thinks that the internal secretion of the pancreas is not a hormone in the proper sense of the word, but an essential part of a compound ferment, the heat-labile part of which is produced by the tissue cells. [An article by Dr. Crofton on this subject appeared in *The Prescriber*, April 1923, p. 101.—Editor.]

Ff. Roberts[16] deals in detail with Banting and Best's original papers and criticizes them severely. He says that Banting and Best have failed to realize that in so radically changing their method of preparation (discontinuing ligation of the duct and reverting to alcohol extraction) they have abandoned the principle from which they started and which they never proved. Roberts is of opinion that the production of insulin originated in a wrongly conceived, wrongly conducted, and wrongly interpreted series of experiments. Through gross misreading of these experiments interest in the pancreatic carbohydrate function has been revived, with the result

13. Wrighf, Sir A. E. : *ibidem.*
14. Achard : *Bull. Acad. Med.*, 1923, 88, 73 ; Jan. 16.
15. Crofton, W. M. *Lancet*, 1922, Dec. 2, 1195.
16. Roberts, Ff. : *B. M. J.*, 1922, Dec. 16, 1194.

11th June, 1923.

With reference to G. O. No. 674 P. H. dated 19th April 1923, M.R.Ry. K. Kannan Nambiyar Avl., L.M. & S. Temporary Civil Assistant Surgeon. on reserve duty at Government Maternity Hospital. Madras is posted to the Government Ophthalmic Hospital, Madras for training for three months from 15th June 1923.

12th June. 1923.

M. R. Ry U. Venkataraya Nayak Avl.. M. B. B. S., Temporary Civil Assistant Surgeon on relief at the Medical School. Tanjore to the Medical School, Vizagapatam vice M. R. Ry. R. Krishna Rao Avl., L. M. S.

M. R. Ry. R. Krishna Rao Avl.. L.M.S., Civil Assistant Surgeon on relief at the Medical School, Vizagapatam to the Medical School Tanjore, vice M. R. Ry. U. Venkataraya Nayak Avl., M. B. B. S., transferred.

13th June 1923

M.R.Ry. K. R. Sitarama Ayyangar Avl., B.A., L. M. & S. Civil Assistant Surgeon, on return from leave, to be Assistant to District Medical Officer, Coimbatore, vice Mr. C. M. Philip, M.B. & C.M., Civil Assistant Surgeon.

Mr. C. M. Philie, M.B. & C.M. Civil Assistant Surgoon, on relief at Coimbarore, Placed at the disposal of the Chairman Municipal Council, Udumalpet, Coimbatere District, vice M.R.Ry. K. G. Tehyunni Menon Avl., L.M. & S., Civil Vssistant Surgeon.

M.R.Ry. K. G. Tehyunti Menon Avl, L.M. & S., Civil Assistant Surgeon. on relief at the Municipal Hospital, Udumalpet. Coimbatore District, placed at the disposal of the President District Board Ramnad, for Local Fund Hospital, Sivaganga vice Mr. P. M. Varughis transferred.

28th June 1923.

M. R. Ry. T, Sri Harinarayana Pantulu Garu L. M. S., Civil Assistant Surgeon on relief at the Municipal Hospital, Ellore is posted to the Government Ophthalmic Hospital, Madras, for training in Ophthalmology for three months.

28th June 1923.

M.R.Ry. V.H Venkatarama Ayyar Avergal, B.A., M.B. B.S., Civil Assistant Surgeon, on relief at the Local Fund Hospital, Kallakurchi, South Arcot District to act as Professor of Biology, Medical College, Vizagapatam.

M.R.Ry. R. Sanjiva Rao Avergal, M.B. B.S , Civil Assistant Surgeon on return from leave is posted to the Government General Hospital, Madras, on reserve duty until further orders.

2nd July 1923.

M.R.Ry. M. Sanjiva Rao Avl, M.B B.S. Reserve duty, Govt. General Hospital, Madras. Placed at the disposal of the Chairman, Municipal Council, Adoni (Bellary Dt.) vice M.R.Ry. H. Krishnan Avl. To move first and urgently.

M.R.Ry. H. Krishnan Avl., B.A., M.B.B.S. On relief at Adoni by M.R.Ry. Sanjiva Rao Avl. To act as Assistant to Professor of Chemistry, Medical College, Madras, vice M.R.Ry. S. Rajagopal Nayudu Garu. To move urgently.

