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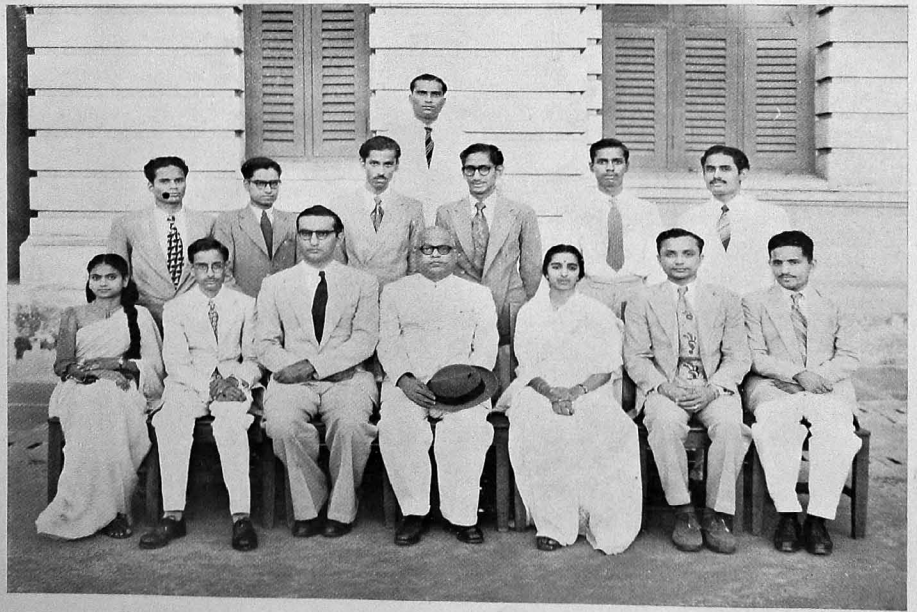

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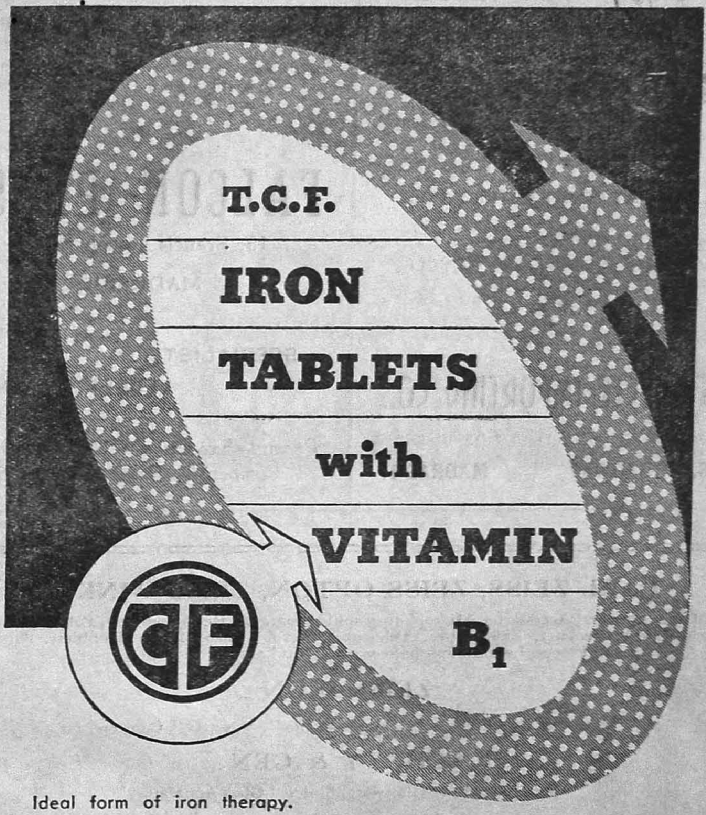

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EDITORIAL

THIS issue comes out at a time, when great changes are taking place. The most eventful happening has been the birth of the Andhra State, a dream of the Andhras came true after fourty years of passionate longing. With the formation of the state, our Andhra brotheren will, we are certain, work to the last man towards its progress and prosperity and thus towards that of our dear motherland as well. On this occasion of notable achievement in the history of the Andhras, we offer our hearty and sincere congratulations and pray that, ere long, the new state will be one of the foremost in our country.

It is with great pleasure and pardonable pride, we are able to record the signal success both financially and socially and the popularity of our recently held Medical Exhibition. It was a phenominal achievement and over a lakh of people visited and went back thrilled and informed of the working of their body and its protection. Even though the period of the exhibition was extended, there were still many who could not avail themselves of this opportunity. The singular success of this venture and the praise and appreciations from notable personalities like the Governor, the Chief Minister, the Health Minister, Dr. A. Lakshmanaswami Mudaliar, the Vice-Chancellor of Madras University, Dr. Alagappa Chettiar, the philanthropic educationist and others could not have been ours, but for the hard work, enthusiasm and keenness of the staff and students alike. But all these energies could not have been harnessed to bear the fruits of success, without the drive, spirited help and advice of our Dean, Dr. C. K. Prasada Rao, Dr. K. S. Sanjivi, Dr. Subba Reddi and others. If we do not pay our special homage to that man, who had been dreaming and planning every single detail of the event for months ahead and the one, who silently but solidly worked from the first scratch to the end, we shall certainly justify ourselves for the criticism that success has blinded us—we mean our pioneer Medical Historian, Dr. Subba Reddi. Lastly our mead of gratitude go out to the scores of medical men and students, who toiled day and night without a murmur.

This success has meant a great financial improvement of the Medical Relief Wing of our College and it will help us to render better free medical aid to the people of Pakkam and round about.

As we go to the press, preparations are under way to celebrate a great landmark in the history of our hospital—its bicentenary. This celebration of the double centenary of the hospital with such great eclat is possible, only because of the zeal, vision and selfless service of so many pioneer medicalmen, Englishmen and Indians alike. If the hospital is offering a high level of efficiency of medical aid to the ailing humanity of this and other surrounding states, it is but a silent and sincere homage paid to those pioneers. We trust, these celebrations will leave behind a permanent landmark. Our College and Hospital is still behind such institutions in the west in that its research department has not yet come into being. This is a great handicap and we hope that it will be possible for the State and Union Governments to lay the foundation for this type of work, in the absence of which neither the College nor the Hospital could be regarded as having reached the stage of maturity. May this hospital proceed towards further progress and we hope one day the eyes of the medical world will be turned towards it for lead and light.

This year again has ushered in a much needed expansion of the dental department from being a place for mere pulling of the teeth into a full fledged Dental College. The department has been well planned, housed and equipped to a high level of detail and perfection to satisfy even the most exacting critic and this we owe to our highly skilled and learned professor of dental surgery—Dr. M. G. Rao. We congratulate him on this and on his being the first Indian to become a Fellow of the Academy International of Dentistry and an active member of the Pierre Fauchard Academy of U.S.A.

It is a matter of personal pride and happiness to see our beloved Professor of Surgery, Lt.-Col. Sangham Lal, I.M.S. become the Director of Medical Service. Knowing him as we do and what little we have seen of him as D.M.S., we are certain that his tenure of office as D.M.S. will be one of great success and satisfaction to those who are committed to his care.

We learn with great pleasure that our Dean has drawn up a scheme by which the postgraduates, both surgical and medical, would in addition to their main training, have a special training in the important allied subjects such as, Pathology, Biochemistry, Anatomy and Physiology. This is a much delayed scheme and we are very grateful to our Dean who with his infectious, enthusiasm and vision has brought about this improvement.

We regret to record the sudden demise of Rao Bahadur Dr. T. S. Tirumurti, B.A., M.B. & C.M., D.T.M. & H. (Eng.), an old alumnus and Professor of Pathology of this College. Ever cheerful, full of buoyancy of spirit, very well read, extraordinarily patient, he was a friend to one and all. His memory will be kept green in the minds of all with whom he came in contact.

So far we have been striking a happy note of satisfaction and elation, but, when we look a little beyond and around us, we see very ominous dark clouds hovering all over the horizon. Shall we, ere long, see the much sought and languished silver lining? When we are thus depressed and try to ask ourselves, "What shall the Indian do?" we cannot but remind ourselves of what our Vice President Dr. S. Radhakrishnan said elsewhere. "If we look at the international scene where the major powers seem to be engaged in initial skirmishes that can grow into a full war, where they are strong for strategic bases, bidding for allies, encouraging subversive movements in the ranks of their opponents, we feel greatly depressed and disturbed..... The democratic method appeals to the Indian mind with its long traditions of Religion, non-violence and individual freedom. We believe that it will be possible for us to work amicably with those whom we may differ fundamentally in outlook and method. The U.N. is intended to help us to live in harmony with nations whose religion, politics and ways of thought are quite different from our own. This is possible because we have a common humanity and a common interest..... If our aim is to devise ways to relax tension and not intensify the present cold war, if our policy is to live and let live and not exterminate this or that way of life, we must ourselves show the democratic spirit which we expect from others". We feel certain that our delegations at the U.N. and other world councils will work towards this ideal.

Before we conclude, we extend our sincere thanks to all those members of the staff and students, whose kind co-operation has made our burden light.

K. Bahuleyan.

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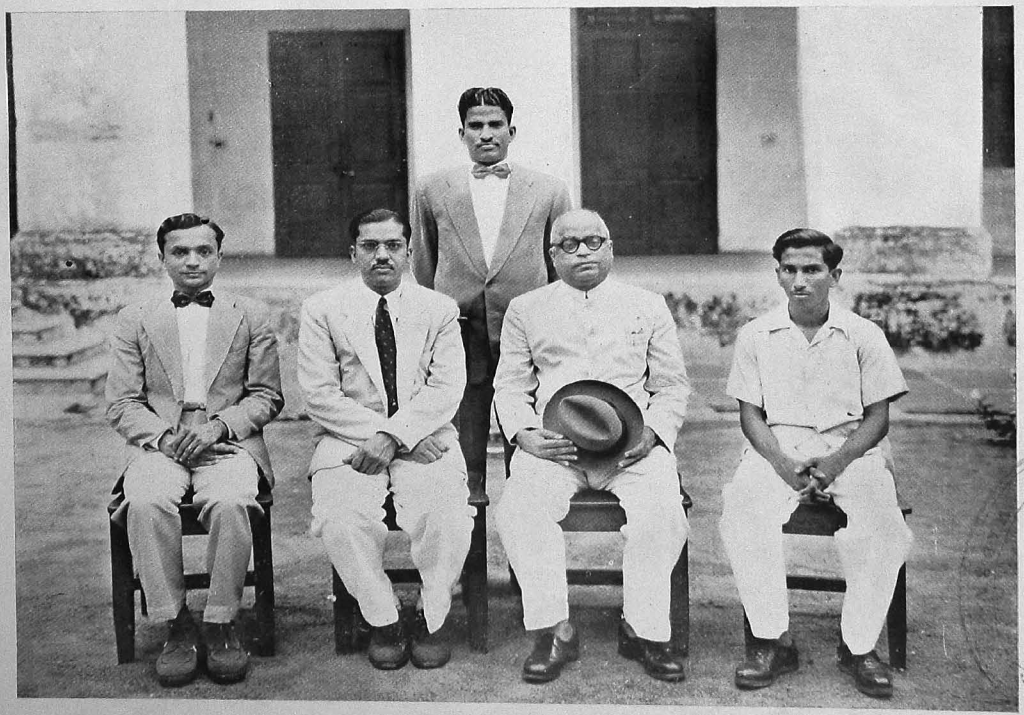

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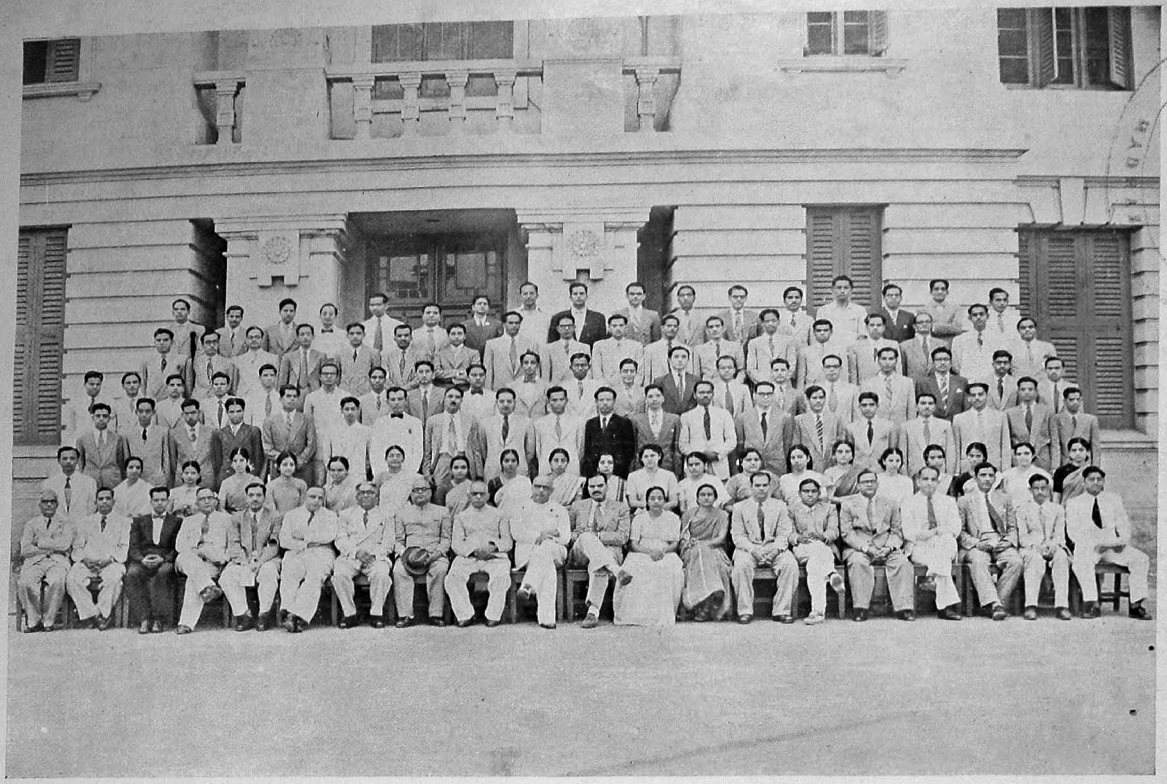
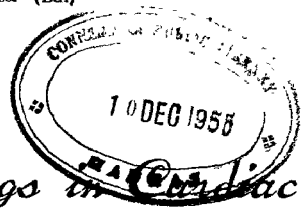


THE GRADUATES OF THE YEAR—1952 - '53.

★We are extremely thankful to Dr. V. Iswariah, B.A., M.B., M.R.C.P., for kindly contributing this highly instructive article. This article, though mainly of a postgraduate standard is dealt in simple style to be understood even by undergraduates.—(Ed.)



Drugs in Cardiac Failure*

Dr. V. ISWARIAH, B.A., M.B., M.R.C.P.,
Prof. of Pharmacology.

TO define cardiac failure is difficult. There was a time when any undiagnosed death, specially if it happened suddenly, was designated Heart Failure. It was later clear that all sudden deaths are not cases of heart failure, unless heart failure meant stoppage of heart ultimately noticed in all cases of death. Many cases diagnosed 'Heart Failure' were just splendid examples of 'Diagnosis failure' or giving a dog a bad name before hanging it. Or possibly cases of sudden death could not be conceived for any other reason than for heart failing suddenly without notice. You will remember that for some time all cases of sudden death were called enlarged thymus. And so we learn that many cases of so called Heart failure are unjust allegation against the heart.

Narrowing down, circulatory failure may be different from heart failure. The circulatory system consists of four important links, and breakdown of any one link precipitates complete breakdown of entire circulation. The links in the circulatory mechanism are (1) Vital centres in the medulla, in particular the vasomotor mechanism (2) Heart itself (3) Peripheral arteriolar mechanism which is in connection with the vasomotor centre and (4) last, the capillaries that form a wide bed, normally not open, but opening up rarely to take in the entire blood, thereby depleting the vessels and the heart.

The condition of shock leading ultimately to heart failure is due to breakdown of vasomotor centre. Analeptics administered to stimulate the vasomotor centres like Leptazol, Picrotoxin cannot be called heart stimulants.

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*Part of Post-graduate lecture of the Madras University.

The heart itself may fail due among others to (1) Valvular defects that were once thought the main cause of heart failure (2) Rhythmic disorders like fibrillation, sinus tachycardia etc. that may precipitate heart failure or (3) Myocardial poisoning or other unknown damage to the myocardium. Here again the three are interlinked, one giving at some stage evidence of other two.

Peripheral vascular failure is associated with vasomotor mechanism where vasoconstrictors like methedrine or ephedrine may revive circulation. Circulatory failure due to primary cardiac failure was at one time assumed to be much the commoner: but now it is realised that a large number of different causes may result in a condition in which blood stagnates in the capillaries and the circulation fails on account of the inadequate venous return. Until 1900, shock or peripheral stagnation of blood was regarded as due to heart failure and treated with strychnine with extremely bad results. We now know that peripheral stagnation of blood was not due to primary heart failure and that strychnine neither acted on the heart nor the peripheral stagnation. We can smile at our ignorance of yesterday as perhaps our successors will smile at us for other reasons. We shall not further dilate on the peripheral mechanism of circulatory failure.

We therefore note that circulatory failure in the first instance is not synonomous with Heart failure, though ultimately the heart will be involved in the final break down.

HEART FAILURE

The present century has witnessed distinct phases in our concept of heart failure or heart diseases. Credit is primarily due to Sir James McKenzie for diverting attention of cardiologists mainly from murmurs—presystolic, systolic and diastolic—and the mechanical consequences of narrowed or leaking valves, to Arrhythmias. Later Sir Thomas Lewis amplified cardiac irregularities by the use of electrocardiographic studies. The study was then amplified to diagnose not only arrhythmias, but also the status of the myocardium. Later the record was used to assess response of heart to drug therapy. The status of myocardium is ordinarily gauged by the output or stroke output of the heart. In heart failure, it is presumed that the stroke output first and later minute output, gradually decrease. This it was thought, was the infallible result of heart failure *i.e.*, a weakening of heart action. This view has been shown to be incorrect by McMichael by his studies on cardiac catheterisation. To give a gross example, a healthy soldier standing at ease may have actually a lower output per minute than many a cardiac patient within an hour or two of

his death. Thus we see that the aim of a drug in heart failure is not primarily or solely to increase the output of the heart, for that is not the only mechanism at fault in many cases of cardiac failure. Granting that the output of the heart (the minute output) is poor, failure of the central pump brings in its train such a host of complex consequences that it is difficult to assess the cause of death. For example, oxygen can sustain a heart case for quite some time without in the first instance or quite for some time improving minute output or stroke volume of the heart. Hence it is possible to postpone death, sometime indefinitely without improving the cardiac output.

If we now attempt to define cardiac failure, it will be "in the presence of a heart lesion say a murmur or arrhythmia, the clinical picture of breathlessness, engorgement of lungs, venous congestion, liver enlargement, with or without oedema indicates heart failure". But this leaves out the signs and symptoms of heart failure in the absence of heart lesion like murmur and arrhythmia. In actual fact, various etiological varieties of failing heart differ vary considerably from one another in the details of their consequences, or sequences.

DRUGS IN CARDIAC FAILURE

Digitalis.—After several vicissitudes, we are back again to the knowledge of our forefathers gained from Withering, with regards the concept of Digitalis action. The main action of Digitalis is to increase the efficiency of contraction of a faulty ventricular muscle. Having made sure of this in most cases, the next effect is to slow the heart, primarily by the vagal mechanism or by depressing the conduction of the bundle. This is emphasised because even McKenzie and Lewis were inclined to feel that the main action of digitalis was to slow the heart and the slowing was responsible for better contraction of the ventricles.

Subsequent events are, peripheral arteriolar constriction and reduction of venous filling pressure, the last presumed by McMichael to be primary action. (We shall consider the sequence of events at a later stage.)

The other established facts about digitalis action may be rapidly surveyed. Digitalis has no action on a normal heart. In fact by increasing the tone and reducing the size of heart, Digitalis may actually reduce the efficiency of contraction of myocardium in a normal heart. This is a warning against so called prophylactic administration of digitalis or to fortify a normal heart. Next, digitalis has no action on a compensated heart. Though the contractility of heart in a compensated heart may be different from its normal state, when the heart is adjusted to a new set fo

conditions, digitalis is not likely to further improve or buttress the compensated myocardium. Regarding heart rate, if changes in heart rate are associated with failure of myocardium, digitalis will correct the rate; but if the variation in rate is unaccompanied by failure of heart, digitalis will not restore normal rate. For, the compensation is conditioned to a particular rate by the self regulating mechanism of the body and digitalis then ordinarily does not interfere with the rate By self regulating mechanism, one is thinking of the delicate carotid sinus and allied pressoceptor and chemoceptor mechanisms that are tuned so well to variations in blood pressure and chemical changes, that drugs ordinarily should not interfere with their regulation mechanisms or easily upset when regulated.

Recent knowledge of the biochemistry of cardiac muscle may help in understanding the role of digitalis in the metabolism of heart muscle. It is sometimes noticed that cardiac efficiency and work are poor in spite of normal or better coronary flow and normal oxygen utilisation. At that stage cardiac glycosides increase the efficiency of heart without increasing its oxygen consumption. This is presumably due to better energy utilisation by heart due to some enzymatic benefit. In the early days of digitalis, it was thought that the glucose or sugar moiety of the glycoside just supplied energy to heart muscls. Later it was noted that the effect of digitalis on the heart was mainly due to the aglycone or sterol moiety of the glycoside, though the sugar part may help in fixing the nonsugar moiety to the muscle. So the aglycone presumably by enzyme mechanism makes the heart better utilise and supply energy for its own work. Szent and Gyorgyi (Science 1949 Vol. II, p. 411) have shown that the ultimate contractile unit of a muscle is Actomyosin fibril, a conjugate of two muscle proteins *i.e.*, Myosin and polymerised Actin. Polymerisation of Actin during diastole of heart cycle results in formation of long fibromuscular strand of actomysin. The energy for this polymerisation is supplied by adenosine triphosphate which, is the sole immediate source of energy for muscle contraction. Cardiac muscle in its contractility resembles voluntary muscle, except that cardiac muscle cannot enter into oxygen debt for long. Depolymerisation with shortening and spirilling of the fibres, causes muscular contraction and liberation of energy during systole or contraction. There was for sometime a doubt as to which is the active phase of the heart—is it the systole or the diastole. Advocates for diastole as the active phase of heart, compared heart muscle to a coil of spring which for expansion has to use energy, recoiling in its passive phase. Evidence seems to suggest rather that systole is the active phase while diastole is the resting phase. It has been shown that cardiac glycosides increase the shortening of the actomysin fibril in vitro, probably through improved utilisation of available energy. This may provide one explanation of the beneficial action of digitalis in

some types of heart failure. In simple king's English, digitalis somehow helps to contract a heart muscle better when it is incapable of so doing under diseased state. Digitalis is not able to supply more energy when a heart muscle is contracting normally. Although with a few exception the disease processes which cause heart failure are irreversible, normal heart function is often maintained for many years in spite of severe anatomical changes. Perhaps a modicum of healthy fibres are able to hold the fort. In acute myocarditis where the majority of muscle fibres are damaged, digitalis is unable to be of any use example diphtheretic myocarditis.

So, the first action of digitalis bodies is to stimulate stronger contraction in certain types of failing myocardium.

Secondly, digitalis slows the ventricle by vagus action and producing partial heart block by depressing the bundle especially in auricular fibrillation. Granting this is the primary effect of digitalis according to earlier students of digitalis, slowing means increased diastole, more rest to heart, better filling, all contributing to better contraction. Hence the contention whether slowing is primary or secondary is not serious as the ultimate result is better contraction.

Before we consider at length the slowing action of digitalis we are to take note of the other two actions *i.e* , digitalis may raise arterial pressure independent of ventricular improved contraction, probably by a vasoconstrictor action. There is experimental evidence of digitalis contracting the arterioles. Lastly there is also experimental evidence, ably proved by McMichale by his findings on cardiac catheterisation, that digitalis reduces venous pressure independent of cardiac output changes, which made him propound the view that reduction of venous pressure was primarily responsible for improved ventricular contraction.

An important question has now to be faced. Are we justified in assuming that the four effects of digitalis above mentioned are in this order of importance or in this order of sequence? In other words, are we justified in assuming that in all cases of heart failure digitalis when administered, first and foremost improved systolic contraction, next or later slows the rate, next causes vasoconstriction and still later venodilatation? The answer is No, experimentally and clinically. Though in a great majority of cases improved ventricular contraction is first noticed, any one of these actions may occur independently without relation to other actions and any one of these actions may fail to occur in certain circumstances. Variation in action is probably due to different

etiological varieties of heart failure or heart diseases, or according to the stage of the disease or for reasons of individual variations; in other words for unknown reasons. For example in a case of hypertensive left ventricular failure, digitalis may precipitate catastrophe, for in that case vasoconstrictor effect first showed itself, which meant aggravating the strain on the ventricles and complete failure. If on the other hand digitalis first improved the contractility of heart without any effect on the vessels, the results would be desirable and life saving.

A second reason that may account for some of the anomalies and puzzling responses which previously led to the suggestion of venous pressure reduction, may be the inequality of action of digitalis on the two ventricles. This presumes that the difference in the two ventricles are perhaps due to changes in pulmonary vessels *i.e.*, constriction or dilatation, having a compensatory effect but in opposite directions on the right and left ventricles. Hence the different effect of digitalis on the two ventricles may give unexpected results.

Digitalis and Heart rate.—It was once thought that the main benefit with digitalis was due to slowing. Slowing may be effected primarily by central vagal stimulation or peripherally by "depression" of bundle, to effect a block, though vagus may be involved here as well. Anatomists tell us that the right and left vagus have different effects on the bundles. It must also be noted that plain stimulation of vagus slows the heart with reduced force of contraction, while digitalis slows the heart with increased force of contraction. Hence primary vagus stimulant action of digitalis remain uncorroborated.

Three kinds of rate abnormalities may be noticed.

(1) Compensation tachycardia, meaning the reduced output of the heart for some reason, through the self regulating sinus and other mechanisms, puts up the heart rate to compensate for stroke output. If this compensation is established, digitalis may not be able to influence the rate to bring it down. If it is uncompensated, digitalis by improving the force of contraction may reduce the heart rate.

(2) **Auricular fibrillation.**—Here digitalis does slow the heart *i.e.* the ventricles though the auricular rate remains uncontrolled. This is presumably achieved by vagal mechanism and the bundle depression mechanism. In auricular fibrillation reduction of venous congestion and improvement in cardiac output are both noticed with reduction of pulse rate. Digitalis is also considered more effective in flutter.

(3) In sinus tachycardia, digitalis certainly reduces venous congestion and improves cardiac output. But the rate may not be appreciably reduced. The danger here is that while in auricular fibrillation, reduction of pulse rate may offer a reliable guide to digitalis therapy, lack of this guide in sinus rythm makes the patient vacillate between underdosage on the one hand and toxic effects of overdosage on the other. Hence rate is not a sure guide for digitalis therapy in sinus-tachycardia.

Cross circulation experiment in animals show that digitalis affects vagoreceptors in the sinus and cause reflex slowing. Individual with carotid sinus syndrome have their condition aggravated by digitalis

Digitalis sometimes produces ectopic beats. There have been many cases of sudden death of a cardiac patient within half an hour of full digitalisation. Pulses bigeminus often develops in later stages of mitral stenosis. Perhaps this is the combined effect of digitalis and severe myocardial disease. The condition may last some time after withdrawal of digitalis. Pulses bigeminus before digitalisation often condemns a patient to treatment by remedies other than digitalis.

Digitalis and Vasoconstrictor action.—Digitalis sometimes disturbs the carotid sinus regulating mechanism of the blood pressure. With doses below the maximal therapeutic injection *i.e.* 1 5 mg. of digoxin and 0.75 mg. of oubain, this B. P. raising response is less likely, but not guaranteed. If the vasoconstrictor action of digitalis occurs in 5-10 minutes, it tends to overwhelm other beneficial action of digitalis and may cause a temporary exacerbation of breathlessness. If the blood pressure raising action of digitalis is transient as it is in many cases, the benefit will become apparent later. Sometimes the arterial constriction by digitalis and oubain is accompanied by uncomfortable feeling in head, a bursting feeling or confusional state with restlessness and garrulity. It is not sure if these are due to cerebral vasoconstriction. Many an unwary physician may associate these symptoms with the disease and not with the treatment.

Before leaving digitalis, a few further points regarding digitalis therapy need remembering. (1) Dosage of digitalis is based on the weight of a patient. Ordinarily for any other drug say quinine or sulpha compounds, a dose may be specified on the basis of whether one is an adult or not. Here the amount of digitalis is for digitalising the heart and the size or weight of a heart is roughly gauged by the weight of an individual (2) The patient should not have had digitalis for about three weeks anteriorily. If he has had, the digitalising dose has to be proportionately less. This is based on the fundamental pharmacological fact that digitalis is fixed to the myocardium and is very slowly eliminated or destroyed.

Three weeks is roughly the time for digitalis to be completely eliminated after the last dose. (3) Urine output is a ready and reliable guide to assess the action or utility of the drug. Even without mercurial diuretic, a copious output of urine in a case of congestive heart failure is a welcome evidence of the therapeutic effect. (4) One has to carefully watch early signs and symptoms of toxicity, toxicity either due to overdosage or idiosyncrasy.

Hence one can sum up and say digitalis is indicated in all congestive heart failure irrespective of the cause. Absolute contraindications are (1) Allergy to digitalis which is very rare (2) Ventricular paroxysmal tachycardia which should be treated with quinine or procaineamide. Even here if other measures like oxygen, aminophylline, mercurials have failed, digitalis has to be administered. (3) Frequent ventricular premature contractions (4) Chronic constrictive pericarditis (5) complete heart block (6) Carotid sinus syndrome or hypersensitive carotid sinus mechanism as the vagal effect of the drug may aggravate the symptoms.

Digitalis combination with other drugs.—When digitalis is used adrenaline, ephedrine, atrophine and calcium are to be avoided, as there is unwanted synergestic or additive action. Animal experiments also show that there is synergisism between Histamine and digitoxin and therefore to be avoided.

Strophanthus.—Strophanthin G is now called Oubain. The main differences between strophanthin and digitalis principles need consideration. The new knowledge about strophanthin is that it, could increase cardiac output without any accompanying reduction of venous pressure. This knowledge was perhaps responsible for revision of McMechael theory that the venous pressure reduction is an essential prelude to improved contraction of ventricles. Strophanthus has a stronger myocardial stimulant effect than digitalisis. Digitalis bodies generally take about 30-40 minutes to bring about a recognisable action while Oubain effect is seen in 5-15 minutes. The speed of action of ouabain may sometimes be dramatic, and the drug can cause rapid disappearances of such features as pulses alternans, triple rythm etc. The rapid action is presumably due to different solubilities of the two drugs; oubain being water soluble while digitoxin alcohol soluble.

Oubain was once thought not to possess vasoconstrictor action and so was preferred in hypertensive heart failure. But oubain also causes vasoconstriction and there is evidence that it causes constriction of cerebral vessels to give sensation of intolerable headache or bursting feeling,

confusional insanity and garrulity. Another great difference between digitalis and strophanthus is that the latter is much less cumulative than digitalis and is more easily eliminated.

Scilla has practically faded out of use in cardiac failures.

We are therefore left with 3 drugs to consider in heart failure *i.e.* (1) Mercurial diuretics (2) Theophylline ethylene diamine or aminophylline and (3) Quinidine.

Mercurials.—The action of organic mercurials as diuretics is well known. They act on tubules and prevent reabsorption of water and salt. Hence they are of great use in promoting elimination of large volume of urine in oedematous cardiac patients therapy rendering comfort to the patient. If this were the only action of mercurials, their use in cardiac failure might be deemed just symptomatic. The mere reduction of oedema might not be expected to do anything to ameliorate other circulatory disturbances which remain. Nevertheless Gold of Cornell University was the first to advocate mercurials for patients with cardiac failure, daily and as a routine. He went so far as to say that mercurial diuretics daily even without digitalis can keep a patient fairly efficient for a prolonged period. The sequence of events in heart failure was thought to be in this order *i.e.* (1) heart weakness (2) increased venous pressure (3) elevated capillary hydrostatic pressure and (4) oedema. Recent concept of sequence of events seems to be (1) heart weakness (2) diminshed renal excretion of sodium and water (3) increased blood volume and oedema and (4) elevated venous pressure. Again, the defective sodium excretion is thought to be due to increased tubular reabsorption of sodium and not a failing heart just not supplying sodium to kidney to excrete. On this basis, heart failure is attempted to be tackled by attention first to sodium through mercurial diuretics. This view is accepted by many Americans who have given a prominent place to mercurial diuretic in heart failure

Till now mercurials were indicated in cases of frank oedema and diuretics relieve oedema and improve general comfort of the patient. Many cases of left ventricular failure without any demonstrable oedema improved with mercurials alone. This Gold explains as due to waterlogged condition of internal organs, like lungs, long before perceptible evidence of pitting oedema is there. Congestion of the lung may be indicated by crepitation or rales in the base. But even before this sign, dehydrating the patient with daily diuretics improves heart action, by presumably relieving the load or strain. In a sense it is equivalent to venesection. Experiments to present views on this aspect are interesting. In cardiac catheterisation findings, mercurial diuretics without theophylline—(for we have to eliminate

the beneficial effects of theophylline)—showed reduction of right heart, venous pressure, thereby improving output of heart. At the peak of diuresis, blood volume is reduced which acts like venesection and consequent improvement in output of heart.

Salt restriction is an important item in this regimen. It has been shown that the kidney tubules in heart failure reabsorb sodium with greater avidity. Why, it is not possible to say. Mercurial then help this aspect of cardiac failure by excreting sodium. Accumulation of sodium and chloride help retention of fluid. Mercurials help elimination of sodium and water and therefore indirectly help a failing heart.

Hence mercurial diuretics help a failing heart in an indirect way. No other positive value of mercurials in improving a failing heart is available.

It must however be remembered that excessive salt depletion may impair kidney function: in hypertensive and arteriosclerotic patients, uraemia may be precipitated. Mercurials may also Precipitate Gout. Let it again be noted that the daily use of mercurials in congestive heart failure with or without digitalis is on the assumption that the chief mechanism in the clinical state of congestive heart failure is a disorder of salt and water metabolism leading to tissue hyperhydration, this is yet to be substantiated. A plan of therapy like daily mercurial diuretics provides continuous dehydration and keeps the patients free of the signs and symptoms of congestive failures. To keep out the obvious symptoms of congestive failure by resorting to dehydration processes and thereby trying to be impressed that the failing heart has been restored to normalcy, is obviously the policy of the ostrich. If what Gold meant, was that mercurials go a long way in helping or synergising digitalis therapy, one has no complaint, but if mercurials claim to replace digitalis in congestive heart failure one has to pause a bit.

To define congestive failure even at this stage is difficult; it is not mere pitting oedema, enlarged liver, pulmonary rales-ascites-hydrothorax etc. Shortness of breath is perhaps an early symptom of congestive failure. Mercurials have come to stay as an integral part in the treatment of cardiac failure. The treatment consists of 4-6 glasses of milk, 4 pints of water, salt free diet (sometimes no food is needed after 5-6 pints of milk), digitalisation and a daily intramuscular Mercuhydrin. After a week, Mercurial could be given every other day and then gradually lengthened, once the weight does not increase appreciably or the weight loss after succeeding diuretics is reduced to nil practically.

Theophylline ethylene diamine or Aminophylline.—In common with other xanthines, theophylline is a diuretic. In addition aminophylline abolishes Cheyne Stokes respiration. It looks as though the ethylene diamine component apparently stimulates respiratory centre while theophylline prolongs the action. The great use of aminophylline is in cases of left ventricular failure or hypertension or coronary atheroma or aortic valcular damage. This presumes that aminophylline improves cardiac function by improving ventricular output. The next presumptive action of aminophylline is on coronary vessels, which it dilates. The recognised vasodilators are Alcohol, Nitrites, Papaverine, Prescoline, Novacane Nicotinic acid, Khellin

Different vessels seem to respond differently to each one of these vasodilators. Coronary vessels are said to be dilated by nitrites, papaverine, khellin aminophylline, but none of these can be relied on except perhaps amyl nitrites in angina. It must be remembered that vasodilatation generally means fall in B. P. appreciably; vasodilatation locally means vasoconstriction elsewhere to maintain B. P. Theophylline ethylene diamine is widely used—in angina and coronary occlusion; In carefully controlled studies it has been found that placebos were equally effective so far as the patients subjective symptoms are concerned. For this reason aminophylline in coronary occlusion has been viewed with scepticism. By reducing venous pressure and venous filling pressure of heart, cardiac function may improve with aminophylline.

In isolated heart, aminophylline stimulates myocardial contractility, but this action in cardiac failure cannot be established. The action of aminophylline is also transient lasting 20-30 minutes. Theophylline and digoxin may be given in succession with summation of effects. About 0·5G must be injected slowly intravenously in 30-40 C.C. of saline. Rapid injection often causes dyspnoea. Orally 0.3 m. t.d.s. may be tried with digitalis. Sometimes this dose may cause gastrointestinal irritation.

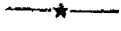
The coronary dilator effect of aminophylline is therefore unproved. It is possible that increased coronary flow is secondary to myocardial stimulation, if present. In some cases of coronary occlusion, myocardial stimulation without coronary dilatation may be disastrous. Some cases of death after aminophylline in coronary occlusion are perhaps due to this.

Arrhythmias—measures to control.—Reflex stimulation of vagus nerve mechanically or by drugs are of value in treating attacks of paroxysmal tachycardia. Tachycardia of supraventricular origin *i.e.* above the ventricles either in the sino auricular or auriculoventricular node, are amenable to the vagus mechanism, but not arrhythmias of pure ventricular origin as

vagus has little control in the substance of the myocardium itself. Pressure on carotid sinus and eye ball are simple and safe means of reflex vagal stimulation. Drugs could be used to directly stimulate vagus but their use introduces the possibility of undesirable side effects. Emetics also stimulate vagus but this is an undesirable mechanism. Acetylcholine and prostigmin can also be tried. Digitalis preparations may also be useful. Quinidine is of recognised value in various arrhythmias like paroxysmal ventricular tachycardia, paroxysmal auricular fibrillation etc. However there is considerable disagreement about exact indications, contraindications, the nature and frequency of toxic reactions, routes of administration and dosage schedule. Lately Procaine compounds (Pronestyl) and mepacrine have also been used in arrhythmias.

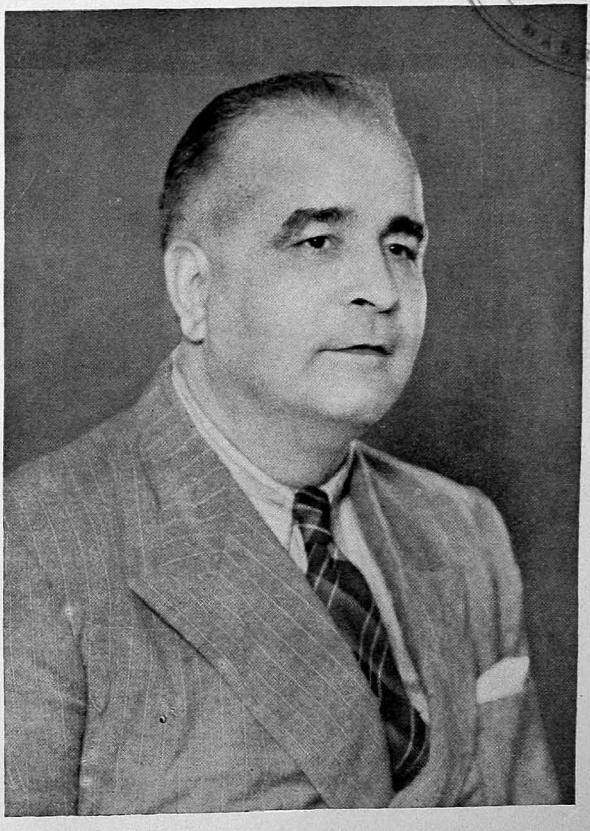
Procaine given I.V. rapidly hydrolyses into paramino benzoic acid and diethylamino ethanol. The latter persists in blood. It suppresses ventricular premature contractions and reverse ventricular tachycardia. It also induces hypotension. Under experimental conditions in dogs, T.E.A. which inhibits transmissions in ganglia intensifies adrenaline induced ventricular tachycardia while diethylaminoethanol from procaine has only sympatholytic action and stops these arrhythmias.

An improved substitute is Procaine amide or pronestyl which has a more prolonged action than Procaine. It is absorbed orally and acts through a direct depressant action on ventricular muscle. Oral dose of 1G followed by 0·5G after six hours I.V. given in 200 mg. doses slowly. Foun useful in premature ventricular betts, ectopic tachycardia. Said to ac best in ventricular rather than supraventricular tachycardia *i.e.* ventricula fibrillation is better corrected than auricular fibrillation.



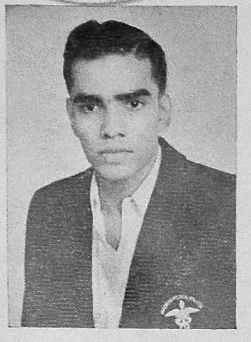
Marriage is the beginning and end of all culture, it civilizes the savage and gives the most cultured the best opportunity of displaying their delicacy. It must be indissoluble, for it brings so much happiness that any unhappiness it may bring with are, when weighed in the scales against the happiness, of no account. There can never be any adequate reason for separation The scale of joy and sorrow in mortal affairs is so high that the sum which two married people owe one another is incalculable. It is an infinite debt, which can only be discharged throughout eternity.

—*Goethe.*



Lt.-Col. SANGHAM LAL, I.M.S.,
Director of Medical Service.

OUR CONTRIBUTIONS TO THE PROVINCE.



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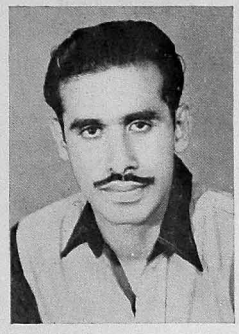

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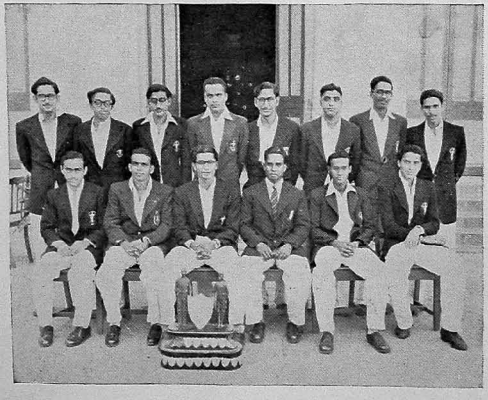

Inter-Collegiate Cricket League Champions 1952—'53.

★Dr. Krishnamoorthy who has a successful personal approach to all problems, needs no introduction to readers of this magazine. Thro' these pages of this magazine, as its editor, he has introduced many a talent into lime light. At present, attached to the research section of the venereal department, his attention is mainly directed to the subject of his choice. We are thankful to him for having found time to contribute this article and we congratulate ourselves on our way of approach thro' which we got this article.—(Ed.)

An Approach

Dr. N. KRISHNAMURTHY, M.A., M.B.B.S.,
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(IN the days of National struggle for existence let us not stand and stare but actively seek and select. Let us not create an I.B.C.)

"Pa, I have bought the ticket and I can start tomorrow with your permission for studies in Madras, though late".

Raj requested in low voice. His father in sick bed had nothing to object except to nod since the money that was due from his estate could be collected only by Raj and not by any of his children or his trusted assistants. It was his firm impression that his son could achieve this success because of his method of approach.

Besides such facts in day to-day life one can gather many instances in the lives of men who have achieved success giving us the clear picture of their approach to the subject of their success. Men of letters and men of science have never tried to hide the fact that they had to struggle incessantly to get at some measurable success and that they could win the struggle only because of their method of approach.

Lord Macaulay, whose history of England is worth reading even a hundred years later, read 150 pages to write 10 lines. Johnson's accuracy and flow of English language is again the result of his relentless effort. In the words of "Boswell" "He (Johnson) had early set it down as a fixed rule to do his best on every occasion, and in evey company to impart whatever he knew in the most forcible language he could put it in and that by constant practice and never suffering any careless expression to escape him or attempting to deliver his thoughts without arranging them in the clearest manner".

Archimedes did not get the idea of his principle just because he thought of it at the time of his work but because he continued to think of the problem in all his activities. Newton did not arrive at the theory of gravitation by seeing the fall of a fruit from the tree but by applying the observed facts to the existing ideas systematically. All these facts prove that an approach to a subject should be incessant and that theory could be accepted by the world only when the actual facts correspond to the expected results.