M.R.Ry. S. Rajagopal Nayudu Garu, B.A. L.M.S., Temporary Civil Assistant Surgeon. On relief at the Medical College, Madras. To act as First Assistant to the Chemical Examiner Madras, vice Khan Sahib Md. Azizullah Sahib Bahadur on other duty.

5th July 1923.

Mr. J. P. Joseph, L. M. S., Civil Assistant Surgeon on special duty in connection with the treatment of relapsing fever cases in Guntur District is transferred to the South Arcot District.

12th July 1923.

M. R. Ry. G. Hari Rao Garu M.B.B.S., Temporary Civil Assistant Surgeon on relief at the Medical School. Vizagapatam, is transferred to Koraput for the charge of the Police Sub-jail and Local Found Hospitals vice 1st class Military Assistant Surgeon P. J. McGrath. I.M.D. granted leave.

M. R. Ry. C. Abbu Avl., M.B C.M., L.R.C.P., M.R.C.S., D.O.M.S., on return from leave, is posted to the Government Ophthalmic Hospital, Madras, on reserve duty until further orders.

16th July 1923.

M. R. Ry, N. K. Ramaswamy Ayyar Avl., L.M.S., Civil Assistant Surgeon on relief at the Alipuram Jail. Bellary is temporarily placed at the disposal of the President. District Board, Kistna, vice M. R. Ry, T, Tirumala Rao Garu. L.M.S., Civil Assistant Surgeon transferred.

M. R. Ry. B. Tirumala Rao Garu, L.M.S., Civil Assistant Surgeon on relief at the Local Fund Hospital, Narasapur is temporarily placed at the disposal of the Chairman, Municipal Council, Nellore for the charge of Municipal, Hospital vice M. R. Ry. T. S. Harinarayana Garu, L.M.S., Civil Assistant Surgeon deputed for training in Ophthalmology.

M. R. Ry. T. S. Ramaswamy Pillai Avl., M.B. & C.M., Civil Assistant Surgeon on relief at the Local Fund Hospital, Nanguneri to be Assistant to Port Health Officer, Tuticorin vice Mr. T. D. Thomas, M.D. (Brussels) permitted to retire.

17th July 1923.

M. R. Ry. V. N. Benegal Avergal, L.M. & S., Temporary Civil Assistant Surgeon on reserve duty at the Government General Hospital, Madras to act as Assistant to District Medical Officer, Ramad, Vice M. R. Ry. T. S. Balasubramanyam Avergal, M.B., B.S., Temporary Civil Assistant Surgeon applied for leave.

4	*Throwing the Cricket Ball.*	1	C. K. Lakshmanan. (Med. Coll.)
		2	Copalakrishnan. (Pach. Coll.)
5	*Hurdles Race.*	1	C. K. Lakshmanan. (Med. Coll.)
		2	Veerasinghe. (Pres. Coll.)
6	*High Jump.*	1	C. K. Lakshmanan. (Med. Coll.)
		2	K. P. Subramanian (Pres. Coll.)
7	*One Mile Relay Race.*	1	Madras Medical College.
		2	Christian College.
8	*One Mile.*	1	Anjaneya Chetty. (R. M. School.)
		2	A. Eling. (Christian College.)
9	*Quarter-mile.*	1	P. Kumaran. (Eng. Coll.)
		2	C. K. Lakshmanan. (Med. Coll.)

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University of Madras.

Medical Examinations

The following is the list of successful candidates at the Medical Examinations held in March and April 1923 :—

MADRAS MEDICAL COLLEGE

First M.B. & B.S.

FIRST CLASS

Rank.	R. No. & name of candidate.	Subject.	Rank.	R. No. & name of candidate.	Subject.
1	2 Ananthachari, M.D.		3	9 Chandrasekara Rao, V. N.	
2	74 Vores, S. P.	... Physics.	4	25 Hariharan, V. S.	Chemistry.

SECOND CLASS

1	21 Ganapatisubrahmanyan, R.	20	72 *Verghese Saramma*
2	33 Krishnaswami, R.	21	8 Chandrasekaran, S.
3	43 Narasimha Pandit, T. L.		64 Vadamalayan, P.
4	24 Govinda Reddi, D.	23	4 Balasubrahmanyan, S.
5	49 Raghavachari, P.T.	24	56 Seshadri, T. R.
6	69 Venkatarama Ayyar, T.S.	25	55 Satyanarayanamurti, G. V.
7	23 Gopalan, S.		63 Tyagarajan, M. V.
8	66 Varghese, M.C.	27	59 Subrahmanya Ayyar, D.
9	32 Krishna Rao, K.		70 Venkataramanayya, G.
10	51 Ramachandran, R.	29	41 Muthayya, R. E. S.
11	27 Joseph Ross, B.	30	71 Venkataratnam, Ch.
	54 *Saruswati, M.*		73 Visvanathan, G. S.
13	10 Chettur, R. K.	32	30 *Koshi, Rebaeca.*
14	45 Narayana Prabbu M.	33	53 Sahjivi, K. S.
15	34 Kuttikrishna Menon, M.	34	26 Jagannathan, M.
	62 Thimma Reddi, G.		39 Mathias, M.
17	31 Krishnan, V.		86 *Venkatakrishna Rao, Raj.*
18	40 Muhammad Abdul Hadi.		91 Ramaswami Ayyar, S.
19	65 Vareed, K. P.		

The following candidates who obtained partial exemption under Regulation 2 of Chapter XXVII have also qualified for a pass in the First M.B. & B. S. Examination :—

Register number and name of candidate	Register number and name of candidate.
76 Asthagiri, A. A.	85 Joseph, T. J.
77 Govinda Menon, K.	86 Krishna Ayyar, N. S.
79 Ranganathan, C.	37 Madhavan, P.
80 Vaidyalinga Ayyar, P. V.	88 Rama Rao, A.
82 Bappu K.	89 Rantnaswami, P.
83 Chattu Achan, V. N.	90 Sankaran, K. A.
84 Jacob, K. C.	

Second M.B. & B.S.

FIRST CLASS

Rank.	Register number and name of candidate.	Subjects in which distinction gained.
1	141 Srinivasan, V.	Anatomy Physiology & Organic Chemistry.
2	104 Krishnamurti, M.	Anatomy & Physiology.
3	93 Adisubrahmanyan,	Do.
4	150 Umanatha Rao, K.	Do.
5	161 Venkataswami, V K.	Do.
6	107 *Kunhilakshmi, V.*	Anatomy.
7	103 Keralavarma Tampan, R.K.	Physiology.
8	122 Pattabhiramayya,	Organic Chemistry.
	160 Venkataswami, P. V.	Anatomy.
10	112 Mukunda Rao. B.	Anatomy & Physiology.

SECOND CLASS

Rank.	Register number and name of candidate.
1	147 Sundaravadana Mudali, B.M.
2	145 Sundaram, T.A.
3	163 Visvanathan, R,
4	144 Subrahmanyan, K.
5	123 Rajamanikkam, N.
6	132 Sadashiva Rao, R.S.
7	106 Kulandaivelu, F.
8	138 Seshadri, T.K.
9	127 Rangachar, P.
10	151 Vaidyanatha Ayyar, N.
11	96 Chandrasekharayya, Tumkur,
	113 Narayana Menon, V.K.
13	133 Sambandam, K.
14	111 Mariappayya, B,
	153 Vareed, C.
16	152 Vaidyanathan, C.V.
17	148 Suryanarayanan, K.
18	118 Padmanabhan, R.V.
	162 Venkat Rao, P.
20	119 Parameswara Ayyar, P.
21	99 Garson, C.E.
22	109 Mahadevan, R.
23	136 Sankaranarayanan, K.
	142 Subbaji Tagat, K.
25	100 George, C.T.
26	139 Seshagiri Rao, V.
27	114 Narayana Menon, V.R.
28	97 Eapen, J.J.
29	134 Sambandam, K.M.
30	130 Ravi Varma (30th Prince of
31	110 Manjunath Rai K. Cochin)
	166 *Bhadrappa, Bhagyamma.*
	168 Mathew, K.C,
	169 *Ommon, Sosamma.*
	170 Rajayya, D.V.
	171 Sankaran, G.
	172 Satyanarayana Gantayat.
	173 Venkataramayya, Y.
	174 Verghese, P.C.

Third M.B. & B.S.