The recent exhilarating news of conquering Everest should set men think of their approach. Even the heroes of the adventure have not hesitated to state that their success is in a large measure due to the information that was available regarding mountaineering. The previous batches though unsuccessful have contributed to a large extent by recording the height reached, the lessons learnt and special features that forced them to climb down. These measured records are the most important stones that paved the way to success. An approach to the subject should be measured and not merely expressed in glorious verbose language.

This conception of approach to the subject is not limited to the sciences. But also to all the other fields in which man is interested-arts, economics, politics, psychology etc. Even in the latest publication of G. B. Shaw's Buoyant Billions there is a reference to this universal truth. During the mutual confession of love, the second son of Buoyant says "Love is not enough, the appetite for more truth more knowledge for *Measurement* and *Precision* is far more universal."

As the population of the world increasd to large numbers from one individual, the problems of man have correspondingly increased. Every problem of man has become a Problem of large numbers. As one of our statesman has declared the problem of independence does not worry us more; it is the problem of interdependence that should be solved.

The progress of man depends on the success of inter-relationship. This inter-relationship should be measured accurately to avoid dangerous deductions on incomplete and insufficient observations leading us away from the path of truth.

At the outset the problem of biological and social sciences may look impossible of quantitative measurements. This idea may even force the men in charge of those sciences to conclude "Some Correlation was found between.....". A science or an observation can become exact or precise only after it is measured. Correlation can be measured statistically and

expressed by a statistician as significant or not. The degree of confidence that anybody can attach to the observation can be once for all settled. Such settled statements alone can give us an impetus for further study for only then we will know whether we are on the right path or not. It is in the discovery of inter-relationship that we have the basis for *prediction and control* which constitute the practical application of science. A statistical method alone can suggest a correct method of approach to utilise samples so as to arrive at the best possible approximation of the characteristics of the universe. When conclusions are reached, the soundness of the quantitative comparisons that must be implicit in them will be much more certain if they are grounded in statistical observation an analysis serving as a check upon *initiative and based judgements.* In conclusion it is the method of approach in every attempt to unravell the hidden truth of nature that decided the result. That method of approach which decided the behaviour of large numbers is the correct method of approach.

(I. B. C.—Not infantile Biliary cirrhosis but Ignorant Breed of Complacency).

Definition.—Statistics—A Science of large numbers.

——★——

Maturity, though a concrete term is often understood vaguely. It is manifested in many ways in different degrees in different persons. But a few important characteristics of the mature person are—

1. Ability to feel with others, to see things from their view point and to be creative and happy rather than antagonistic and indifferent in one's relations with others.

2. Objectivity towards one's self—ability to recognise and accept one's own emotions as natural and to project hypothesis about one's behaviour.

3. Ability to select suitable long term goals and to organise one's thinking and acting around these goals.

4 Ability to make adjustments to situations.

5. Ability to meet unexpected stresses and disappointments without experiencing emotional or physical collapse.

6. Ability to give as well as receive affection.

7. Ability to form opinions based on sound reasoning and to stand up for them and to accept compromises which do not violate fundamental convictions.

This is a maturity check-up My dear reader, are you fully mature?

★Treatment of Hypertension is a topic that has been dealt with by different people in varying ways. One who goes thro' all that fails to form a definite opinion, and all that the literature leaves behind is only a trail of confusion. Dr. Ramachandra has dealt with the topic in a methodical way. He has done the thinking for us and we have only to inbibe it. Our thanks are extended to Dr. Ramachandra for this valuable article.—(Ed.)

Therapy of Hypertension

Dr. RAMACHANDRA, M.D.

THERE are many modern diseases which are difficult to manage and Hypertension is one of them. Very little is known about the development and pathogenesis of this vascular disease and the treatment of this condition is no way better. This entity has come into prominence recently, not that it was absent in bygone days. It is a disease of Human Beings and as such must have existed from the time human species were in existence. In literature very little is mentioned about this entity but several episodes of Hypertension have been referred to in ancient writings. Paralysis is a term which had its origin from ancient medical literature. We hear of several people dying of stroke especially among the older generations. Now what could have culminated in this catastrophe? A few of them must have been Hypertensives. Such like Episodes are often mentioned and it is but logical to think of them as Hypertensive sequelae though the term High Blood Pressure or Hypertension has not been mentioned.

As Human species is advancing—as civilisation is progressing. Hypertension has come more into prominence. It may be due to the advancement of medical science that detection of this disease has become easier, but at the same time it should not be forgotten that the incidence is increasing from the time its existence was recognised. It would not be far from right if it is said that Human Race is degenerating in many respects and Hypertension is one of the indications of such a degenerative process. It would not be long to note this condition in Infants children and at Adolescence, in time to come and Hereditary transmission the most likely factor in its aetiology. No doubt such a concept even to-day exists that this disease runs in families but manifesting later in life. There may come a time when a new born infant or young individuals may manifest the symptoms of this disease to a greater percent than at present. It is not

known whether such a disease is present in animals and other species. The existence of Hypertension in domesticated animals—caged animals and other animals which live in association with Human Beings, *e.g.* Horse, Cows etc. animals of torture would be a term most suited for them is not definitely known. The recording of the Blood Pressure of domesticated animals would in measure give an idea about the psycho-smatic influences responsible for this disease. This disease has got a heriditary background. Susceptibility is more in individuals of a particular type of temperament—Sensitive, shy and insecure. They belong to the higher group in the civilised races. Their minds are highly receptive and emotions pent up. Many of them are unable to lead a normal existence and usually break down under the stress of modern life. They may enter mental institutions. The same individual may become the subject of Hypertension, when such minor problems are repeated. Though placed high in the scale of civilisation such temperamental imbalance is suggestive of a degenerate progeny.

Bearing this aetiology in mind, it is a very difficult problem to manage Hypertension. The mind has to be treated and often the Psychiatrist will be of more help than the general Physician or the Cardiologist. The general Physician is one who is of help in the management of symptomatic hypertension but in the essential or idiopathic type mental readjustment is desirable, a thing practically impossible though recommended by every Physician. An individual with a particular temperament can never lead an existence characterised by mental severnity or calmness. Equiliterium is lacking and that is the key-note of the disease. So to advise an impossibility is not a practical line of approach. Revealing the existence of such a disease or instituting a strict control over diet, Habits etc. will also have a deleterious effect on them. Suspicion about the seriousness of the disease will lead to an advancement of the condition. Under these conditions it becomes a problem.

Drugs have very little place in the management as these Hypotensive methods do not ameliorate the symptoms of the disease. They may even aggravate the symptoms or may make symptomless Hypertension symptomatic. The only benefit of these Drug is to produce a manometric fall in the Blood Pressure without any permanent relief of symptoms. These Drugs are all transient in action and not specific in the treatment of the disease. Use of these Hypotensive drugs may produce Vaso-dilatation of blood vessels due to direct action on arteriolar mechanism or by paralysing sympathetic nerve endings or by blocking the ganglion cells, but the Psychosmatic influences are not controlled. They continue to act and the Blood Pressure though not kept so high because of these Drugs—still produce damage to the vasculature. So by using Hypotensive drugs it would not be possible to prevent damage. The changes

in the vessel wall progresses pari-passu with the psycho-smatic influences —only a very much raised Blood Pressure is lacking. In some cases use of these drugs in therapeutic doses may not lower the Blood Pressure at all. It continues to be high. The drugs have no effect in dilating the arterioles by any of the above three mechanisms. Sometimes tolerance develops limiting the fall of Blood Pressure. In some cases the Blood Pressure even rises under the influence of these Drugs indicating how powerful Neurogenic influences are to overcome the Hypertensive effect of these drugs. Such varied responses are met with unhesitatingly it may be mentioned that the patient may succumb as a result of pushing this form of therapy beyond a certain limit. It has frequently been noted that Hypertension recognised at routine examination of an individual for a Insurance company or a Certificate, has resulted in serious complications due to Drug treatment. An individual who could have survived longer unfortunately meets with his end. The Physician has to be blamed.

Moreover Hypertension may be met with at all ages—in various stages and with various complications. So no line of treatment can specifically be laid down. Treatment has to be adopted suiting the individual patient. The experience of the Physician has more to play than a knowledge of these drugs. The progress of the Disease also varies with individual to individual. It is a common experience to detect high blood pressure in young people who rapidly deteriorate. At the same time older individuals with a same Blood Pressure live a longer span of life without manifesting any symptoms. During ones practice it would be common to meet with individuals having a Blood Pressure above 200 and diastolic above 120 leading a normal life. Some develop complications with a moderately raised Blood Pressure, the complications themselves varying, Cerebro-vascular, Cardio-vasculature or Reno-vasculature. It cannot be prophesied. It is a real problem to unravel the mysteries of this disease and understand it scientifically. Yet there must be a method in this madness. Nature is not chaotic as the Human Race. The ultimate conclusion still remains—once a Hypertensive always a Hypertensive at the hands of any Physician who practices any system or cult. A psychiatrist Physician is one most suited in managing these individuals in striking at its root cause. The general Physician is most suited in treating its complications. A Surgeon may try his hand but unfortunately such attempts lead to other complications.

At the present moment Drug treatment of Hypertension is being extensively tried and every Drug more or less producing the same result. No drug is free from side effects and no Drug has a permanent Hypotensive property. To maintain a patient's Blood Pressure at the normotensive level cannot be achieved by any Drug, and at the same time to limit the

damage which is occurring to the vasculature. The circulation of pressure substances either adrenaline or Angiotoum cannot be prevented or its action nullified The Bio-chemical changes in the Blood cannot be reversed by the use of these Drugs. These Drugs can give an individual mental relief when the attending Physician reveals that his Blood Pressure has fallen. The sigh of relief may be of more benefit in limiting the advancement of the Disease.

Vascular Spasm is one which is intimately related to a raised Blood Pressure. Vascular Spasm is responsible for the Hypertensive Crises's but by itself it may not produce vascular damage. The damage is a result of the High Blood Pressure. Once damage has occurred to the vessel wall, Drugs have no effect as vascular spasm no longer operates.

In Asymptomatic Hypertension—whatever may be the level of Blood Pressure, it is always advisable to limit the use of Hypotensive Drugs. Sedatives must be used freely as these Drugs have a depressing effect over the higher controls Blood Pressure generally falls. Phenobarbitone is best of such drugs used upto doses of 2-3 grs. per day—½ gr. individual doses with. Restriction of his activities and dietetic regulation. This has been discussed in a previous article on Hypertension. Weak Vaso-dilators such as Papaverine ½ gr. combined with sedatives may prove more beneficial than the powerful Vaso-dilator like,

Group II (1) Aminophylline.

(2) Nicotinic Acid.

(3) Methonium compounds.

These have only a limited field of usefulness. Many of the Hypertensives fall in the I category and it is a problem whether to use Drugs of the Group II or not. It is much safer not to use them. Aminophylline has a direct action on the arteriolar musculature. Nicotinic Acidhas a similar action. Vegolysin blocks the ganglion cells of sympathetic and Para-sympathetic. The Blood Pressure is reduced due to its action on the Sympathetic ganglion. The side effect of this Drug are many and its use very limited *in Symptomatic Hypertension.*

Symptoms attributable to the Disease like Headache, giddiness, loss of vision, anginal pain can be treated with these Drugs. Otherwise they have no place in the management of symptomatic Hypertension. Symptoms may be brought on by the use of the Drugs.

During crises such as Cerebral Encephalopathy those drugs may relieve the spasm by the I.V. route and prevent necrosis to the various tissues.

Aminophylline can be given I.V.

Nicotinic Acid.

Tetraethyl Ammonium Bromide.

Hexamethonium compounds.

Later the same drugs can be given by the mouth in the form of tablets. Hexamethonium compounds can be given by the I.V. route in an oily base to keep the Blood Pressure at a constant level.

Drugs having a similar action to Nicotinic Acid are Ronicol, Priscol etc.

Aminophylline used for more than one week loses its action as tolerance develops.

The same is true with Hexamethonium Compounds. Tolerance develops within a period of 7-10 days, and large doses of the Drugs have to be begun. This is not recommended as side effects become manifest, which distress the patient. The Drug should be given intermittantly with about any interval of 3—4 days Drug free period. This Drug has no uniform action. The degree of fall of Blood Pressure varies from individual to individual; where spasm is the chief features the fall is more and where sclerosis has occurred the fall is less. In Juvenile Hypertensives where spasm is the main features the fall in Blood Pressure is considerable and the response good. The older the individuals the fall is less and tolerance develops rapidly

Side effects.—Constipation—Dimness of vision;
Difficulty in urinaling etc.;
Loss of appetite.

Nitrites.—Are not used in the routine treatment of Hypertension, but are used for its complications especially Angina Pectoris. The Quick acting Nitrites are more useful. Sodium Nitrite being slow acting has a sustained effect in reducing the Blood Pressure. Alkaloid from Raulfia Serpentina—Extracts from Misilloe. Tissue free Pancreatic extracts have similar action. Thiocyanates, Perandren, Vitamin E, Choline, Khellin are Drugs which have served no useful purpose, may be remembered for the academical interest only.

★This article kindly contributed by Mr. M. G. Rao, Professor of Dental Surgery, throws light on the newly started B.D.S. course in Madras Medical College. The need for this course was a long felt one, and it has been so fortunate and opportune that the course is born at a time when the General Hospital has such an eminent Dental Surgeon and Professor in Mr. M. G. Rao. We wish all success to those who are seeking knowledge under the able guidance of the learned Professor Mr. M. G. Rao.

Dental Education

M. G. RAO,

Professor of Dental Surgery, Madras Medical College and Dental Surgeon, Govt. General Hospital.

DENTISTRY has long been a Cinderalla of the professions and it is not surprising to find people believing still that an entrance can be effected other than by the official portal. Most of the general public, apparently even now, not all of them, know, that since the admission under Dental Act 1948, persons already practising with academic qualifications, there is now no means of securing admission to the practice of Dentistry except by a course of Study in any recognised Dental Institutions. A comprehensive survey under-taken by the Health and Development Committee in 1946, released an accurate information which led to the passing of the Dental Act 1948 by the Dominion Legislature, to regulate the profession of Dentistry. From the Register maintained under this act, is seen that 500 Dentists are with academic background and those without any qualifications amount to nearly 3000 in whole of India. Out of this 16 qualified and 400 without any kind of hospital training are practising in the Madras State. In the countries abroad a basic minimum of one Dentist to 3000 of the population is considered to be inadequate. The trained dentists available now in India are only 1 to 400,000 of the population.

The immediate necessity to produce sufficient number of competent Dentists to minister the oral health needs of the public in Madras State necessarily called for the establishment of the institution of a 4 years Course in Dentistry in the dental wing of the Madras Medical College, leading to the degree of Bachelor of Dental Surgery. Nearly 4 years have been given to the exploration of the feasibility of the plan of our State Government which sought sound quality of educational standards.

Each of the 4 years of the B.D.S. Course has an Examination of the Madras University. Taking the B.D.S curriculum for I.S.C. candidates the class room work has been calculated on a minimum of 30 weeks in an

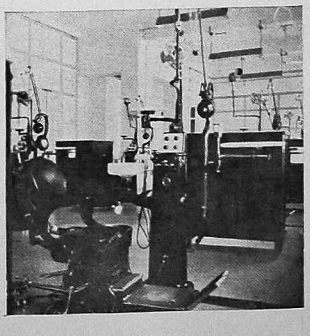
academic year, 37 weeks in hospital for general Medicine and Surgery and Dental clinic work for 45 weeks in an academic year. With the course now in operation the students spend a part of their 1st, 2nd and 3rd years to have courses in Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, medicine and surgery as related to Dental Surgery besides the Dental subjects. During the clinical years of the B.D.S. study the students work in collaboration with specialists in most fields related to medicine, for example, with the Cardiologist in regard to management of Dental procedures for patients with Hypertension and cardiac insufficiency, with the pediatrician in regards to the oral diagnosis of exanthemas; congenital cardiac lesion and pyogenic infection with the neurosurgeon, for joint management of the neuralgia or dysfunction of the 5th, 7th and 9th cranial nerves and differential diagnosis of the Dental pain; with the orthopaedist for the combined management of fractures of jaws and problems of tempero mandibular joint and with the general and plastic surgeons for orofacial prosthesis. It will thus be seen that each problem and each consultation reveals new facets of interdependence between medicine and dentistry.

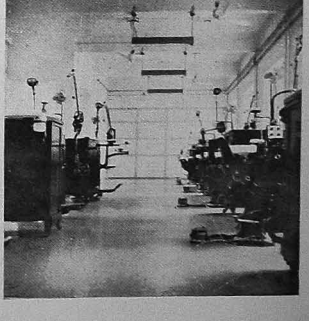
The important question about the costs for the course will probably enter into the calculations of many intending entrants into the field of dentistry. Apart from the tuition fee of Rs. 250/- per year, the cost of equipment and material that the student is required to purchase is approximately Rs. 400/- per annum. Of course the cost of maintenance for students living away from home must be added to this expense. The institution however under-takes the supply of heavy and precision equipment for working.

The prospect in Dentistry for those who are now about to commence to their studentship is a fairly good one. It may be said that the three thousands, in the whole of India, registered under the Dentists Act 1948 without Medical or Dental qualifications, will actually be a fewer number in years to pass. This class, which I need hardly say is comparatively small in our State is also decreasing and will have to be supplemented by qualified Dentists. Large number of new entrants to the profession of Dentistry may find an employment in the Army, Air Force, and Naval services. Public services, may in future absorb many candidates, leaving a few to try their future in private practice, which has a sound prospect.

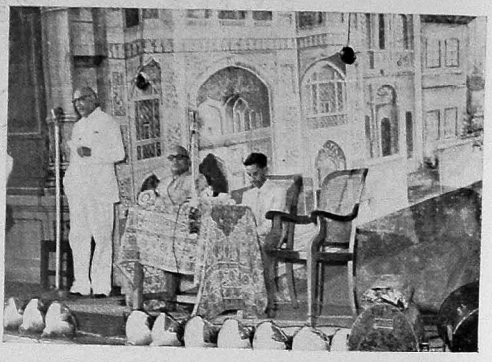
—★—

We congratulate Dr. Miss. SOUMINI, old student of M.M.C., and wish her *Bon Voyage* and happy return. She is awarded W.H.O. Fellowship to study and qualify for M.P.H., majoring in Venereal Diseases in the Institute of Hygiene at John Hopkin's University at Baltimore, U.S.A.





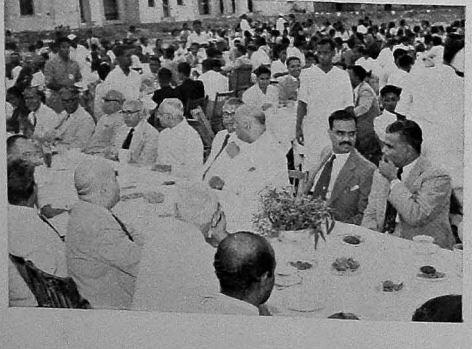
RIBS OF THE DENTAL WING.



Old and

New Wise-domes.

GRADUATES' RECEPTION



TATA — TETE

(Before Tea)

★This article reveals a dreamer in the making with the garb of an exhuberant gaiety. His thoughts leave an idyllic beauty about them, his words a halo of romance. He sees nature with the true perspective imparting to it life, glory and magnificence. Let this smouldering cinder turns forth to a conflagration to shed light unto himself and around.

The Romance of Nature

M. SIVARAMAKRISHNA RAO,
III - M.B.B.S.

GOD has provided beauty with the profusion of nature in rich measure around us. Most people, however beset by worries are indifferent to the infiniteness of beauty and joy that greet their eyes. I was an ordinary man, one such, the work of God tugged at my heart, my feelings and expressions. I said "Thanks to you!". But what tribute could I pay a workman whose works I had barely a glimpse of? I looked around me; in rocks I found glory, in their majesty, their fiery colours, and in their total aloofness to our afflictions. In plants and trees I found happiness—in their endless variety of forms, colour and movement.

The form of an angel, the exquisite proportions of venus of the statues of Ajanta and Hampi, of the eyes of a deer, of the face with glory all its own, the face like the starry heavens; this I have seen.....

Of the colour of our clothes, of the colours of the flowers, the glory of the blossoms, of the gardens whose nodding flowers sing the praise of the Lord, this I have seen.....

Of the movement and sound in life, of the rustling wind caressing the boughs like a lover in a million, whose hand soothes as it heals, whose touch is scarcely felt, but gives thrill after thrill; the branches swaying in ecstasy under the hands of its beloved, the sinuous movements of the boughs, with no masked motion, but blending into one another, with the grace of a dancer—this I have seen.....and heard... ....

Sprawled on our terrace, I looked at the stars. As a child, I was not interested in them; as a youth, I am awed by them—by their lustre, and their countless myriads. Each star a shining dot of cold fire, liquid

gases aflame, shedding stardust into the silent voids for ever and ever—sparkling in their gaiety; and looking down upon us and our deeds, the the million eyes of God!..... This I have seen.....

The sweet face of a Baby, radiant in its expression—eyes of a heavenly hue; an expression of indescribable purity and innocence, with ministering angels bending over it—the peal of bells and the hymns from sweet throats; the air charged with expectancy and yet the clouds rolling by, at peace with the world—eventide with the cattle wining their way home; and the dust of their feet glittering in the twilight—and darkness, with the deep blue of the evening sky charged with the clouded yellow of the coming moon; and the million twigs of the trees weaving a web of magic around the scene—The heart of the world at peace and rest.... Peace on Earth and Goodwill to Men!

In the deathless still of the morning, when the cold wind kissed my cheeks, as I pedalled along the roads, the twilight awaited the great Dawn; and I heard pealing bells in the distance—a pilgrimage to Heaven. I heard the bullock-carts creak, and it was music to mine ears. The bullocks plodded their rumbling way, and I saw the passengers, sleeping or yawning; as yet the morning did not dawn. The occasional lash of a whip, the groan of the wheels, and the clear eyes of the cattle; all these, a part of our Drama. This I have seen, and I say, "Thanks, thanks to you, God!".