FIRST CLASS

Rank.	Register number and name of candidate.
1	217 Kumara Menon, P.
2	219 Lakshmanan, C. K.
3	241 Subba Rao, D.
4	212 Govindan Pandalai, N.
	247 Venkataraman, K. V,

SECOND CLASS

Rank.	Register number and name of candidate.
1	*233 Rajagopalan, T. V.*
2	*221 Madhava Pai, T.*
3	*243 Sundaram, S. K.*
4	*250 Visvanathan, C. P.*
5	*218 Kuppuswami, P. S.*
	226 Narayanswami, L. S.
7	*213 Govindaraj Shenai, B.*
	220 Madhavan Nayar, V.
9	*211 Govinda Menon. A.*
	232 Rajagopalan, N.
11	*246 Suryanarayanamurti, G.*
12	*245 Sundararajan, S.*
13	*204 Anantakrishnan, K V.*
	242 Sundaram, R.
	249 Venkatasubba Reddi, D.
16	*222 Masilamani, S. E. D.*
17	*209 Gopala Menon, T.*
	223 Mathew, T. V.
19	*226 Krishna Rao, S.*
20	*210 Govindakutti Menon, M.*
	215 Krishna Ayyar, V. N.
	235 Ramaswami, B. S.
23	*234 Ramamritam, S.*
24	*240 Sriramulu, B.*
25	*248 Venkata Rao, S.*

Final M.B. & B.S. Degree Examination

PART I ONLY

Register number and name of candidate.
274 Anantanarayana Ayyar, A.
275 Anantanarayanan, A.
277 Ananta Rao, M.
278 Balasubramanyam, D.
279 Chalapati Rao. D.
280 Dakshinamurti, S.
281 Gopalachari, P.
282 Gopalakrishnan, T. S.
283 Isvarayya, V.
284 Janardhana Kamath, K.
285 Kalyanasundaram, P. R.
288 Krishna Rao, U.
289 Kunjunni Thirupad, R.
290 Mahadevan, L.
291 Mathew, M. K.
292 Matthai, Oonnunniamma.
293 Matthai Rebecca.
294 Muhammad Ismail, M.
295 Nagabhushana Rao, V.
296 Nataraja Ayyar, K.
297 Padmanabha Mallya, U.

Register number and name of candidate.
298 Padmanabha Panikkar, N.
299 Purushottama Kamath, C.
300 Rajaratnam, T. P.
301 Ramachandra Rao, M.
302 Ramanatha Bhaddari, M.
303 Rama Pai, T. R.
304 Ramaswami, S. K.
305 Ratnaswami, G.
306 Sambamurti, R.
307 Sankaran, K. S.
308 Sarvottama Mallya, B.
309 Shanmukha Rao, K.
310 Sivasambandan R.
311 Srinivasachari, P. R.
312 Sundaresayya, V.
314 Suryanarayanamurti, C.
314 Vaidyannthan, T. R.
315 Vaman Nayak, K.
316 Venkatarama Ayyar, T. K.
317 Venkatesan, G. S.
318 Viswanathan, K. S.

The following candidates have qualified for the M. B & B. S. Degree :—

FIRST CLASS

Rank.	R. No. & name of candidate.	Subject.
1	31 Annaswami, S. ...	Medicine.
2	322 Balakrishna Kurup, P.	
3	333 Krishnan, A. ...	Medicine.
4	335 Madhavan, K. ...	

SECOND CLASS

Rank.	Register number and name of candidate.
1	352 Sanjiva Rao, R.
2	330 Jacob, A. O.
3	341 Raghuttaman, T. V.
4	320 Appu, K. S.
	321 *John, Matilda nee Samuel.*
6	349 Rangaswami, T. R.
7	343 Ramachandaram, T. S
8	354 Satyanarayana, Pottumarti.
9	338 Padmanabha Pai, M.
	351 Sambasiva Ayyar, M. K.
11	342 Ramachandran, A. S.
12	356 Subba Rao, Vinjamuri.
13	353 Satyanarayana, K.
	367 Parasuram, A. R.
	368 Srinivasan, J.
	371 Amrita Rao K. S.
	372 Paul, K. C.
	373 Vurghese, I.

FIRST L.M. & S.

Register number and name of candidate.

92 Thomas, T. Achamma.

SECOND L.M. & S.

Register number and name of candidate.