Pensive, I laid myself over the green grass of the meadow in the evening and lost myself in a reverie. Came a friend, and asked me if I was happy. I replied,

"I have found my soul here. When you are groping about in the dark, and a great Dawn comes over you, and you realize you woke up from sleep into a World of Wonders. Each object in the Universe has some beauty in it..... As I watch the sunrise, it is as though my beloved is getting ready to shed her radiant beauty over the earth for the day; flaming in her majesty and yet cool and fragrant as the morning .....and the dewy rose, eager and expectant vies with the lily for the sun's caressing rays. In the noon, when her temper is manifest, not all our sighs can redeem us! And yet for her rashness her sister the sky weeps often, and the tears falling on my anguished brow herald a rainy day of sweet odours, green grass, and an evening seranade of frogs. As I watch the sun set, of I see my beloved going to bed in a burst of splendour after a day so unbelievable radiance. And yet, in her hesitancy, how often she changes her dress by the minute—Orange and crimson and gold, streaks of purple and green! Settled at last, she takes rest beyond the horizon in the land we never see. The birds bid farefell to her, and the angels draw together the curtains of darkness.

"There is romance in nature, Suri, and happy is the man who can woo her..... Out here, even in your back-yard, solitary nature awaits you with open arms.....each second is blissful, and time stands still. No care exists, and the birds come to sing to you love-songs; and the brook murmurs sweet words into your ears, where the wind refreshes you and where the rain is so cool. As you walk under God's own archway of a rainbow, and petals raining as if out of the sky, shimmering red and gold and blue, bestrewing your path onwards forever, look yonder there, the limping lamp carried ever so tenderly by the shepherd, bleats to its mother beyond the hillock. All joys are here and truly I am contented; I realize my place in the Universe.....

"Open Thy gate of mercy, gracious God! My soul flies out to seek Thee. As it drifts among the stars, in the cold, bleak, outskirts of the Universe, where no time, no matter, no space exist, show me greater splendours and let me sing Thy praise".

In literature, as in love, we are astonished at what is chosen by others.

* * * *

The greatest undeveloped territory in the world lies under your hat.

* * *

The man was suffering from a bronchial attack, and as a result of it he was unable to speak above a whisper. He decided to call at the residence of the doctor who had just moved to town. The patient appeared one evening at the doctor's front door, rang the bell, and after a short wait stood facing the doctor's young and pretty wife.

"Is the doctor at home?" he asked in his bronchial whisper.

"No", the young wife whispered in reply. "Come right-on in".

★It is not what is achieved that matters, but what you do and the spirit in the doing. This article reflects the marathon efforts put in by the authors, goaded by the lust for knowledge. Under the encouraging and able guidance of the heads of the V. D. Dept., the elements for this article were gathered. Plough the fields, O, Yeomen, let thy harvest be rich.

A Note on Cerebrospinal Fluid with special reference to its normal values in South Indians

B.C.K.; T.S.K.; R.H. & V.R.

HIPPOCRATES, the father of medicine, though a profound observer failed to note the presence of fluid in our brain, that fluid we now call the cerebrospinal fluid. Thus it was left to Vesalius and Valsalva, the great anatomists of the 16th century to demonstrate the presence of this fluid in the ventricles of the brain. After this remarkable discovery, C.S.F. has been a thought-provoking subject for scientists in the centuries that followed, In the year 1762, Cotugno claimed that a limpid fluid existed not only in the ventricles, but also in the sub-arachnoid space. Four year later Haller substantiated Cotugno's statement. Little was known however regarding the distribution of the fluid, until Magendie established the connection between the sub-arachnoid space and the ventricles. It was not until 1891, that all this knowledge was put into practical use when Quincke of Kiel, did the first lumbar puncture as a therapeutic measure for the relief of intra-cranial tension in a hydrocephalic infant. It is interesting to note that Quincke's technique is still used in modern practice with little improvement.

For the space of a decade, no further outstanding work was done on the subject. The earliest application of the spinal fluid examination in the detection of the syphilitic involvement of the cerebrospinal axis was that of Ravaut and of Widal and Sicord in 1903. This antedated the first performance of the Wassermann reaction on the fluid by Levaditi and Marie in 1906.

The next most brilliant contribution is that of Dandy who, by his experimental work on animals, proved that the choroid plexus is the sole source of the fluid and that the ependyma plays no part in its production. By a most ingenious technique, he succeeded in blocking the Foramen of Munro on one side of the dog's brain, while on the other side he first

removed the choroid plexus of the lateral ventricle, leaving the ependyma intact. Then he blocked the Foramen of Munro on that side. In the former case the ventricle was greatly distended with fluid—a condition of unilateral hydrocephalus—while in the latter it became shrunken and collapsed containing not a drop of fluid, though the ependymal lining was still intact. The brilliance of the conception is only matched by the finesse of the technique.

Heretofore, we have relied on the normal base-line findings of the constituents of the C.S F. published by western workers and based on investigations conducted on normal occidentals. While physiologists are not quite agreed as to the exact role played by the C.S.F., it is well recognised by clinicians that C.S.F. serves as a diagnostic mirror of the pathological changes that take place in the C.N.S. in various disease states and, sometimes long before clinical manifestations make their appearance. We are indebted to Dr. P. N. Rangiah for the suggestion that it may be interesting and informative to conduct a series of the routine examinations of C.S.F. of apparently normal South Indians with a view to determine whether there is any marked variation between our normal findings and those recorded by Western workers. We set on ourselves, to determine the normal or average of certain constituents of C.S.F. in one hundred persons.

The task which we set ourselves to do involved considerable difficulties. Firstly a suitable source for getting the specimens of C.S.F. had to be found. Spinal puncture is being performed in the Wards and Operation Theatres of the hospital every day, either for diagnostic purposes or as a preliminary to the induction of spinal anaesthesia. For obvious reasons the fluid taken from patients suffering from various pathological conditions of the nervous system, is of no use for the purpose of our study. Surgical cases requiring operative treatment under spinal anaesthesia, would in the majority have no systemic disease likely to interfere with the physiology of C.S.F. The only chance of the surgical patients not possessing a normal C.S.F., is when they have had at one time or other, suffered from syphilis or any other disease known to cause an abnormal reaction in the C.S.F. This possibility had to be eliminated and the obvious thing to do was to examine the cases, and as far as possible, exclude any historical or clinical evidence of syphilis. This involved certain difficulties. The patients had to be examined two or three days after the operation. The time which was convenient for us was only after 4 O'clock in the evening when visitors were gathered round the patients. It was rather embarrassing to the patients to be questioned about personal matters in the presence of their relatives. No information pertinent to V.D. was to be had from the case sheets. A convenient time

suitable both to us and to the patient had to be found. This actually cost us some of the lectures of the afternoon session. Other difficulties were confronted in the actual collection of the fluid. At this juncture we would like to thank the anaesthetists of theatres A. B. & D. for their willing co-operation in collecting the fluid for us. However, we cannot but mention that the fluids thus obtained were invariably insufficient for the purposes of conducting the whole series of tests one intended to do. We realise that this is no fault of theirs as the various spinal anaesthetic procedures interfered with the collection of sufficient fluid. But we thank them once again for the extreme tolerance shown to us in spite of our repeatedly pressing them, and for enabling us to reach our goal in such a short time. We collected from the surgical Units 99 specimens of C.S.F.; out of these it was unfortunate that we had to reject 27 specimens merely because, the quantity was insufficient to carry out all the tests. For the same reason we were forced to the necessity of seeking spinal fluids elsewhere.

At this juncture, Dr. N. V. Rao of the V. D. Department, suggested that the simplest way of solving this scarcity problem, was to get specimens from the V. D. Department from people who were historically, serologically and clinically declared negative for venereal diseases. This gave us the opportunity of not only reaching the target of 100 cases but also afforded us the unique experience of performing a number of spinal punctures by ourselves, but under supervision. This experience we would otherwise have been denied as students.

We started our study on the 4th of June 1953. By the end of July, 112 specimens of C. S. F. were collected for examination.

The following are the tests that we performed:—

(*i*) Inspection as to appearance, colour, cloudiness etc.

(*ii*) Cell-count.

(*iii*) Estimation of total protein with Lumetron photo-electric colorimeter.

(*iv*) Nonne-Apelt reaction for globulin.

(*v*) VDRL Test-Both qualitative and quantitative.

(*vi*) Colloidal gold reaction.

We undertook to do the above tests only because as students we could afford very little time. The test for chlorides, sugar etc. would take up more time than we could spare.

The known attributes of the normal spinal fluid are as follws:—

1. **Appearance.**—Normal C. S. F. is always colourless but when any pathology is present, there are interesting changes to be observed in it In acute pneumococcal meningitis the C. S. F. is very turbid and purulent. In tuberculous meningitis on the other hand, the fluid may be clear at the time of collection, but on standing overnight a web develops. In general paresis, the fluid after collection may look slightly opalescent due to excess of cells. Sometimes an yellow coloured fluid—Xanthochromia—may be encountered. The discolouration is probably due to haemolysis of R. B. C. In long continued jaundice, there may be sufficient bilirubin to give a yellow colour.

Bloody tap.—Sometimes the spinal fluid may be blood stained in which case it could be ascertained whether discolouration is due to admixture of blood with C S. F. during spinal puncture, by puncturing a vein, or to a cerebral or sub-arachnoid haemorrhage. If the blood is from a vein the fluid will clear after a few drops have been let out. But in haemorrhagic conditions the colour is retained and the fluid is homogeneously mixed with blood.

2. **Cells.**—It was Sicord and Ravaut who first realised the significance of cytological changes in the C. S. F. An alteration of the cell count is of significance in disease, for example in *tuberculous meningitis*, there is an increase of lymphocytes in C S F. In pyogenic meningitis, enormous numbers of polymorphs are met with. Cell count must be done soon after the collection of the fluid as there is a possibility of the cells getting lysed. Loren Schaffer carried out a brief but instructive series of unpublished studies on the relation of the cell count of the spinal fluid to the time after the withdrawal at which the count was made. He found that the chief error came through the sedimentation of the cells on standing. The contents of the tube must be vigorously shaken to form a uniform suspension before counting. Great variation may occur through withdrawal of the fluid at various depths from the test tube—very low counts being obtained from the upper layers and very low counts being returned when the fluid is taken from the bottom of the test tube. Furthermore the cells have a tendency to adhere firmly to the sides of the test tube when the fluid has stood for some time. The suspension being uniform however, cytolytic deterioration seems to occur at an almost uniform rate of about 20% in every 24 hrs.

The cell count of the spinal fluid is usually performed with one of the newer counting chambers such as Fuchs Rosenthal. This chamber consists of a ruled area of 16 one mm. squares bordered by triple lines.

Each 1 mm. square is sub-divided into 16 smaller squares and is identical with that of the W. B. C. area in the Neubaur Haemocytometer. The total ruled area is 16 sq. mm. and the depth below the cover slip is 0.2 mm. Thus the volume of the fluid in the ruled area with the cover glass on is a trifle more than 3 cmm. (3.2 cmm.) but is taken as three cmm. for purposes of calculation. The dilution due to the stain being disregarded, the final result is arrived at by the division of the total number of cells counted by three. The pipette that is used is an ordinary W. B. C. pipette.

Procedure.—The leucocytes are stained with 1% aqueous methylene blue solution. This solution is drawn into the W. B. C. pipette upto the mark 1, followed by the spinal fluid upto the mark 11. After mixing the contents well, the count is made. All the cells in the ruled area are enumerated and the calculation done as mentioned above.

The cell count of the spinal fluid is an index of meningeal reaction, *i.e.* Leptomeningitis. It is therefore an entirely non-specific finding. The cell count however assumes a great importance as a warning sign of trouble, actual or impending, since meningeal reaction represents the activity of pathological processes in neurosyphilis. Stokes, Beerman and Ingraham in their 'Modern clinical syphilology', state the following:—"Absolutely normal count varies from 1 to 3 lymphocytes per cmm. or an upper limit of 4 cells per cmm. may be regarded as within the range of normal". Nonne places the upper limit at 5 cells per cmm. Greenfield and Carmichael place them at three cells, presence of 4 cells in a specimen being suspicious. Carl Lange on an examination of a series of five hundred unselected spinal fluids based on cell counts, observed that C. S. F. falls into three separate categories. He found that the first group of fluids revealed less than four cells per cmm. This group he called normal. The second group of fluids showed a cell variation between 4 & 9. These fluids could neither be called normal nor abnormal; so he called them the intermediary group. The third group is called definitely abnormal as the C. S. F. showed a cell count exceeding 9 per cmm. As far as syphilis is concerned, cell counts from 5 to 10 lymphocytes have no significance, unless they are associated with a positive serology.

Total Proteins.—The estimation of total proteins affords valuable information. This is done with the aid of the Lumetron photo-electric colorimeter, the latest device for estimating the constituents of biological fluids, including the total protein content of C. S. F.

Performance of the test.—2·5cc of the spinal fluid is taken into a test tube and an equal quantity of 10% trichloracetic acid is added and the contents mixed well. The test tube with the contents is kept in a water

bath at 37 deg C for ten minutes. The percentage of light transmission is determined with the unknown using a water blank of 100% transmission. The percentage transmission of the unknown in mgm. percent of total proteins is obtained by reference to a calibration chart.

We would like to draw the attention of the reader at this juncture to the interesting observation made by Dr. Guruswamy Mudaliar, Dr. Ramachandra Iyer and the late Dr. S. K. Sundaram on the protein content of bloods taken from medical students. They found that the average value was 6.2 gms %, which is definitely lower than that established by western observers who put the level at 7.2 gms %. It is therefore quite reasonable to assume that a similar drop in protein value in C. S. F. in Indians is possible; but the average that we established is 33.6 mgm %. This value is more or less in agreement with the value arrived at by the western observers which is 30 to 35 mgm %.

Nonne Apelt globulin reaction.—Normally globulin in C. S. F., is present in such minute quantities that it is impossible to identify its presence by the ordinary methods at our disposal. The presence of it is always pathological.

Procedure.—2 c.c. of C. S. F. is taken into a test tube and an equal quantity of a neutral solution of saturated ammonium sulphate is added along the sides of the test tube. If globulin is present, an opalescent ring develops at the junction of the two fluids after about two minutes.

V. D. R. L. Test.—The spinal fluid is heated at 56 deg C, for 15 minutes and cooled.

One c.c. of heated spinal fluid is pipetted into a test tube. Positive and negative spinal fluid controls are included in each test run. 0.2 c.c. of sensitised antigen emulsion is added to each spinal fluid. The racks of tubes are shaken in the Kahn shaking machine for 15 minutes and returned to the Kahn-shaking machine, and shaken exactly for 2 minutes. Results are reported as follows:—

Positive.—Definitely visible aggregates suspended in water clear or turbid medium.

Negative.—No aggregation. Complete dispersion of particles—appearance slightly turbid or granular.

Lange's Colloidal Gold Reaction.—During the early years of this century, and just a couple of years before the first World War, Lange perfected his colloidal gold reaction which is now being used with advantage in the clinical laboratories all over the World. Lange derived

his inspiration from the experiments of Zsigmondie, who in 1901, stated that solutions of proteins protected solutions of gold and other metals from being precipitated by electrolytes. Lange in attempting to apply this method for the estimation of protein in C.S.F., found on the contrary that the proteins did not protect the colloids but actually facilitated their precipitation. He also noted that the intensity of the reaction had no relation to the amount of protein but depended on the quality of protein present. Based on these findings, he evolved the gold colloid reaction, which is carried out as follows:—

Apparatus used.—11 Pyrex glass test-tubes, well cleaned and washed with double distilled water.

10, 5 and 1 c.c. pipettes similarly washed and cleaned. The 11 test tubes are arranged in a suitable rack, the last one being used as a control.

Procedure.—0.9 c.c. of 0.4% saline is pipetted into the first test tube with a 5 c.c. pipette, and 0.5 c.c. of the same saline to the remaining test tubes—including the control. 0.1 c.c. of the C.S.F. under investigation, is added to the first test tube with a 1 c.c. pipette, thus bringing up the volume in that test tube to 1 c.c. The contents of the 1st test-tube, are well mixed and 0.5 c.c. of this mixture is transferred to the next, using the same 1 c.c. pipette. Contents of this tube are stirred well, and the process of transferring 0.5 c.c. from test tube to test-tube is carried out until the 10th tube is reached. The last 0.5 c.c. is discarded. 2.5 c.c. of standard freshly prepared colloidal gold solution is added to all test tubes including the control using the 10 c.c. pipette. The rack is left overnight and the results are read next morning. With pathological specimens of C.S.F. varying degrees of precipitation and the resultant colour changes are noticed. The results are numerically expressed as follows:—

Colourless	....	5	Denotes comple precipitation.
Light blue	....	4	Partial precipitation.
Blue	....	3	
Purple	....	2	
Red blue	....	1	
Red	....	0	Unchanged.

Normally colour remains, unchanged in all the test-tubes or a slight precipitation is noticed towards the 8th tube.

There are three types of + ve colloidal test. They are the so-called first zone, mid-zone, and the end-zone, or the paretic, the luetic and the meningitic curves respectively. The paretic or first zone curve always reads high at the left.

When numerically expressed a typical paretic curve would be 5555432100. This 1st zone curve is the best defined and most distinctive of all. The luetic or mid-zone reads high in the middle and low at either end, thus a typical curve would read 0123455410. The third type of curve (Meningitic) reading high on the right as 0001235555—is without much significance and occurs in certain meningeal infections.

With the above background in mind we began our study. The following table presents the categories of cases that donated spinal fluid. The first series of patients were chosen by sight in the operation theatre; any cases presenting a slightest suspicion of a possibility of systemic disease in them, were excluded from our study by reference to their case sheets and answers to our questionnaire.

The second series of cases were selected by a careful screening with the highly sensitive blood V.D.R.L. test and a careful physical and historical examination to exclude syphilis.

TABLE 1

First series (Cases obtained from the surgical theatres)

No.	SURGICAL CONDITION.	Number of Cases.
1.	Gastric cases	8
2.	Hydrocele	20
3.	Hernia	18
4.	Piles	4
5.	Calculi bladder	1
6.	Enlarged prostate	1
7.	Bubonocele	1
8.	Cystoscopy—A case for	1
9.	Injury rectum	1
10.	Stone—Pelvis of kidney	1
11.	Osteomyelitis Tibia	1
12.	Epethelioma foot	1
13.	Fistula in ano	1
14.	Ovarian cyst	1
15.	Faecal fistula	1
16.	Adenocarcinoma hepatic flexure	1
17.	Appendicitis	1
18.	Anastomotic ulcer	1
Second series	(Cases from the V. D. dept.)	37
	Total No. of cases	101

A Case of Hashimoto's Disease

Miss. M. V. SHANTHA,
—*Vth Year.*

NAME.—Chinnama. Age-45 Years. Sex-Female. Admitted on. 3rd August 1953 under Dr. U. M. Rao. Complaint (1) Loss of appetite. (2) Constipation (3) Distension of abdomen. (4) Generalised oedema. Duration 6 months.

Family history.—Married—husband died five years ago of fever and chronic cough of three months duration—No hemoptysis—Two children alive and well. No similar complaint in the family.

Previous illness or injuries.—No previous history of Hyperthyroidism, No cough or hemoptysis or abortions.

Menstrual History.—Attained puberty at 11 years—Normal periods till 41 years, when they stopped. No history of discharge per vagina after that.

Habits.—Nonvegetarian, used to chew tobacco.

History of present illness.—The present complaint started 8 months ago with continuous and high fever which lasted for about 1½ months—The fever was accompanied by rigor. She was given some pills, for this fever and the temperature came down. Soon after, she noticed the loss of appetite which used to be normal prior to this. She was also constipated and used to have hard black motions She then developed oedema of the whole body, distention of the abdomen and a sense of discomfort in the upper half of the abdomen. Patient gives a history of having put on considerable weight in the past six months and of dropping of hair. Her voice has become husky. She feels exhausted and has pains in the arms and legs. She is not sensitive to change in weather conditions. She has no dyspnoea on exertion, No interference with swallowing or breathing and no pain in the region of the neck.

TABLE No. 1

Set down in table is the complete record of our work showing the values of spinal fluid accepted or rejected.

SURGICAL CASES

No.	Name.	Age	Sex	Surgical Condition.	Cerebrospinal Fluid Characteristics.					
					Appearance	cells per cmm	T.P Mg%	Globulin	V.D. R.L.	Lange's test
1	Krishnammal ...	33	F	Duodenal obstruction.	Clear	0	34.0	Nil	-ve	Not done.
2	John ...	26	M	Hernia ...	,,	0	37.0	,,	,,	
3	Ratnam ...	30	M	Hydrocele ...	,,	2	42.0	,,	,,	
4	Balan ...	20	M	Hydrocele ...	,,	1	36.0	,,	,,	
5	Rajaram ...	19	M	Hydrocele ...	,,	1	Q.N.S.	,,	,,	
6	Venkatachalam ...	45	M	Calculi bladder ...	,,	0	40 0	,,	,,	
7	Govindaswamy ...	48	M	Enlarged Prostate ...	,,	0	40.0	,,	,,	
8	Muthusamy ...	23	M	Hydrocele ...	,,	2	Q.N.S.	,,	,,	
9	Chenḍan ...	50	M	Carcinoma Penis ...	,,	0	Q.N.S.	,,	,,	
10	Babiah ...	35	M	Varicose veins ...	,,	1	Q.N.S.	,,	,,	
11	Kannan ...	25	M	Hydrocele ...	,,	1	49.0	,,	,,	
12	Guruvappa ...	25	M	Hernia ...	,,	0	37 5	,,	,,	
13	Lakshman ...	25	M	Peptic ulcer ...	,,	1	Q.N.S.	,,	,,	
14	Munusamy ...	60	M	Hernia ...	,,	0	39.0	,,	,,	
15	Sreenivasan ...	23	M	Hydrocele ...	,,	3	30 0	,,	,,	
16	Sambandamoorthy ...	23	M	Bubonocele ...	,,	0	38.0	,,	,,	
17	Madevan Nair ...	40	M	Prolapsing piles ...	,,	0	40 0	,,	,,	
18	Mohamed ...	22	M	Cystoscopy ...	,,	0	40 0	,,	,,	
19	Chinnaiya ...	30	M	Hernia ...	,,	0	20.0	,,	,,	
20	Ramachandran ...	21	M	Gastric ulcer ...	,,	0	26.0	,,	,,	
21	Krishnappa Naicker ...	30	M	Hernia ...	,,	4	20.0	,,	,,	
22	Rama Reddy ...	53	M	Hernia ...	,,	1	50.0	,,	,,	
23	Dan Singh ...	28	M	Hernia ..	,,	0	60.0	,,	,,	
24	Thanḍavelu ...	25	M	Hydrocele ...	,,	1	38 0	,,	,,	
25	Kuppan ...	30	M	Injury Rectum ...	,,	0	44 0	,,	,,	
26	Ramaraj ...	20	M	Hydrocele ...	,,	1	20.0	,,	,,	
27	Kuppuswamy ...	30	M	Hydrocele ...	,,	0	22.0	,,	,,	
28	Dass ...	26	M	Hydrocele ...	,,	1	34.0	,,	,,	
29	Annammal ...	25	F	Duodenal obstruction.	,,	0	22 0	,,	,,	
30	Bala Kurup ...	21	M	Hernia ...	,,	8	Pyocyaneus			
31	Jaganathan ...	17	M	Hernia ...	,,	0	24.0	,,	,,	
32	Sundaramoorthy ...	25	M	Hydrocele ...	,,	0	22.0	,,	,,	
33	S. A. Nabi ...	39	M	Stone pelvis kidney.	,,	1	36.0	,,	,,	
34	Narayanaswamy ...	24	M	Hernia ...	,,	0	42.0	,,	,,	
35	Sundaram ...	20	M	Hernia ...	,,	2	32.0	,,	,,	
36	Kesavulu ...	40	M	Osteomyelitis Tibia...	,,	0	43.0	,,	,,	
37	Kondiah ...	38	M	Hernia ...	,,	13	26 0	,,	,,	
38	Ekambaram ...	54	M	Epithelioma ...	,,	25	42.0	,,	,,	
39	Raghavan ...	32	M	Fistula in ano ...	,,	6	32 0	,,	,,	
40	Madava Rao ...	40	M	Hydrocele ...	,,	4	Q.N.S	,,	,,	
41	N. L. N. Krishna Reddy.	18	M	Hydrocele ...	,,	0	46.0	,,	,,	
42	Haneef ...	29	M	Peptic Ulcer ...	,,	5	Q.N.S.	,,	,,	
43	Venkatasubbiah ...	25	M	Hernia ...	,,	0	Q N.S.	,,	,,	
44	Ranganathan ...	18	M	Haematocele ...	,,	0	33.0	,,	,,	
45	Doraiswamy ...	25	M	Hydrocele ...	,,	0	37.0	,,	,,	
46	Chengalvaroyan ...	52	M	Hernia ...	,,	0	28.0	,,	,,	
47	Raghavan ...	25	M	Hernia ...	,,	5	Q.N.S.	,,	,,	
48	Chellapan ...	30	M	Hydrocele ...	,,	0	48.0	,,	,,	
49	Saraswathy ...	40	F	Duodenal Ulcer ...	,,	0	Q.N.S.	,,	,,	
50	Gopal ...	22	M	Hernia ...	,,	0	25.0	,,	,,	

TABLE No 2—*(contd.)*

Set down in table is the complete record of our work showing the values of spinal fluid accepted or rejected.