181 Narayanan, M. S.
189 Sivarama Menon, E.
193 Umesha Rao, M.
197 Devaraj, A. C.
198 *Ephraim, Lily.*
199 Garson, J. E. T.
200 Narasimha Rao, H.
201 Panduranga Rao, H.
202 Sundaram, T. A.
203 *Lazarus, Hope.*

THIRD L.M. & S.

Register number and name of candidate.

252 Bhaskar Rao, R.
253 D'Silva, I.
254 *Dunlop, Elizabeth M.*
255 Gopalaswami, S.
256 Halasyam, M. H.
267 Hensman, E. M. V.
258 Joseph, N. T.
264 Nilakantan, K. V.
265 Nityanandan, P. G.
266 Rajaratnam, T.
268 Tirumalaiswami Nayudu, V.
269 Tyagarajan, R. S.
273 Visvanathan, T. S.

Final L.M. & S. Degree Examination.

Part I.

Register number and name of candidate.

374 Anantapadmanabha Ayyar, T. S.
375 Chatterji, H.
376 Fernado Edward A.
377 Gopalakrishnacharya, B.
578 Gopalan, T. K.
379 Joseph, J. J.
380 *Kamalamma*, B.
381 Krishnamurthi, C.M.
382 Krishnan Nayar, P. T.
383 Kumaran Nayar, P.
384 Mathew K. V.
385 Minakshisundaram, E. V.
386 Muhammad Habibulla
387 Narasimha Nayak, U.
388 Padmanabhachari, R.
389 Rajaratnam, J. N.
390 Rama Ayyangar, V.
391 Ramachandran, G.
392 Ramachandran, S.
393 Ramanatna Avyar, D.
394 Ramaswami, G.
395 Rangaswami Reddi C.
396 Ratnam, P. N.
397 Sitaramayya, B.
398 Somasundaram, P.
399 *Swamikan, Rosie*
400 Venkataraman, G. K.
401 Venkataraman, L. A.

The following candidates have qualified for the L.M. & S. Degree :—

Register number and name of candidate.

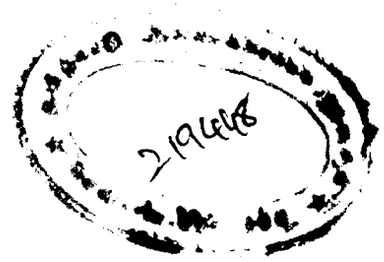
402 Arunachalam, S.
403 Balasubrahmanyan, V.
404 Chelladore, M.
405 Chellayya, Henry P.
406 Dayandam, K.
408 Dikshitulu, Erramilli
411 Jambunathan, P. E.
415 Krishna Rao, V.
419 Narayanan, V. S.
420 Raghavendra Rao, K. P.
421 Raja Ayyangar, S.
422 Ramachandramurti, S. B.
426 Venkatachari K.
428 Visvanathan, D. K.
429 Winslow, C. N.
430 Achyuta Marar, E.
431 Perera, S. S.
432 Raman Pillai, E. K.

B.S. Sc. Degree Examination.

Part I.

Register number and name of candidate.

434 Govindakrishna Prabhu, Bantwal.
435 Govindan Unnithan, P. G.
437 Joseph, I.
439 Krishnan Tampi, N.
440 Krishnaswami, P.
442 Lakshmanan, Mandalam S.
444 Perumal, W. V.
447 Subrahmanya Ayyar, E.



Military pupils

Passed Board Examination March 1923.

1st YEAR.

M. Candilac
M. J. Masters
F. E. Dias
P. D'Mello

IInd YEAR

C. E. Garson
C. Tapp
J. Righton

IIIrd YEAR

E. Craggs
J. D'Silva
J. E. Garson

IVth YEAR

C. P. Coshan
H. C. Human
J. P. V. Leggett
C. Watts
H. E. J. Nicholas
J. Edwards
I. T. Legge
G. E. McDonald
P. Wolfe

Lady Students

4th YEAR

Miss A. Fernandez.

FINAL YEAR

Miss S. S. Achat
" M. Hughes
Miss D. Theodore
" J. E. Gabriel

Govt. 1st Class Health Officers

1. B. Misro M.B. & B.S.
2. Ananthan L. M. & S.
3. Rangaswami, M.B. & B.S.
4. K. V. Batt L. M. & S.
5. Somasundara Mudaliar L. M. & S.

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