SURGICAL CASES

No.	Name.	Age	Sex	Surgical Condition.	Cerebrospinal Fluid Characteristics.					
					Appearance	cells per cmm	T.P. Mg%	Globulin	V.D. R.L.	Lange's test
51	Ramaswamy ...	22	M	Hydrocele ...	Clear	1	32.0	Nil	-ve	
52	Anthony ...	35	M	Gastric Ulcer ...	,,	0	Pyocyaneus			000000000
53	Subbiah Raju ...	31	M	Hydrocele ...	,,	0	Pyocyaneus			111000000
54	Palani ...	20	M	Piles ...	,,	0	37.0	Nil	-ve	001110000
55	Ellammal ...	60	F	Ovarian cyst ...	,,	0	22.0	,,	,,	
56	Amirtha Rao ...	49	M	Faecal fistula ...	,,	0	37.3	,,	,,	
57	Kuppusamy ...	31	M	Piles ...	,,	7	60.0	,,	,,	Normal.
58	P. N. Reddi ...	27	M	Piles ...	,,	30	37.0	,,	,,	Normal.
59	Muthurangam ...	25	M	Duodenal Ulcer ...	,,	1	38 0	,,	,,	
60	Kaliappan ...	25	M	Duodenal Ulcer ...	,,	0	25.0	,,	,,	
61	Chensaiya ...	35	M	Hydrocele ...	,,	0	34 0	,,	,,	
62	Pichirajan ...	35	M	Piles ...	,,	2	Q.N.S.	,,	,,	Normal.
63	Dasarathan ...	18	M	Hydrocele ...	,,	3	Q.N.S.	,,	,,	
64	Kanthi ...	25	M	Peptic Ulcer ...	,,	0	20.0	,,	,,	Normal.
65	Bashyam ...	19	M	Hydrocele ...	,,	1	32.0	,,	,,	
66	Andy ...	50	M	Hernia ...	,,	0	32.0	,,	,,	
67	Chakravarthi ...	28	M	Peptic Ulcer ...	,,	1	20.0	,,	,,	
68	Alavandar ...	40	M	Adeno carcinoma of hepatic flexure ...	,,	0	42.0	,,	,,	
69	Narayana Nair ...	28	M	Hydrocele ...	,,	0	48 0	,,	,,	
70	Vaidyalingam ...	30	M	Duodenal Obstruction.	,,	0	Q.N.S.	,,	,,	
71	Vadivelu ...	35	M	Hernia ...	,,	0	38 0	,,	,,	
72	Gnanamuthu ...	40	M	Piles ...	,,	0	Q.N.S.	,,	,,	
73	Gopalan Nair ...	50	M	Hernia ...	,,	1	80.0	,,	,,	
74	Srinivasachari ...	58	M	Hernia ...	,,	10	54 0	,,	,,	
75	Venkatasubbiah ...	35	M	Hydrocele ...	,,	4	Q N.S.	—	—	
76	Rangaiah ...	50	M	Peptic Ulcer ...	,,	—	—	—	—	
77	Natarajan ...	55	M	Carcinoma-penis ...	,,	0	Q.N.S.	Nil	-ve	00000000
78	Munuswamy ...	47	M	Hydrocele ...	,,	0	20.0	,,	,,	
79	Kathavarayan ...	54	M	Peptic Ulcer ...	,,	4	20 0	,,	,,	00001111100
80	Varadarajulu ...	23	M	Hernia ...	,,	1	Pyocyaneus			
81	Ananthanarayanan ...	43	M	Hernia ...	,,	1	Q.N.S.	Nil	-ve	
82	Ekambaram ...	30	M	Hernia ...	,,	0	12.0	,,	,,	
83	Rosiah ...	30	M	Hernia ...	,,	0	18.0	,,	,,	
84	Srinivasan ...	25	M	Hydrocele ...	,,	0	Q.N.S.	,,	,,	
85	Jaganatha Rao ...	30	M	Piles ...	,,	3	Q.N.S	,,	,,	
86	Jagadambal ...	33	F	Appendicitis ...	,,	2	12.0	,,	,,	
87	Munniappa Mudaliar ...	60	M	Hernia ...	,,	0	Q N S.	,,	,,	
88	Narayanan Nair ...	53	M	Hydrocele ...	,,	0	Q.N.S.	,,	,,	
89	Chengalvarayan ...	22	M	Hernia ...	,,	1	Q.N.S.	,,	,,	
90	Subramanian ...	44	M	Hernia ...	,,	0	Q.N.S.	,,	,,	1222200000
91	Munuswamy ...	30	M	Hernia ...	,,	0	—	—	—	2232000000
92	Pakkiriswamy ...	70	M	Hydrocele ...	,,	3	22 0	Nil	-ve	
93	Radhakrishnan ...	29	M	Hydrocele ...	,,	0	16.0	,,	,,	
94	Parthasarathy ...	18	M	Anastomotic Ulcer ...	,,	0	22.0	,,	,,	
95	Jayaraman ...	35	M	Piles ...	,,	1	Pyocyaneus			1122110000
96	Paul ...	44	M	Duodenal Ulcer ...	,,	0	Q N S.	Nil	-ve	5544400000

TABLE No. 2—*(contd.)*

Cases selected from the venereal department:

No.	V D. O.P. Number.	NAME.	Age	Sex	Cerebrospinal Fluid Characteristics					
					Colour	Cells per cmm	T.P in Mg%.	Globulin	V.D. R.L.	Lange's test
1		Ponnuswamy ...	20	M	Clear.	0	18.0	Nil.	-ve	
2		Kannammal ...	25	F	,,	0	21.0	,,	,,	
3		Madhavan ...	25	M	,,	0	48.0	,,	,,	0000000000
4	7376	Balu ...	21	M	,,	0	33.0	,,	,,	
5	7314	Pacchaiyappan ...	48	M	,,	0	40.0	,,	,,	
6	5142	Ruby ...	23	F	,,	0	19.0	,,	,,	
7	3413	Govindamma ...	30	F	,,	0	26.0	,,	,,	
8	7420	Ramaswamy ...	18	M	,,	0	34.0	,,	,,	
9	7426	Tirumalpiah ...	24	M	,,	0	39.0	,,	,,	
10	7310	Rajagopal ...	22	M	,,	0	33.0	,,	,,	
11	7501	Kuppuswamy ...	40	M	,,	0	22.0	,,	,,	
12	7365	Narayana Iyer ...	46	M	,,	0	28.0	,,	,,	
13	3551	Parvathy ...	30	F	,,	0	21.0	,,	,,	
14	1840	Thangam ...	15	F	,,	0	41.0	,,	,,	
15	7494	Palaniandi ...	23	M	,,	0	25.0	,,	,,	
16	3655	Chandra ...	18	F	,,	15	25.0	,,	,,	
17	7551	Damodaran ...	18	M	,,	97	27.5	,,	,,	
18	7599	Kondiah ...	36	M	,,	3	43 5	,,	,,	
19	7522	Perumal ...	35	M	,,	0	22.0	,,	,,	
20	7633	Paul ...	19	M	,,	1	32.0	,,	,,	
21	7603	Lakshmanan ...	30	M	,,	0	52.0	,,	,,	
22	7548	K. O. Anthony ...	23	M	,,	0	34.0	,,	,,	0000000000
23	6987	Elumalai ...	22	M	,,	0	QNS	,,	,,	0000000000
24	7516	Kuppan ...	25	M	,,	1	33.0	,,	,,	
25	7716	Gopal ...	28	M	,,	2	35.0	,,	,,	0000000000
26	7523	Ganeshan ...	22	M	,,	0	38.25	,,	,,	
27	7624	A. Rajagopal ...	35	M	,,	0	41.0	,,	,,	
28	7728	P. T. Gupta ...	24	M	,,	1	33.0	,,	,,	4453200000
29	7786	N. V. Kannan ...	23	M	,,	0	65.0	,,	,,	
30	1884	Perumal ...	30	M	,,	0	33.0	,,	,,	
31	7830	M. Velu ...	36	M	,,	1	37.5	,,	,,	0000000000
32	7788	P. Kannan ...	28	M	,,	0	39.0	,,	,,	0000000000
33	7705	Murugan ...	37	M	,,	1	27.5	,,	,,	0000000000
34	3191	Krishnan ...	62	M	,,	0	29.0	,,	,,	
35	7754	Jayaraman ...	28	M	,,	0	33.0	,,	,,	1111000000
36	7793	Ramaswamy ...	30	M	,,	1	49.0	,,	,,	1111100000
37	7988	Seshadri ...	23	M	,,	0	30.0	,,	,,	1500000300
38	7984	P. Chandran ...	30	M	,,	0	28.0	,,	,,	1110000000

TABLE 3

The table below reveals the number of cases based on differing protein values.

Total Protein in mgm%	11 to 15	16 to 20	21 to 25	26 to 30	30 to 35	36 to 40	41 to 45	46 to 50	Above 50
No. of cases.	2	11	15	10	20	22	9	7	3

Maximum No. of cases fall between .... 30 to 40 mgm%

The mathematical average .... 33·6 ± 4 mgm% (± = 4 approx)

The following table strikes the average values of C.S.F. for different age groups.

AGE GROUP.	CELLS		TOTAL PROTEIN	
	Av.	Range.	Av.	Range.
Below 20 years ...	2	0 to 15	31	20 to 40
Bet. 21 & 30 years ...	1	0 to 4	27	16 to 65
Bet. 31 & 40 years ...	—	—	34.5	12 to 43.5
Above 40 years ...	3	0 to 10	33.3	20 to 54

Comparative values of spinal fluids examined by the authors in Madras and by Mahoney and others in Staten Island and Chicago are given in the following table.

TABLE 4

Non syphilitic patients.	Total cases.	5—9 cells.	45 mgms % or more protein.	5—9 cells & 45 mgms % or more prot.	Total border line.	%	10 or more cells.	below 5 cells
1. Staten Island series ...	123	6	17	3	26	20	1	—
2. Chicago series ...	405	24	27	1	52	13	11	—
*3. Madras series ...	100	2	12	—	14	14	5	84

*Madras figures approximate with those of the Chicago values.

SUMMARY OF OUR FINDINGS

1. **Appearance.**—The C. S. Fs. obtained during the course of our study were invariably clear and colourless except on two or three occasions when the spinal punctures resulted in "bloody tap" due to accidental puncture of veins, the fluid returning to normal soon after a little of it had flowed out.

2. **Cells.**—Cells in our C. S. F. were almost always lymphocytes. We rarely came across a single polymorph. On the whole there were only 5 specimens of C. S. F. that revealed more than 10 cells per cmm. But the donors of these specimens were examined carefully and found to be perfectly normal. Mostly the range of cells was between 0 and 3.

3. The total proteins of C. S. F. that were examined showed a wide variation. There were fluids with total proteins as low as 12 mgms. % and as high as 80 mgms %. But the majority showed a value between 31—40 mgs. %.

4. **Globulin.**—None of the hundred fluids presented globulin.

5. V. D. R. L. test was negative in all the cases.

6. **Lange's test.**—Lange's test was performed on 30 specimens, many of which were unsuitable for study either because the quantity was not sufficient for other tests or because of contamination with Ps. pyocyanea. In those which we took into consideration, no abnormal curves were obtained.

It is now our pleasant duty to thank all those who guided, helped and encouraged us in our work. We are grateful and deeply indebted to the following:—Dr. C. K. Prasada Rao, M.D., Dean, Madras Medical College who enabled us to put our thought into action. He was kind enough to grant us the permission to collect fluids from the theatres and make full use of the Staff, Clinical Lab., procuring for us at the same time a new Fuchs's Rosenthal Chamber for doing the cell count. What little we have achieved would have been impossible but for the kindness, patience and valuable advice of Dr. R. V. Rajam, Director of Upgraded Venereal Diseases Department, who guided us at every step. To Dr. Rangiah, Associate Professor, V. D. dept., without whose help and encouragement we could not have attained our object. Amongst so many other things he also taught us to perform spinal punctures and more important he taught us the art of perseverance. Dr. (Mrs.) Anguli, who spared us her valuable time in teaching us to perform the Lange's test in the characteristically

scientific manner of hers. Dr. Gaub and Dr. Chacko, the Serologists, V. D. dept., for conducting the V.D.R.L. test and estimation of total proteins. Dr. Natarajan, M.D., Professor of Bacteriology, for allowing us the use of departmental Rosenthal Chamber and test tubes. The Director and Staff, King Institute, Guindy for providing us with all equipment and reagents for performing Lange's test in General Hospital itself. The Anaesthetists, Surgeons and House-surgeons of the General Hospital for the extreme kindness that they have shown to us lastly our thanks are also due to the Nurses of V. D. Dept., attenders of Various theatres, T. A. Sigamony and Chinnappan of the Clinical Lab., for active co-operation. To reverse the famous Churchilian saying, never in the annals of the Madras Medical College and General Hospital have so few of us been benefited by and indebted to so many of the Staff, Dean, the Professors, Nurses, Lab. Technicians and Attenders of the two Institutions.

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A Case of Double Uterus

Miss. S. GNANASUNDARI,
Final Year.

INCIDENCE.—Clow in 1927 collected statistics and found out that 220 in 1000 girls in the schools within 4 years of puberty suffered from Dysmenorrhoea. 22% congenital 1% mal-development.

Embryology.—Mullerian duct arises as a ridge external to Wolffian body. At the inferior end of this ridge a groove like invagination of the coelomic epithelium appears. At its anterior or cephalic end the invagination remains open forming the abdominal ostium of the Fallopian tube. Caudal to this the lips of the groove fuse and form a tube—utero-vaginal canal from the bottom of which a solid epithelial sprout develops and gradually tunnels backwards in the tissues of the ridge till it reaches the Cloaca. The two Mullerian ducts fuse to form the uterus, and upper 4/5 of vagina. The cephalic portion, that is the part above the crossing of genital ridge remains unfused and forms the Fallopian tubes.

Congenital anomalies —

1. Uterus diadelphus.
2. Uterus bicornis bicollis with septate vagina.
3. Uterus bicornis unicollis.
4. Uterus septus.
5. Uterus sub-septus.
6. Uterus unicornis with an accessory cornu.

Case.—Name: Devakiamma, aged 28 years, Place Kottayam: Hindu.

Complaint.—(i) Pain in the lower abdomen ever since she attained puberty and it is more during periods. (ii) Sterility.

Present History.—The patient attained puberty in 14th year. She had a minor operation namely D. & C. done in Travancore for pain in the lower abdomen. Married: for 12 yrs. No history of abortion.

Menstrual History.—Periods regular, painful and scanty once in 30 days, lasting 7-10 days last menstrual period 10-20 days ago.

Pain.—Pain in the lower part of the abdomen. Patient describes the pain as "I feel as though something is turning over and over inside the abdomen". The pain comes on with the onset of flow, and stops with the stoppage of the flow. She says she has vomiting for 2 — 3 days during periods occasionally. D. & C., relieved her of her pain temporarily. After 5 months it recurred.

General condition.—The patient is a well nourished individual, of about 28 years, slightly anaemic, not cyanosed, not jaundiced, no oedema present. Heart and lungs nil abnormal. No other congenital anomalies detected clinically.

Investigations.—17—2—53: Vaginal Examination done. Vagina is very shallow.

P. V. under anaesthesia. Patient was given general anaesthesia and she was put in lithotomy position. Auvard's weighted self retaining speculum was put in and the cervix was exposed. On exploration it was found that there were two cervices. Vagina was shallow.

Rectal examination.—Uterus was felt, but was not definitely made out that it was double uterus.

Abdominal palpation.—No plapable mass, no tenderness.

Hystero-Salpingography.—Forsdikes method. The patient is placed in lithotomy position, and the cervix exposed with retractors and pulled down with special valsellum forceps which has a ring sort of arrangement. The cervix is cleaned with ether and picric acid solution and uterine sound is passed. Jarcho's pressometer which is a manometer with a container for the medium is made use of. (Neohydriol which is a lipiodal-iodine clinically combined with oil). This is well tolerated by peritoneum. This is the radio opaque medium. The apparatus is charged with the medium so as to replace air. This pressometer acts as a pressure control. If any type of mechanical apparatus is used to inject the opaqe medium, it is always possible that a dangerously high intrauterine pressure may be produced. In order to avoid oil emboli it is essential that the pressure will never exceed a maximum of 300 mm of mercury. After removing the uterine sound the special cannula is introduced and the cervix is closed with the special arrangement so that there may not be any leakage of fluid from the cavity of uterus. 5-10 cc. of fluid was injected into the uterus. The injection was in control by visualising the opaque medium on the flouroscopic screen from the beginning of the test to the end. A skiagram was taken immediately. 24 hours after a control film was taken to find out if there was any peritoneal spill.

X-ray findings.—Double uterus. Terminal portions of tubes visualised. Peritoneal spill visible in 24 hours.

Blood.—Hb — 68.7%; RBC — 3.25 mil. ; B.P.: 130/80.

Aetiology.—Aetiology of congenital maldevelopment and anomalies is unknown. Embryologists suggest that defective germ plasm, and unfavourable environment during embryonic life may contribute to this. Others are of opinion that such conditions as reduplication of uterus are of pre-natal origin. They are of opinion that they take origin in the earlier months of gestation. "Recent experimental work was shown that nutritional disturbances and slight traumatic influences can profoundly disturb the course of development of ovum in vitro. Thus by submitting the ova of frogs to very dilute concentrations of various metallic salts lithium, strontium, and calcium, it is possible to produce artificially such gross malformations as spina bifida and anencephaly. The influence of the natural secretions, *e.g.* uterine upon the human ovum before development commences, is therefore not without interest and lends modern support to old theory that an "unhealthy endometrium" may be a cause of not only abortion but also of some congenital malformation. Direct evidence of the operation of such conditions in the course of natural development is of course difficult, if not impossible to obtain. Clinical observation shows that heredity and possibly parental syphilis are the only conditions to which an unfavourable influence upon development can reasonably be attributed."

Treatment.—Pre-operative: Acid tonic oz. 1 t d.s.
Poly-haemine 1 tab. t.d.s.
Gynic mixture.

Post-operative: Rectal saline — 2 pints.
Morphia: 1/4 gr. Omnopen — 1 tube.

Operation notes.—Patient was given heavy spinal anaesthesia. Nupercaine 1.5 c.c. The abdomen was opened by right para median incision. It was opened in the hope of uniting both the uteri—unification. There was a septum between the bowel and the bladder dividing the pelvis into two compartments. On each side there was a separate uterus As the uteri were far apart and the septum was in between it could not be achieved. Right side tube was the seat of Hydro salpinx. Left ovary was cystic. Both tubes were blocked at the fimbrial end. Septum was removed. Bilateral hysterectomy and right Salpingoo opherectomy and left salpingectomy was done. Abdomen was closed in layers after putting in Solusepticine.

—★—

A Case of Hashimoto's Disease

Miss. M. V. SHANTHA,
—Vth Year.

NAME.—Chinnama. Age-45 Years. Sex-Female. Admitted on. 3rd August 1953 under Dr. U. M. Rao. Complaint (1) Loss of appetite. (2) Constipation (3) Distension of abdomen. (4) Generalised oedema. Duration 6 months.

Family history.—Married—husband died five years ago of fever and chronic cough of three months duration—No hemoptysis—Two children alive and well. No similar complaint in the family.

Previous illness or injuries.—No previous history of Hyperthyroidism, No cough or hemoptysis or abortions.

Menstrual History.—Attained puberty at 11 years—Normal periods till 41 years, when they stopped. No history of discharge per vagina after that.

Habits.—Nonvegetarian, used to chew tobacco.

History of present illness.—The present complaint started 8 months ago with continuous and high fever which lasted for about 1½ months—The fever was accompanied by rigor. She was given some pills, for this fever and the temperature came down. Soon after, she noticed the loss of appetite which used to be normal prior to this. She was also constipated and used to have hard black motions She then developed oedema of the whole body, distention of the abdomen and a sense of discomfort in the upper half of the abdomen. Patient gives a history of having put on considerable weight in the past six months and of dropping of hair. Her voice has become husky. She feels exhausted and has pains in the arms and legs. She is not sensitive to change in weather conditions. She has no dyspnoea on exertion, No interference with swallowing or breathing and no pain in the region of the neck.

General Examination.—Patient is an obese individual of about 45 years with a puffy, expressionless, sallow facies, slightly anemic. Skin is rough, dry, and scaly. Hair is dry and scanty particularly over the frontal region. The arms and legs appear oedematous but do not pit on pressure. Supraclavicular pads of fat are present. Tongue is large, moist and clean. Speech and cerebration slow.

Eyes.—Palpebral fissures narrowed, drooping of the upper eyelid and puffiness of the lower present.

Temperature.—Normal. Pulse:—84/ Minute. Volume and tension—Poor, Rhythm—Regular. Blood pressure:—98/62.

LOCAL EXAMINATION

Neck.—On inspection there is a diffuse swelling over the front and sides of the neck, there are no pulsations or visible veins. On palpation there is a generalised enlargement of the entire thyroid gland, which was masked by the pseudo oedema, to about thrice its normal size. The borders are well defined, surface smooth, firm in consistency, not fixed to the skin or deeper structures and moves freely with deglutition. Carotid pulsations are felt. Trachea is not deviated. It is dull on percussion and no bruit heard on auscultation. No palpable lymph glands in the neck.

Abdomen.—Distended, umbilicus everted, flanks are full. On palpation there is a firm, smooth, round swelling occupying the hypogastrium a little to the right of the midline. The mass is movable from side to side. The upper and lateral borders are well defined. The tumour is dull on percussion. Shifting dullness is present.

Cardiovascular system.—The heart is enlarged. Apex beat 6th. Intercostal space 2" lateral to the midclavicular line.

Right border.—½" lateral to the right lateral sternal line.

Upper border.—2nd intercostal space. Heart sounds are normal.

Respiratory system.—N. A. D.

P. V.—Cervix—Pointing backwards. A firm mass felt in the anterior fornix separate from the uterus.

P. R.—N. A. D.

Skeletal system.—Normal.

Investigations.—

1. B. P. 98/62.
2. Hb%—75.
3. Total W. B. C.—7900/C.mm.
   Differential count—Polymorphs 62%.
   Lymphocytes—34%.
   Monocytes—4%.
4. R. B. C. Count—3.2 *millions*/C.mm.
5. Urine—Reaction—Acid
   Sp. Gr.—1010.
   Albumin—Traces present.
   Sugar—Nil.
6. B. M. R.—10.
7. Blood cholesterol—286 mg%.
8. Serum calcium—16.3 mg%.
9. Blood Widal—Negative.
10. V. D. R. L.—Negative.
11. X 'Ray chest—Diffuse enlargement of heart.
12. Indirect Laryngoscopy—No vocal cord paralysis. Appearance suggestive of Myxoedema.

Diagnosis.—(1) Hashimoto's Disease and (2) Ovarian cyst.

The diagnosis of Hashimoto's disease was made because of the following findings:—

1. Struma lymphamatosa nearly always attack women.
2. Incidence is in the late forties—Patient's age is 45 years.
3. History of six months duration with complete freedom from pain.
4. **Thyroid swelling.**—(*a*) Uniform enlargement.
   (*b*) Firm consistency.
   (*c*) Absence of perithyroid adhesions and mobility.
   (*d*) Absence of pressure symptoms.

5. **Thyroid insufficiency.**—(*a*) Obesity.
(*b*) Facies of early myxoedema.
(*c*) B.M.R.—10.
(*d*) Enlargement of the heart.
(*e*) Laryngoscopic findings.
(*f*) Blood cholesterol—286 mgs%.

DIFFERENTIAL DIAGNOSIS

1. **Reidel's struma.**—The complete absence of pain, dysphagia and stridor together with the extreme mobility of the thyroid and signs of hypothyroidism help to rule out this condition.

2. **Carcinoma.**—The relatively slow growth, absence of pain, fixity to the surrounding structures and non-involvement of the lymph glands of the neck serve to distinguish the condition from Carcinoma. Myxoedema is not usually associated with malignant disease of the thyroid.

3. **Infectious Granulomata.**—There is no evidence of syphylis or tuberculosis.

Prognosis.—Is good as pressure symptoms are absent and administration of thyroid will improve the myxoedema.

Treatment.—The recommended treatment is either Deep X-Ray therapy or thyroidectomy. Lymphadenoid goitre is usually radio-sensitive and rapid response to deep x-ray also helps to distinguish it from carcinoma. This effect may not be permanent. So, thyroidectomy has been advocated.

Since there were no pressure symptoms, neither of the above mentioned lines of treatment were adopted in this case. Moreover, with either form of treatment a degree of myoxedema is bound to develop and as the patient was already exhibiting signs of thyroid insufficiency substitution therapy alone was given.

Summary.—A case of Hashimoto's disease with typical clinical feautures is reported here because of its rare occurrence—1% of thyroid swellings.

(My thanks are due to Dr. U. Mohan Rao for his kind help and permission to publish this case.)

—★—

Rao Bahadur Dr. T. S. TIRUMURTHI

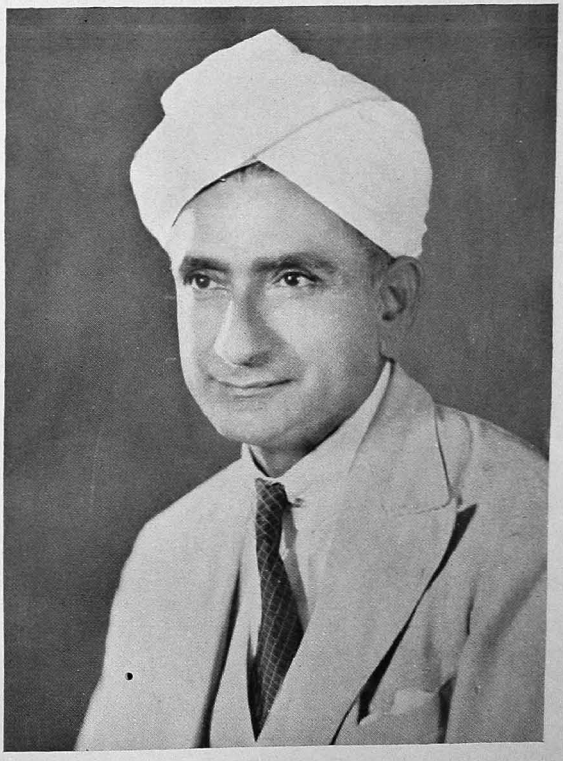
Born on: 28—11—1885.] *[Died on: 26—8—1953.*

In the sudden demise of Dr. T. S. Tirumurthi our profession and our state have sustained an irreparable loss. Son of a well known educationist in South India, Dr. Tirumurthi took his medical degree M.B. & C.M. in 1909 and worked as assistant professor of Pathology under Col. Kirkpatric. During the first World War when there was a dearth of I.M.S. Officers for the professorial posts, his long service and wide knowledge of the subject were recognised by the government and though he was an officer of the Provincial Service, he was appointed as Professor of Pathology. He was the first Indian to occupy this chair and he filled it with distinction. His quickness, keen observation and impressive teaching in the post-mortem room are still remembered by his old students. After the demobilisation when I.M.S. officers claimed professorial posts, he went out to the districts as D.M. & S.O. for a while. But when the second Medical College in the Province was opened at Vizag he was posted as the first Professor of Pathology in 1925—26. He organised the department of Pathology and museum at Vizag. As a Professor of that College he soon attained a prominent place in the Andhra University and acted as the Principal of the College and also as Vice-Chancellor of the Andhra University in 1930. For over a decade he represented the Andhra Medical College in the Andhra University Syndicate and in the Indian Medical Council at Delhi. He was one of those who fought for the recognition of the Andhra Medical Degrees by the Indian Medical Council and the British Medical Council. From his Vizag days he was associated with Indian Science Congress and Indian Medical Association. Later he was posted as Professor of Pathology, Madras Medical College.

When the Royapuram Medical School was converted into Stanley Medical College Dr. Tirumurthi became its first Professor of Pathology and Principal. He served the institution with great enthusiasm till he retired. Even after his retirement he was very active and divided his time between Indian Medical Association and various educational and philanthropic institutions. He was the President of the Press Board of the National Girls High School, Triplicane and director of the T.U.C.S. His services to the medical profession were rewarded by his election as the President of the Indian Medical Association. Till his sudden unexpected death he was attending almost every important meeting and function in our College. Though he is dead his life and activities have left their imprints on Medical Colleges in Madras and Vizag. He is one of the few medical men who could boast of having encouraged, trained and helped a number of young brilliant medical graduates to secure careers in Medical Colleges and Medical Research Institutions. We wish there were more men like Dr. Tirumurthi to serve the profession and the country.

MAY HIS SOUL REST IN PEACE.

IN MEMORIAM



Rao Sahib Dr. T. S. TIRUMURTI,
B.A., M.B. & C.M., D.T.M. & H. (ENG.).

IN MEMORIAM

Dr. R. M. MATHEW, M.R.C.P. (Edin.)

★Our claims to Dr. Sarathy are that he was our teacher, and our officer of the U.O.T.C. Pharmacology claims him as one who knows everything about the subject. This highly erudite article on this complex subject, is dealt in such a simple way, dealing from the very fundamentals that thorough grasp of the subject is given to the reader without much difficulty. Articles of such nature, are very helpful to students of Pharmacology, as subjects of the above nature are generally not clearly dealt in text books of Pharmacology. We are thankful to the present contribution and look forward for further articles of this nature from him.

Ion Exchange Resins and their application to Medicine

Dr. K. P. SARATHY, M.B., B.S.; M.Sc.,

Professor of Pharmacology; Stanley Medical College.

SOME substances have the power of removing ions from solutions and liberating equivalent amounts of other ions in their stead; this is known as ion exchange. In recent years, synthetic organic substances having the power of exchanging ions have been prepared; these are known as ion exchange resins.

Chemistry of ion exchange resins.—An ion exchange resin may be regarded as composed of an inert lattice to which ions are attached in such a way that they can readily be displaced by other ions without any change occuring in the structure of the resin. Because it is ions which are exchanged, two kinds of resins exist: cation exchange resins and anion exchange resins.

Cation exchange resins take up and liberate :—

Cations (*e.g.* Sodium, Potassium, Calcium and Hydrogen ions); commercially they are most commonly available in either the hydrogen or the Sodium form.

The reaction between the hydrogen form of such a resin and a Soln. of Sod-Chloride may be written.

$$CER—H^+ + Na^+ Cl^- \rightleftarrows CER— Na^+ + H^+ Cl^-$$

Where CER — H^+ denotes the cation exchange resin.

Two main types of cation exchange resins exist containing respectively sulphonic groups and carboxylic groups. The terms sulphonic and carboxylic refer to the groups in the resin in which the cations are believed to be attached. Sulphonated resins in the hydrogen form behave

as insoluble strong acids; cation exchange occurs within a wide range of pH. Carboxylic resins in the hydrogen form behave as insoluble weak acids. Cation exchange only occurs in the vicinity of neutrality!

As the name indicates, anion exchange resins take up and liberate anions such as chloride, bicarbonate, phosphate, and hydroxyl ions. They are usually available in the hydroxyl form. The reaction between a hydroxyl form of such a resin (AER — OH^-) and a solution of Sod. Chloride may be written as.

$AER — OH^- + N^+ Cl^- \rightleftarrows AER — Cl^- + Na^+ OH^-$ and again the end result will be an equilibrium.

It will be obvious that the removal of salt from water (*e.g.* to make sea water potable) is achieved by the simultaneous use of both cation and anion exchanges. Thus the removal of Sodium chloride from a solution can be described as follows.

$$CER — H^+ + Na^+ Cl^- \rightleftarrows CER — Na^+ + H^+ Cl^-$$

$AER — OH^- + H^+ Cl^- \rightleftarrows AER — Cl^- H^+ OH^-$ and all but the merest trace of $H^+ + OH^-$ ceases to be ionized and is but water. This method of purification will only remove from water substances which are ionised.

The equilibrium achieved in these reactions depends upon the ions present; the resins combine more readily with some ions than with others. Thus divalent ions (whether cations or anions are held by the resins in preference to monovalent ions).

THERAPEUTIC APPLICATIONS OF ANION EXCHANGE RESINS

Peptic Ulcer.—In a solution containing a strong acid such as hydrochloric acid, the appropriate anion exchange resin in the hydroxyl form will remove chloride ion and liberate hydroxyl ion; the acid is neutralized, either wholly or partly. This reaction has been applied to the treatment of peptic ulcer. If the anion exchange resin be ingested in the hydroxyl form, the neutralization of gastric acidity will convert it into the chloride form which, in the alkaline small intestine, will be reconverted into the bicarbonate or the carbonate form because of the abiquity of carbon dioxide in the body; the net result of this is that no change occurs in the electrolyte composition of the body. The resin is insoluble and so none is absorbed and therefore alkalosis cannot occur; the resin itself appears to be without effect on the bowel. With antacids containing magnesium,

or calcium there is always some loss of phosphate because of precipitation of insoluble phosphates; no appreciable loss of phosphate occurs when anion exchange resins are used because the concentration of phosphate ion in alimentary tract is low and therefore only small quantities of the resin are converted into the phosphate form. Neither resin nor aluminium hydroxide cause an acid rebound. The efficiency of 'Amberlite 1R-4' in neutralizing gastric acidity is greatly increased if the resin is used as a fine powder of 200 mesh (USP). The most common side effect of the administration of antacids is constipation and there is unanimity among those authors who have used anion exchange resins that they do not cause constipation. A small proportion of patients receiving these resins complain of nausea, distension or belching. No cases of alkalosis have followed their use; they are reported to cause no change whatever in the body electrolyte.

Resins may be combined with the ordinary dietetic restrictions and with the use of Belladonna, phenobarbitone or other drugs. A minimum dosage of 2 g. two—hourly should be given. The resin can be given in 1 g. cachet and needs to be as fine as possible—at least 200 mesh (USP).

THERAPEUTIC APPLICATIONS OF CATION EXCHANGE RESINS

Because of the efficient machinery which maintains the osmotic pressure of the body fluids at a constant level, any loss of water from the body is followed by a corresponding excretion of salt by the kidney, similarly any loss of salt entails the excretion of water. If it be assumed that a diminution of total body fluid will bear preferentially on oedema fluid and on ascitic fluid when these are present, the diminution of the amount of sodium in the body will lead to a reduction in the amount of oedema or ascitic fluid. Attempts have been made to diminish the body sodium by feeding cation exchange resin. In the treatment of hypertension, numerous suggestions that restriction of the sodium intake leads to lowering of the blood pressure culminated in the Kempner rice diet. Patients dislike the diet and it was a short step to the conception of a diet more liberal in sodium and more palatable, associated with the administration of exchange resins to remove the extra sodium.

A number of studies has illustrated the physiological effects of these resins. Following moderate doses of resin the excretion of sodium, potassium, calcium and magnesium in the faeces is increased, the urinary output of sodium, potassium and calcium is diminished, the plasma carbon-dioxide content falls and the plasma chloride level rises; there is little effect upon the plasma sodium, potassium and calcium levels. Larger doses lead to falls in the plasma Na, K and Ca levels. The pH of the

serum falls as does that of urine and the daily output of ammonium ion in the urine increases as much as tenfold. It was found that the hydrogen form of the resin was unpleasant to take because the Nacl of the saliva was converted into Hcl. This was overcome by substituting the ammonium form of the resin which behaves in other respects like the hydrogen form Owing to the dosage needed (45 g. daily is a moderate dose) it is not practicable to give the resin in cachets. Suspend in liquids, in jellies or eaten with cream.

Congestive heart failure.—At least 47 cases have been described in which cation exchange resins have been used in the treatment of oedema associated with congestive heart failure. Currers used resin in the ammonium form; Krans used ammonium form of a sulphonic resin; Martz, Kohlstaedt and Helmer, used Pot. Amm. Carboxylic resin.

Cirrhosis of the liver with ascites.—In many cases ascites can be controlled by restricting the Na. content of the diet. The present trend is towards a liberal diet—particularly in protein—but it is not easy to continue a high—protein with a low sodium diet. If excess sodium could be removed by exchange resin the task of the dietitian would be eased. Hay and Wood used a mixed potassium—ammonium form of carboxylic resin. Marz et al limited sodium intake to 1·5 to 3 g. daily and gave 60 g. carboxylic resin were given each day in the hydrogen—potassium form.

Nephrosis wth oedema and ascites.—Six children suffering from nephrosis with oedema and ascites were treated by Payne and Wilkinson with cation exchange resin, five of the children showed loses of body up and dimunition of oedema but there was little change in the ascites.

Hypertension.—Dock states that results are good in about half the cases. Other uses:—Penman used a mixed potassium and ammonium form of a carboxylic resin to remove sodium and thus prevent fluid retention in toxaemia of pregnancies. One of the causes of renal failure may be a retention of potassium—hyperalkalemia. A carboxylic exchange resin in the ammonium form was effective in keeping the serum potassium level within normal limits. Because of the vomiting the resin was given as an enema.

Dermatology has recently made use of two groups of substances which have found extensive application in industry—the silicones and the ion-exchange resins. Ion-exchange resins have been found to be effective in removing ammonium ions and so preventing napkin eruptions and also in removing alkali ions contained in soaps and detergents. Hence they might prove a useful adjunct to the treatment of alkali dermatitis.

SIDE EFFECTS OF CATION EXCHANGE RESINS

(1) Pot. deficiency states. So use carboxylic resin in the mixed Potassium—Ammonium form.

(2) Uncompensated Acidosis.

(3) Dehydration and constipation.

(4) pH of the urine should be kept above 6 if possible.

(5) Tetany due to a fall in serum calcium.

(6) Long continued administration of these resins might lead to serious loss of Ca and Mg.

(7) Signs and symptoms of digitalis poisoning when patients receiving digitalis preparations were given cation exchange resins: any arrhythmias due to digitalis can be relieved by either K. Salt or Mg. salts.

The use of cation exchange resins must be accompanied by careful clinical observation of the patient and repeated estimations of the Serum C, the plasma Co_2 content and Serum Na.

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Practitioner (1952): Advances in Treatment.

—★—

"What is your age?" asked the judge "Remember you're under oath".

"Twenty-one years and some months", the woman answered.

"How many months?" the judge persisted.

"One hundred and eight".

MILK, MALT

AND

OVOMALT

Milk is produced in an animal, when she has an offspring. Milk is the special food of the young of that animal. Mind—this supply lasts in the mother only till the offspring is able to take something else to sustain it.

Similarly, Malt is produced in any cereal like Ragi, Rice, Wheat, Cholam, etc., when the *seed* germinates. This malt is the food that is naturally produced in the seed for the sake of the tender sprout.

So, Milk and Malt are naturally produced special food for the young and tender ones. They are rich in Nutrients and easily digested.

OVOMALT is made from germinated (malted) Ragi. When taken with Milk, it forms a wholesome food. It is an *Indian Product.* It is easily prepared by mixing in hot milk. It is delicious, tasteful and palatable; contains Vitamins A, B, C, D, and E. 3 cups per day will give you enough Nutrients. It supplements a diet of milled Rice, as is taken in South India.

Following is a passage from a letter written to us by the late Dr. Tirumurthi:

> *"Registered Medical Practitioners are prohibited from boosting openly any Medicinal or Food products of private firms. But they can do so unofficially by prescribing them to their patients and friends".*

Late Dr. Tirumurthi wrote to one of his friends as hereunder:

> *"I can testify to the good quality of OVOMALT. In my experience it, is easily digestable and agrees with health."*

★

Please Try OVOMALT From To-day!

Some Special Nutritional Problems of India

G. RADHAKRISHNA MURTHY, B.Sc.

THE problem of nutrition is one of the most crucial tasks facing India today. Out of the three basic factors *viz.* food, living quarters and working conditions, food is by far the most important. Dr. Karl Ewang admirably says "Food is a *conditio sine qua non* for normal growths and development, physically and spiritually, for resistance to disease, for capacity to overcome ailments, for working capacity and mental balance.

Nutritional problems are world-wide. Malnutrition stares us in the face wherever we go. In India, Pakistan, China, South Africa and elsewhere, we hear the shrill cries of the under-fed, ill-clad and shelterless millions. Specially is it so in India. "India is a land of poverty in the midst of wealth, of social prejudices irrational customs and widespread ignorance". We have barely "two rice bowls for three mouths." It is sometimes said and rightly too, that India is a rich country inhabited by a poor people. It is no exaggeration if Sir Robert MacCarrison says, "The proper nutrition of her people, the adjustment of the food supply to the population and of the population to the food supply, the provision of efficient sanitation in her towns and villages; these are India's needs; all else is of secondary importance."

Nutrition is not just the consumption of food. It is "the sum of the processes by which an organism is nourished by absorbing substances different from itself and assimilating them to substances identical with itself." It implies a sum total of myriad co-ordinated processes including digestion, absorption, assimilation, excretion and so on. McCarrison puts it superbly: "Food is the instrument of nourishment; Nutrition is the act of using it." Claude Bernard as long ago as 1867 defined nutrition briefly but beautifully as "perpetual creation."

Nutrition as a science is very young. The scientific concepts of nutrition are very recent. "The newer knowledge of nutrition", as it is often called, is a milestone in the history of medicine comparable with the work of Pasteur, which laid the foundation for the modern aseptic surgery. The researches of Sir McCarrison and Dr. Aykroyd have gone a long way in indicating the vastness of the practical field of nutrition in India. Now, we have tables of percentage composition of various food stuffs and their calorific values. We have Balanced Diet Sheets. But, of what use are they to the common man?—He needs something to eat, some place to live and some work to do.

Countless problems present themselves to the nutritionist in India. The geographical situation and the climatic conditions are but minor considerations, as the living human body has the mysterious power of adjustment to the existing environmental conditions. The more important problems are to mention only a few, an ever-increasing population, an unparalleled poverty, dietary prejudices, social customs and widespread ignorance leading to a defeatistic attitude towards life.

The manifestations of malnutrition in India are legion. The main dietary defects are:

1. Great deficiency in the total calories.
2. Too high a proportion of cereals.
3. Too great a consumption of carbohydrates.

and 4. Too deficient an intake of proteins esp. first class or animal proteins, fats, minerals and vitamins.

A classification of the disorders of malnutrition given by Lucius Nicholls is given below:

1. Disorders mainly following deficiencies of water-soluble vitamins of B Complex:
   - (*i*) Beriberi and Wernicke's Encephalopathy.
   - (*ii*) Pellagra and Hyporiboflavinosis.
   - (*iii*) Other nutritional disorders of nervous system.
2. Disorders mainly following deficiency of fat-soluble vitamins:—
   - (*i*) Night Blindness and Keratomalacia.
   - (*ii*) Rickets and Osteomalacia.
   - (*iii*) Hypoprothrombinaemia of the metabolism of vitamin K.

3. Scurvy.
4. Anaemias of nutritional origin.
5. Nutritional oedema.
6. Liver damage and Cirrhosis of nutritional origin.
7. Malnutrition of pregnancy.
8. Decay and Irregularities of teeth.
9. Surgical aspects of malnutrition.
10. Starvation.
11. Conditioned deficiencies (Sprue).
12. Blemishes of malnutrition of importance in public health practice, including skin disorders.

The poor nutritional status of the population is to some extent responsible for the outbreaks of communicable diseases.

In forming a food policy, the services of expert nutritionists and medical men on the one hand and an adequate administrative machinery on the other, are the primary requirements. The medical man has to assess the nutritional state, lay out the essential needs of the body and educate the common man. It is the duty of the administrators to adopt measures to step up production and to ensure equitable distribution.

The nutritionist makes use of a certain nutritional yardsticks in the appraisal of the nutritional state of the country. They are:

(*a*) Dietary Surveys: Which indicate the potential nutritional state of country. These are again qualitative and quantitative. The quantitative surveys consist essentially of five stages *viz.*

1. Preliminary investigation.
2. Training assistants.
3. Carrying out the surveys.
4. Assessment of nutritional value of recorded diets.
5. Presentation of results.

(*b*) Nutritional Surveys.

(*c*) Laboratory work.

(*d*) Vital Statistics esp. Infant Mortality and Maternal Mortality Rates.

(*e*) Growth and development of children: This gives an idea of the state of nutrition as well as the nature of the social environmental factors in rearing them.

(*f*) Clinical Examination upon any subjective study.

(*g*) Scientific methods involving physiological and biochemical tests.

After thus assessing the existing state and knowing the vital needs of the country, the administrator, the agriculturist and the public health worker should pull together to formulate and execute the ways and means for increasing production. Yet a lot has to be done in the fields of agriculture, horticulture, animal husbandry and fisheries. The problems implied in the phrase of Mr. S. M. Bruce of Australia of "marrying agriculture and health" are of special import in India. First is to step up food production. Secondly, it is necessary to arrest the alarming process of soil impoverishment as a result of erosion and ill-planned agriculture. Thirdly, co-ordinated investigations in plant genetics and plant ecology to improve the existing varieties of crops and to introduce new ones. Lastly, the problem of marketing the agricultural produce is important.

At this stage the milk position in India attracts our attention. It is strange that we, in India, with the cattle wealth we have, consume so small a quantity of milk. The per capita consumption of milk in India is only 5 oz., as against 20 - 25 oz. in some of the western countries. It is high time to note and drive home to the public that milk is a very vital foodstuff, which contains the calories, the vitamins and the minerals we need. It is an ideal food esp. for the vegetarians.

Then follows the problem of equitable distribution. The food habits and traditions should be taken into account. Food contamination and adulteration, food waste and storage, transportation and distribution are some of the details, which deserve careful consideration.

The problem of ever-increasing population baffles the nutritionist. The following lines from "An Essay on the Principle of Population" by Malthus is of interest in this connection:

"In an endeavour to raise the proportion of quantity of provisions to the number of consumers in any country, our attention would naturally be first directed to the increasing of the absolute quality of provisions;

but finding that, as fast as we did this, the number of consumers more than kept pace with it, and that with all our exertion we were still as far as ever behind, we should be convinced that our efforts directed only in this way would never succeed. .....Finding, therefore, that from the laws of nature, we could not proportion the food to the population, our next attempt would naturally be to proportion the population to the food ".

This trend of argument, sound as it is, does not seem to apply to India. There is much scope for enhanced agricultural production, if the technical knowledge is fully applied. Moreover, it is an accepted fact that a good nutritional state and high standard of living indirectly reduce the birth rate. Hence, the solution to the population problem does not consist so much in limiting the population as in reorienting our agricultural policy.

The solution to the widespread ignorance of the people is public health education. As Fenton puts it " knowledge is the key to health ". So, the basic principles of nutrition, the deficiencies and disorders associated with malnutrition and the respective remedial measures, the happiness derived from healthful living should all be impressed by means of films, posters, travelling educators and so on.

The food problem is not merely one of increased production and an equitable distribution of food. Its present basis is the Science of Nutrition; its ultimate success is with the administrators.

—*—

The man who thinks only of himself is hopelessly uneducated. He is not educated, no matter how instructed he may be.

—*Dr. Nicholas Murray Butler.*

* * *

The desire to be important is the deepest urge in human nature.

—*Professor John Dewey.*

★ This young doctor who has more letters behind him as degrees than his age, is a valuable addition to our worthy armamentarium of teachers. That a man who is so learned could write in so simple a style, dealing exhaustively the problem of clinical approach to cardiology, a general bug bear for the undergraduates, is a meritable achievement. While thanking him for this article, we are looking forward to articles of such nature to adorn the pages of our magazine in future.

Clinical Approach to Cardiology

Dr. P. K. KRISHNANKUTTY, M.D. (Madras)
M.R.C.P. (London) M.R.C.P. (Edin), F.R.F. P. & S. (Glas).

IN this modern age of machinery, we have become more and more dependant on intricate instruments and technicians, who operate them, for diagnosis of diseases. The situation has become so bad that we are on the point of losing our clinical sense, and judgement. I believe the time has come when clinical medicine should reassert its pride of place. This observation is readily applicable to cardiology with greater emphasis. Hence I am going to discuss in this short paper "The clinical approach to cardiology". I will divide the topic under the following headings:—

1. History.
2. General examination of the Patient.
3. Examination of the Heart.
4. Discussion on (*a*) Cardiac irregularities.
   (*b*) Cardiac murmurs.
   (*c*) Congenital heart diseases amenable to surgery.

History.—Physical examination of the heart is valueless without proper appreciation of the symptoms which brought the patient to the doctor. The commonest symptoms with reference to the heart disease are

(*a*) Dyspnoea,
(*b*) Oedema,
(*c*) Praecardial pain.

(*a*) **Dyspnoea.**—Earliest symptom suggestive of cardiac inefficiency is exertional dyspnoea, *i.e.*, the patient becomes breathless on exertion but not at rest. As the disease progresses, the patient may become dyspnoeic even at rest and may actually become orthopnoeic.

(*b*) **Oedema.**—In early stages oedema occurs around the ankles, towards the evening, which disappears with rest during night, only to reappear again on walking.

(*c*) **Praecordial pain**—is quite a common symptom in both organic and functional heart diseases. It is important that functional type of pain is discovered early enough, so that we can prevent unnecessary and avoidable cardiac invalidism. In order to appreciate the true nature of pain, the physician should ask the patient the following questions.

1. What is the site of pain? The true cardiac pain is retrosternal in origin. Left mammary pain generally indicates that the pain is functional in origin.

2. What is the nature of the pain? Cardiac pain is a dull aching pain often constricting in nature. Stabbing, stitching, burning and pricking pains are always functional in type.

3. What brings it on? Real ischaemic pain of cardiac origin producing angina pectoris is the result of effort and immediately disappears with rest.

4. Does the pain radiate? Generally cardiac pain radiates upto the jaws and left upper extremity.

After taking the history, one has to make a *general examination* of the patient.

While taking the history the physician should be making a preliminary general inspection. He should pay particular attention to head and neck looking for evidence of goitre, leaping carotids and jugular pulsation. He should look for evidence of dyspnoea and cyanosis, then evidence of congestive cardiac failure like oedema, engorged pulsating veins and basal crepitations.

Examination of the Heart.—The four cardinal methods of examination of the heart are (1) Inspection, (2) Palpation, (3) Percussion, and (4) Ausculation.

Inspection—One looks for evidence of thoracic deformity like scoliosis, kyphosis, and depressed sternum. A left-sided praecordial bulge is generally due to right-sided enlargement of the heart. Side by side one looks for the apical impulse and its character: and also any abnormal pulsations in the praecordium, Abnormal pulsations are generally due to aneurisms.

Palpation—fix the apex beat: apex beat is the down-most and outer-most point in the praecordium, where a definite cardiac impulse could be detected. The fixing of the apex beat is important. Because, if extrinsic causes of displacement are excluded, then an apex beat which is outside the midclavicular line, shows that the heart is enlarged and all enlarged hearts are diseased. The character of the apical thrust should be studied. A heaving apex beat is suggestive of left ventricular hypertrophy and a tapping apex beat is due to right ventricular hypertrophy.

Palpation also detects thrills both at the apex and elsewhere. A definite pulsation in the second left intercostal space near the sternum is due to the pulmonary artery.

Percussion—It is doubtful whether any useful information will be obtained by percussing the heart excepting in detecting pericardial effusion and aortic aneurism.

Auscultation.—Bell type of stethoscope is good for detecting low pitched sounds such as mitral diastolic murmurs, whereas diaphragm type (Bowles) detects high pitched aortic diastolic murmurs. So a combined type is preferable.

Heart sounds.—First sound is almost entirely due to the closure of atrio ventricular valves. Its intensity depends on the position of the cusps at the end of diastole. The position of cusps in the beginning of ventricular systole depends on the P—R interval. Thus when the P—R interval is short the valve leaflets are low down in the ventricles and so they have to move through a longer distance before they close: hence a loud first sound: conversely when P—R interval is prolonged as in partial heart block, the valve leaflets are fairly high up in the ventricles and so the first sound is weak. Thus a weak first sound does not indicate a weak myocardium, but a partial heart block.

In complete heart block since ventricular filling is very irregular we get a varying intensity of the 1st sound and it is almost diagnostic. Other conditions in which the first sound is loud are:—(1) Mitral stenosis, and (2) conditions associated with hyperdynamic circulation like hyperthyroidism, anaemia, and fever.

2nd sound.—Is due to the closure of the semilunar valves. Generally the second sound is single in the mitral and aortic areas and split in the pulmonary area. When the pulmonary second sound is single it shows that only one great vessel either the aorta or the pulmonary artery is functioning. In right bundle branch block there is wide splitting of the 2nd sound in the pulmonary area. The aortic 2nd sound is loud in atheroma, hypertension and aortic syphilis. It is generally weak in aortic stenosis.

Third sound.—Occurs in mid-diastole and is normal and physiological in adults upto 40 years. After the age of 40, the third sound should be considered pathological, when it is known as *Protodiastolic gallop rhythm.*

It occurs in mitral stenosis, cor pulmonale, right sided heart failure, thyrotoxicosis and anaemia. When the extra sound occurs late in diastole, it is known as *presystolic gallop* and occurs in left ventricular failure. This gallop rhythm disappears with the onset of auricular fibrillation. The presence of gallop rhythm means cardiac failure.

Cardiac irregularities.—Many of the cardiac irregularities like extra systole, partial and complete heart block and auricular fibrillation can be made out by simple auscultation.

When there is tachycardia and the rhythm is regular, the following conditions should be thought of. (1) sinus tachycardia, (2) supraventricular paroxysmal tachycardia, (3) ventricular tachycardia, (4) auricular flutter.

(1) Sinus tachycardia.—The onset and offset are rather slow. There is always some factor like nervousness, thyrotoxicosis, or fever and toxaemia, to explain the tachycardia. The rate seldom goes beyond 120 and it does not respond to carotid pressure.

(2) Supra-ventricular paroxysmal tachycardia.—It comes and goes suddenly. The rate is generally over 160 and quite regular. The heart is not enlarged usually, and it responds to vagal pressure.

(3) Ventricular tachycardia.—The rate is very rapid. The rhythm is slightly irregular and the heart is enlarged and the patient is seriously ill.

(4) Auricular flutter.—The rate may vary between 130 and 160: but in children the rate may actually be 300. Every now and then the heart rate may get halved suddenly. It does not improve with carotid sinus pressure: Digitalis converts it to auricular fibrillation.

Cardiac murmurs.—Mitral diastolic murmurs occur in the following conditions: (1) Mitral stenosis, (2) In Lutumbachers' Syndrome, (3) In early rheumatic valvulitis, when it is known as Carey Coomb's murmur, (4) In association with aortic regurgitation when it is known as Austin Flint's murmur, (5) In certain cases of patent ductus arteriosus, due to the increased blood flow, past the mitral valve, a mitral diastolic murmur may be present, which disappears on the ligature of the ductus.

Apical systolic murmurs.—The significance of apical systolic murmur has been very much debated. (1) Many conditions associated with increased velocity of the circulation can produce significant systolic

murmurs, as in hyperthyroidism, fever, anaemia, and tachycardia. (2) The mitral systolic murmurs might be conducted murmurs from elsewhere as in aortic stenosis, and interventricular septal defect.

Excluding these possibilities, any systolic murmur whose intensity is grade III or more should be considered due to organic mitral regurgitation.

Pulmonary area.—Diastolic murmurs are generally known as Graham Steell's murmur. They occur in late stages of mitral stenosis and in 50% of cases of atrial septal defect.

Pulmonary systolic murmurs.—May be functional or organic. If organic there will be other signs of pulmonary stenosis.

Aortic diastolic.—Murmur is often best heard in the left third space and is due to aortic regurgitation.

Aortic systolic murmur.—If associated with a thrill is diagnostic of aortic stenosis.

Congenital heart disease.—(1) Fallot's Tetralogy : It is a fairly common anomaly. It is characterised by cyanosis, clubbing of fingers and toes. Typically, there is a history of *squatting*, when the patient gets exhausted. On examination, the pulse is of small volume, there is evidence of right ventricular hypertrophy, there is poor pulsation in the 2nd left intercostal space and auscultation reveals a pulmonary systolic murmur with a single second sound.

(2) **Patent ductus arteriosus.**—Is characterised by a wide pulse pressure and by a typical continuous machinery murmur in the left 1st or 2nd intercostal space with a systolic accentuation.

(3) **Co-arctation of the aorta.**—Here the patient is well built. The femoral pulsations are weak or absent. Anastomotic vessels could be seen both in front and behind the chest. Examination of the heart shows evidence of left ventricular hypertrophy and a systolic murmur might be heard all over the praecordium.

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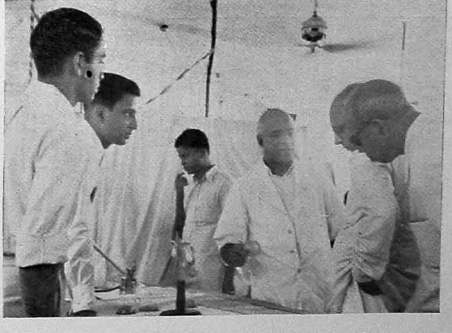
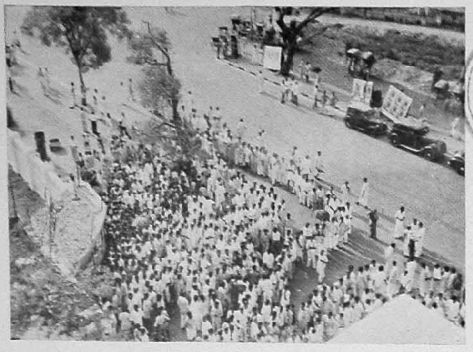
Reviewing the ancestors.



—By Gopalakrishnakhandige.

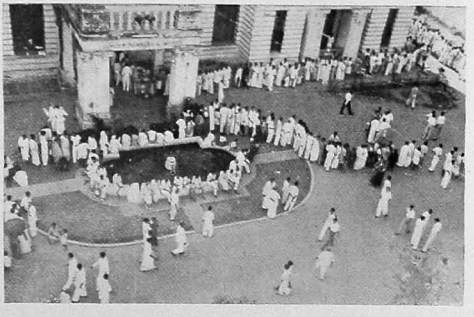
Preached against his practice.

MEDICAL EXHIBITION.



The Madding Crowd.

—By Gopalakrishnakhandige.



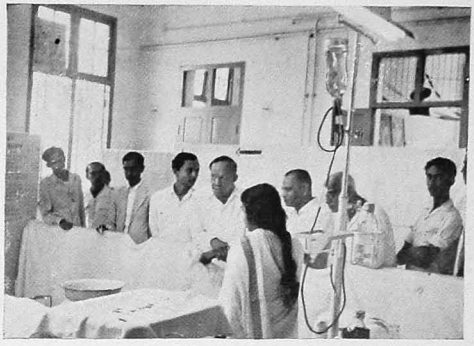
The Queing Crowd.

—By Gopalakrishnakhandige.

The Learning Crowd.

—By Gopalakrishnakhandige.

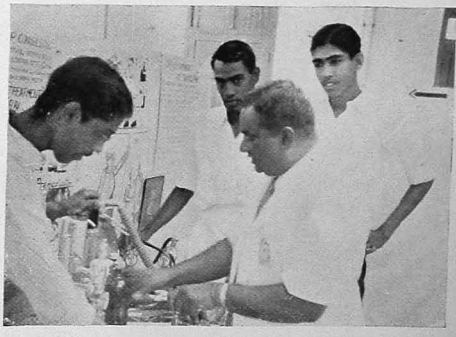
MEDICAL EXHIBITION.



Great expectation !

—By Gopalakrishnakhandige.

Expert handling.



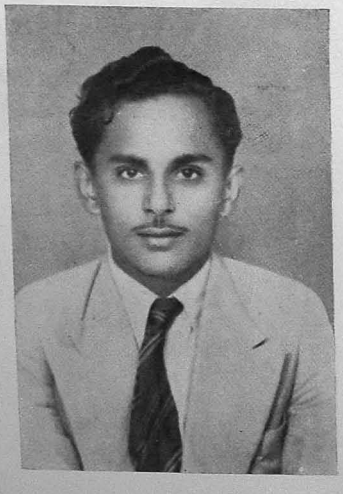
—By Gopalakrishnakhandige.

Walter-Mitty ?

—By Gopalakrishnakhandige.

He filled the heart.

—By Gopalakrishnakhandige



Dr. Rajasekhara Reddy, B.SC., M.B.B.S.,
He played all his games well.

Happy Reminiscences of our Exhibition

C. PADMANABHAN, B.A.

I wish to dedicate this article to that 'Power' which inspires and allures to take me to that realm where I can visualise more and more novel aspects of the medical line.—(C.P.)

THE long felt urge of conducting an exhibition in our college premises was materialised this year. We had to exhibit various preserved specimens, models and other matters of medical interest. We promised pleasure to the public by proclaiming a display of the secrets of the body —the anatomical, physiological and pathological aspects of it. The public were also aware of the other attractions of our college. To get a good collection we made a humanitarian approach to the mass. We wanted money, pocketful of money, plenty of money. The public were given to understand that what little money they offered was to be utilised to the uplift of the diseased and disabled of Pakkam and surrounding rural parts. The day approached. Our students were free from college work and had time to think. They resolved wisely to utilise their time in serving for the exhibition. What was the other day an open space, bounded by four walls with scattered tables and chairs, had been turned overnight into nice sections. The competitive spirit to make a good display of each department was aroused. Our meticulous preparations were at an end and the exhibition was thrown open to the press and the public.

Under normal circumstances a visitor took at least four to five hours to go through the exhibition. Such being the case it is infeasible to make an attempt to exhaust the humorous aspects of each section. Sections like psychology and V. D. were responsible for the stagnation of the crowd and they detained a large queue in waiting. In the health check-up counter a good profit was realised. The ape in one department was constantly reminding us that we are the descendants from it. In one corner the secrets of family planning were initiated into the public mind openly. Even the eminent surgeons were cowed to attend to our surgeon's oration though not operation. The plucked heart worked in a sinking rate.

The smoked drum moved smoothly but never gave a proper curve. The pharmacologist confessed no cure for birth or death save to enjoy the interval—he could offer only a drug like pain balm to alleviate head ache. It was a pleasure for the public to watch our girls handling the frog's heart. Bottles of blood had been syringed out and many a pocket thinned out to help the diseased and distressed.

The staff and students had a busy time during those days. We felt as though there was a festival celebrated in our college for days together. We sweated from the morning till late in the evening. Many a time we had to satisfy ourselves with an unfinished lunch. We had no time in the evening to have a wash or at least to have a look at the mirror. We applied our heart and brain to make every exhibit of our sections look tidy. All the queries, from the intelligent as well as the ignorant were answered. Most of the volunteers worked continuously for more than one shift. A few became allergic to the work and developed signs and symptoms like fatigue, 'flu and fever'. But never were they carried away from their work, by such physical weakness..... It was a proud privilege of our volunteers to explain the various intrigue details to the visiting city students. Our girls were looked with an eye of envy by their friends. Some times our girls too envied their friends who visited with their families. The more the number of visitors, the more precise was the explanation given. A bevy of girls used to come now and then in blue and white or in green and white. All these and others got explanations with ready attention. Amidst this strenuous work, we could enjoy some fun also. The student in charge of the microphone was entertaining the public with his prattle and melodious music. Sometimes cream, cake, coffee or fruit was pushed to the fellow volunteers forcibly. Whether they liked to have or not, they had to oblige, since it was done in their interest. Occasions needed such feeding, for they could not divert from their heavy job of explanation.

The officers in charge of our exhibition were working like ghosts. Rarely they would be seen in the departments; sometimes perhaps along with a minister. They would be moving all in hurry. There might be an urgent message to the President. The loudspeakers would bawl out requesting him to report. He would take his own time (to hear the announcement) and would come out from some corner with his usual smile on his face. The Secretary and the Treasurer were kind enough to provide ample bata to the working volunteers. Yet we had a hell of time with the canteen coupons they had issued. When we would send for cream, only coffee would be available. When we actually got something, the stuff would be neither cold nor hot One person who always felt the pulse of the volunteer-mind and was voicing all of us with regards to any disputed

matter was our beloved a.....a..... He always reminds us of the quotation of a French rebellion: 'The mob is in the street. I should know whither thery are going..... For I am their leader'.

At the end of the exhibition, one might get a decrease in weight by a few pounds—this was the impression we had in the beginning. But what had resulted was, just the reverse..... We worked and at the same time enjoyed the fun of it too. We moved with all the people, had better contact and better understanding and knew one another well. Apart from these major gains we can add by way of completion that our rural relief wing had got swollen with funds only to offer us better and better chances to serve in the village with good financial backing.

The exhibition took us away from the study worries for a good number of days. The minute the exhibition was over, it had left us again to our books, wards and other troubles. The countless hours we spent on this appear to be a waste in the study point of view. But it is not true. We had qualified ourselves to get a pass more easily. The sincere volunteer who had tried to understand and retain the knowledge which the exhibits imparted on him or her had gathered much better than what he or she could get through books. Our professors know, we had to master the subjects as we explained and explained repeatedly. Sir A. L. Mudaliar, our Vice Chancellor, after his visit was quite rational to opine that the medical exhibition afforded education not only to the public but to the people of the medical and other allied professions. Well, dear friends, you didn't know what an ocean of medical knowledge you could acquire. We thank our professors for having helped us to study the subjects in this pleasant way.

Physicians take Gold, but seldom give:
They Physick give, take none: yet healthy live.
A Diet they prescribe; the sick must for't
Give Gold; Each other thus supply-support.

—*Epigrams Book I, No. 53.*

Collegiate Champions

"COLLEGIATE Champions"! These words hailed and cheered us at the close of the last season. This enviable position was mainly due to Korah and his XI and the exciting and thrilling victory on the Marina.

This season we have practically the same team but for a few changes Muthuswami, Krishnan and Madhava Rao.

Muthu replaces Gopinath Rao to open the attack and though not possessing the swing and swerve of Gopinath he can make the ball lift most awkwardly and consternatingly. Madhava Rao is our new find. He has the makings of a good spin bowler. He turns it in from leg, bowls an occasional googly and what's more he puzzles the batsmen to juggle their feet! He will certainly be an asset to the College team in the years ahead—specially now, that our Champion Asgar Ali is threatening to retire from Big Cricket along with the more famous test bowler Mankaud.

I. D. S. Mani our senior professional has made a welcome return. He is as good a hitter as ever he was. His only handicap—if handicap that is!—is that he seems a bit thicker around the waist but despite that, he is light on his feet and as fast as any of us between the wickets.

A word of thanks to Mr. Swaminathan, for his invaluable experience and advice which he has always been willing to give the team. He has done much to build this team of ours. Our gratitude too, to a few college friends and outside cricketers who have so often bowled and fielded for us at the nets.

In our two practice matches we did extremely well to beat two of the leading clubs in the city. Our congratulations to Visvanathan on his hard hit century; Madhava Rao on his courageous bowling and Vaidyanathan on his brilliant all round performance.

In the collegiate league we are at the top. Our encounter with the Law College, was looked forward with mixed emotions. Apart from the Medico-Legal aspect—the lawyers were keenest and toughest rivals—on the

field. They certainly were a far superior team with state players and varsity blues. But as it does, so often happen in this funny sunny game 'Fortune Favoured the Brave'.

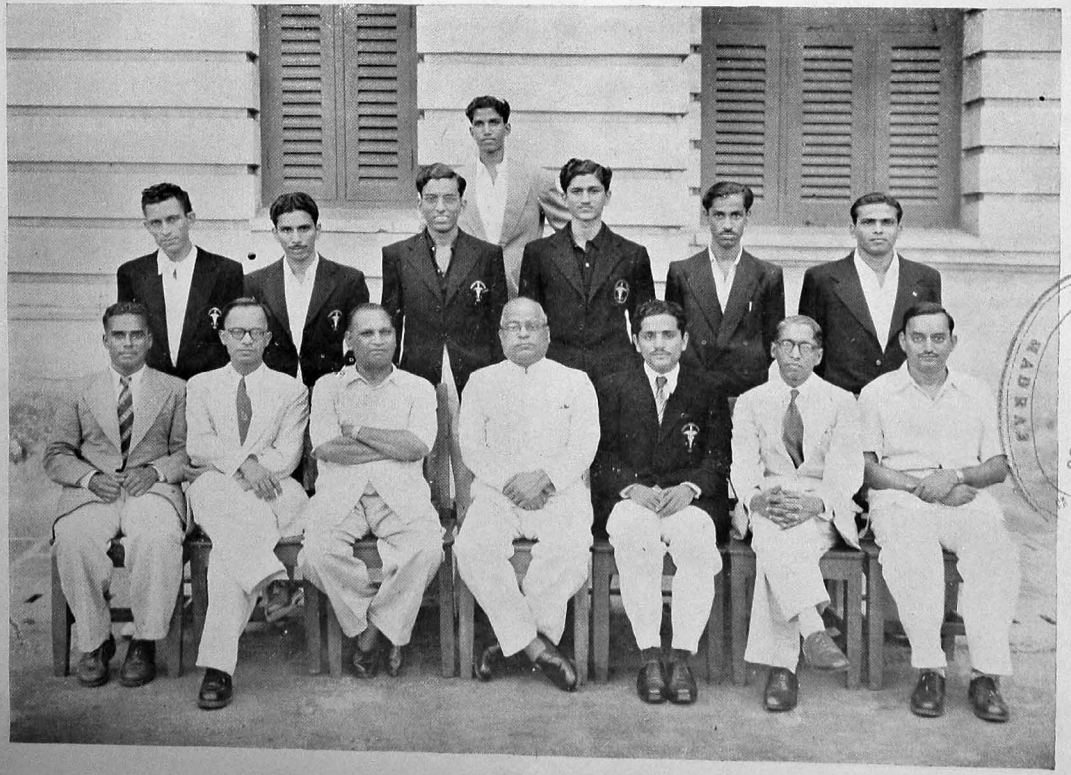
Our groundsmen Messrs. M. Jhool & Co., prepared us a sporting wicket. These sturdy little lads have always done us a good though humble job. We are indeed grateful to them. We made first use of the wicket and after scoring our customary 200 decided a halt. Korah and Visvanathan gave us a flying start. But a minor collapse followed with Wilson being bowled for a blob and Ramamoorthy being run out. But then stepped in that large hearted Vaidhy and the broad chested Mani. They collared the lawyers, Vaidhy doing it with grace and power, while Mani's Beefy shots all around the field kept the fields men on their toes. It was a glorious pull through!

Later Kondal Rao and Rajagopal made merry hay while the going was gay. More jubiliation was to follow when the formidable Law batting side was bundled out for a paltry hundred or so. That was something great!

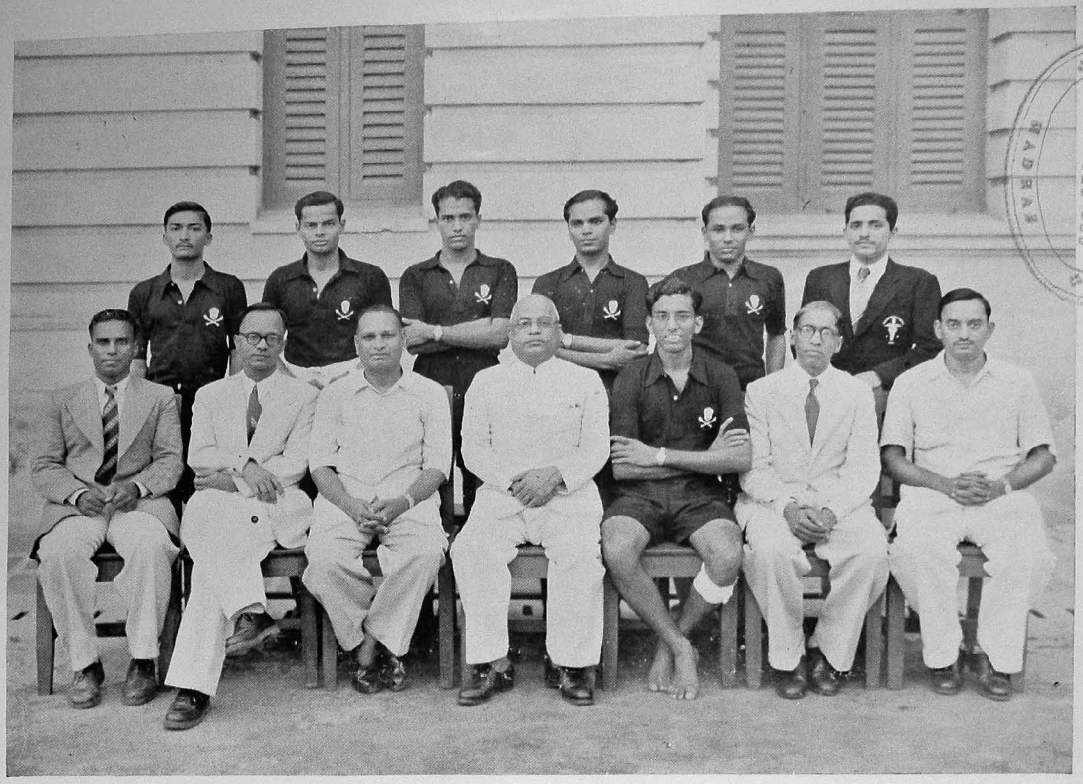
The match against the Loyola almost gave us the frights. Here, Fortune favoured those who took their catches. Our fielding has been generally good Kondal, Krishnan and Vaidhy being outstanding. But in this match we dropped some sitters. It was only a stubbern 6th wicket stand—by 'stay-put' Kondal and the lanky Muthu that saved the day. Later Visvanathan played an innings mixed with caution and aggression though at times he gave us an impression that his eye was more on the passing electric trains than on the ball.

The Loyola match showed us in our true colours. We had to fight our way through almost overwhelming odds. But we held through in the right spirit and true to the old maxim that "no match is won until it is lost". Like Leads to the Englishmen, the Loyola ground to the Medicos has always been a bogey. Nevertheless our hats off to Kripal Singh and his gallant cricketers. For Loyola, Kripal played a gem of an innings—truly a Captain's knock. We look forward to meeting them in the finals, and we shall certainly do our best to retain that coveted trophy. Be that as it may, in victory or in defeat let us remember the simple advice and the oft quoted lines of a saintly sportsmen 'Whether therefore Ye eat or drink or whatsoever Ye do, do all to the glory of God'.

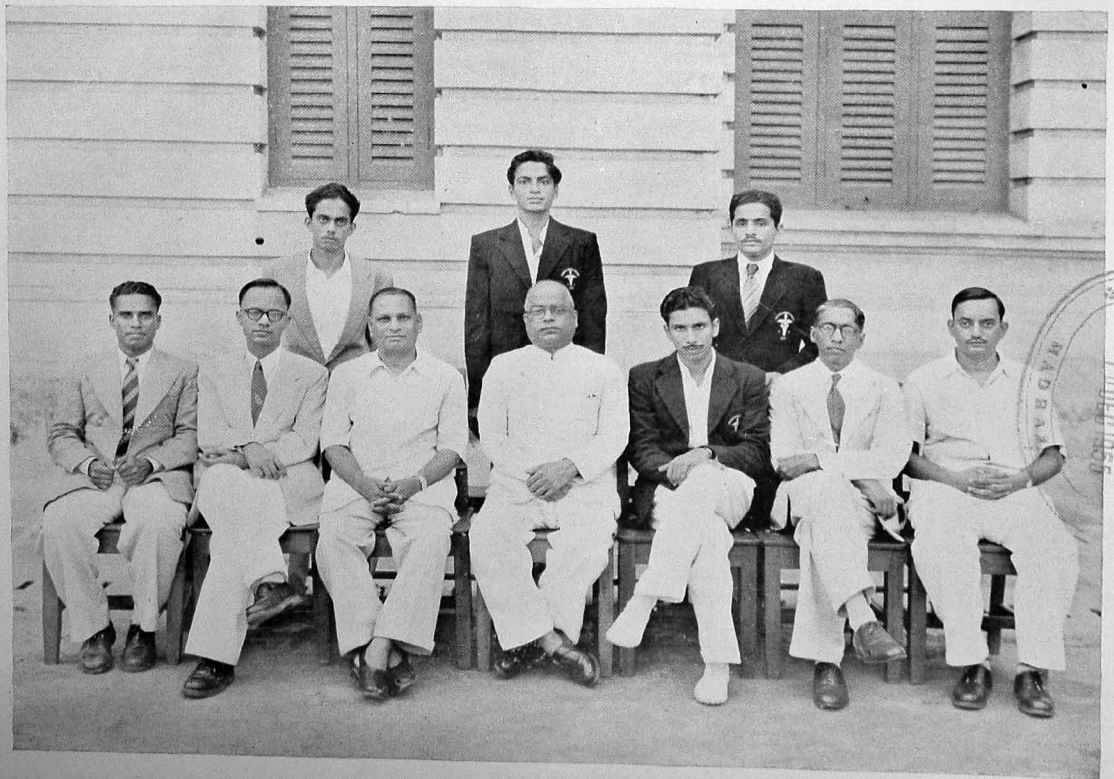
—★—



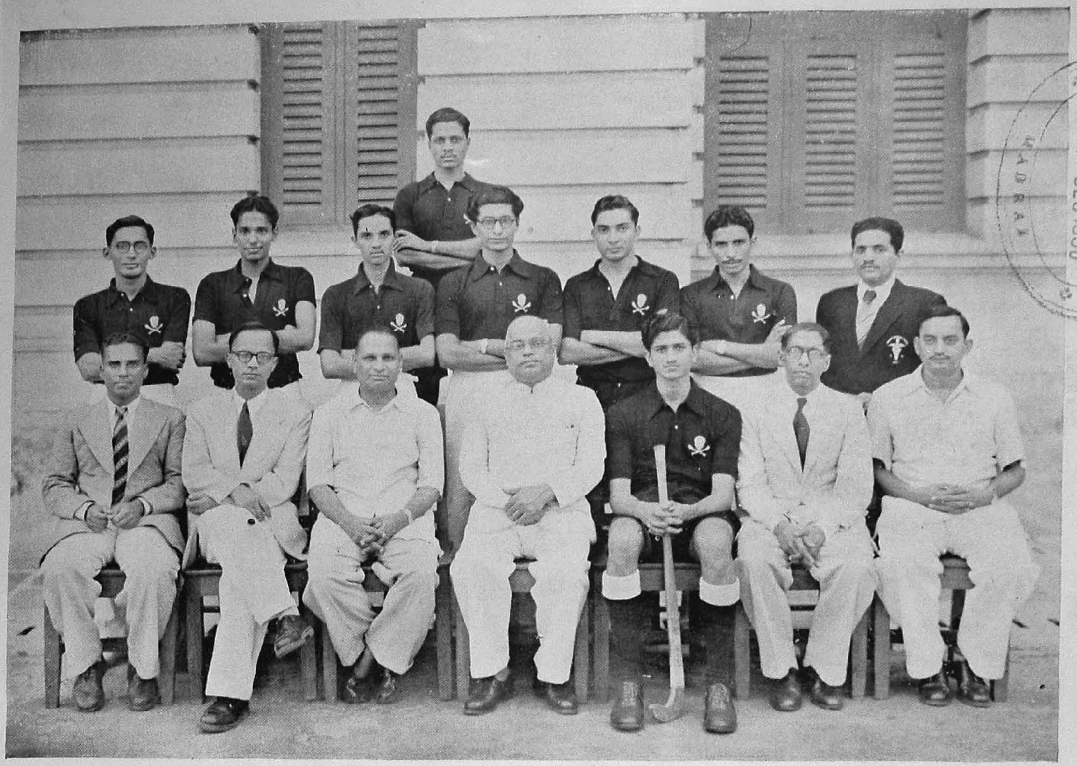
SPORTS COMMITTEE 1953—'54.



VOLLEY-BALL 1953—'54.



TENNIS 1953—'54.



HOCKEY 1953—'54.

Oh! My beloved in blue

For the past o'er a week, I am moody and sad,
Friends of mine say, that it is pretty bad,
Me, they advice to enjoy the day
To revel in the present, but how could I?
When contemplation of the past is agony
And the future all black as ebony.

She was the apple of my eye
Though many like her did I 'buy'
For joy and me, she lay as a link betwixt
She was the star to which did I hitch
The wagon of my life—

OH! MY BELOVED IN BLUE!

So ravishing to the eyes, so nourishing to my soul
So blue and beautiful to behold.

OH! MY BELOVED IN BLUE!

With features fine and curves so perfect
Like a tendril around my bosom she twined

MY BELOVED IN BLUE!

She was so modest and ne'er did boast
Nor ever pretend she was so grand.
To me she was an angel and never to be lost
Or—so I thought—after all a mortal's thought.
I was mistaken, for like other jades
She too deserted me and drove me to hades
A piece of poor comfort—not for another shade.

Even before, we used to part for a while
But this was always done with a smile;
For everytime she did come back
Stiff and gay—so chic-chac;

OH! MY BELOVED IN BLUE.

But alas! last week she left me for once
Never to come back, that was the last once
My life she wrecked; my dreams she shattered,
Like an automaton I lived and battered
And with the rise of the sun, on every morn
I heave a sigh of sorrow and scorn
And ask myself:—"After all, is life worth living?"

Oh, my beloved blue shirt, the shirt I loved so most
Why were you lost, by the dhobi, his Ghost!
Oh, my beloved in blue, you were only an year old
Oh, my beloved in blue, for you my soul I have sold.

—BY ACHUTHANKUTTY MENON.

—★—

Madras Medical College Student's Clinical Society

(U. TARANATH)
Secretary.

President.—Dr. B. Ramamurthi, M.S., F.R.C.S.

Secretary.—Mr. Taranath—Final year.

Treasurer.—Mr Chacko.

MEMBERS OF THE EXECUTIVE COMMITTEE

Final year Senior	....	Mr. M. Srinivasan. Miss. S. Gnanasundari.
Final year Junior	....	Mr. P. Sivaramasubramaniam. Miss K. Anusuya.
Fourth year Senior	....	Mr. N. Lakshmipathi. Miss. T. S. Kanaka.
Fourth year Junior	....	Mr. R. Narayanan. Miss. C. Minnie Ponnappa.
Third year	....	Mr. V. Ramachandran. Miss. V. Narayani.

INTRODUCTION

IN spite of the lot of difficulties, our society was able to pass through its infant stage tolerably well. I am rather proud of the fact that the above achievement is in full due to the untiring enthusiasm of the members of the executive committee and the co-operation we got from the students.

We began well with the inspiring inaugural address of Dr. B. Govinda Reddi on 20th June 1953. He directed us how to conduct the meetings and in what way we have to approach the cases during our discussions. Our vice principal, Dr. R. Subramaniam, honoured us by his presence.

PROCEEDINGS

I. Meeting.—20th June 1953. President was in the chair. Dr. M. G. Prabhu was the honourable observer. Dr. B. Govinda Reddi delivered the inaugural address. The folowing cases were discussed.

Lieutenant Colonel K. P. G Menon's Unit:

(*i*) A case of Lung Abscess.—by Mr. K. M. Kalappa—Final year.

Dr. K. S. Sanjivi's Unit:

(*ii*) A case of Kartegener's Syndrome—by Mr. R. Narayanan—Fourth year.

Dr. A. Srinivasan's Unit:

(*iii*) A case of Mediastinal Syndrome—by Mr. C. B. Mohandas—Final year.

II. Meeting.—18th July 1953. President was in the chair. Drs. Balasubramaniam, Venugopal Shetty and Sankaran were the honourable observers. The following cases were discussed.

Dr. U. Mohan Rao's Unit:

(*i*) A case of Swelling over the medial end of clavicle—by Mr. P. N. Raman—Final year.

Dr. R. Mahadevan's Unit:

(*ii*) A case of an abdominal Tumour—by Mr. Raghuveer—Final year.

Dr. K. S. Sanjivi's Unit:

(*iii*) A Heart—case (clinico-pathological)—by Mr. R. Narayanan—Fourth year.

III. Meeting.—1st August 1953. President was in the chair. Drs. K. V. Krishnaswami, Narayana Shenoy and Johnson were the honourable observers. The following cases were discussed.

Dr. J. A. S. Masilamani's Unit:

(*i*) A case of constrictive pericarditis—by Mr. Ananthachar—Final year.

Dr. U. Mohan Rao's Unit:

(*ii*) A case of multiple myeloma—by Miss. N. P. Leelavathi—Final year.

Mental Hospital:

(*iii*) A case of paranoid Schizophrenia—by Miss. T. S. Kanaka—Fourth year.

IV. Meeting.—11th August 1953. Dr. K. V. Krishnaswami was in the chair. Dr. Varma was the honourable observer. The following cases were discussed.

Dr. A. Srinivasan's Unit:

(*i*) A case of pancoast's Tumour—by Mr. N. P. Paul—Final year.

(*ii*) A case of Marcus Gunn phenomenon—by Miss. M. Leela meenakshi—Fourth year.

Dr. M. Krishnamoorthi's Unit:

(*iii*) A case of hypernephroma of left kidney—by Mr. M. S. Venkataraman—Fourth year.

Dr. U. Mohan Rao's Unit:

(*iv*) A case of Hashimoto's disease of thyroid gland—by Mr. P. N. Raman—Final year.

V. Meeting.—22nd August 1953. President was in the chair. Drs. Moses and Subadhra Devi were the honourable observers. The following cases were discussed.

Lt. Col. K. P. G. Menon's Unit:

(*i*) A case of heart disease—by Mr. Jayaram Panickar—Final year.

Dr. E. V. Kalyani's Unit:

(*ii*) A case of pseudomucinous cystadenoma of ovary—by Mr. A. Varadaraja Sundaram—Final year.

(*iii*) A case of pyosalphinx—by Miss Savithri K. Mardi—Final year.

CONCLUSION.

The students took part in the discussions in right earnest, and it was appreciated by one and all as being of a high order. However, I am very sorry to remark that most of the members of the fair sex do not take any active part in the discussions. With much regret, I have also to say that we are very much lacking in getting financial aid from the students. So we are compelled to give up the end-talk over a cup of coffee which in my opinion kept up the attendance to a certain extent. But still we do hope to get the fullest assistance from the students.

During all these days the President had been a constant source of encouragement and help in spite of his heavy ordeals with disordered brains and nerves. Whenever we went astray in the darkness, he served as a beacon light to us guiding us from all the pitfalls and difficulties in our discussions.

At this juncture, it is entirely ungrateful on my part if I forget to mention the inspiration and help given by our Dean. I should in particular mention his permission to use the mike and speaker set of General Hospital for our meetings. We are greatly indebted to him for taking so much care and interest in our activities in spite of his heavy and responsible duties. My thanks are also due to the college sergeant Mr. Ayya Naicker for arranging the halls for our meetings even during holidays.

I congratulate the students, who presented interesting and rare cases of much clinical value, for bravely facing the questions shot at them. Particular mention has to be made here to the presentation of clinico-pathological and psychiatric cases which aroused great interest and enthusiasm among the students. Lastly I wish to thank you all on behalf of the members of the executive committee and myself for the constant encouragement and sincere co-operation you have extended to the progress of the society.

Thanks a lot.

—*—

Special Supplement

FOR

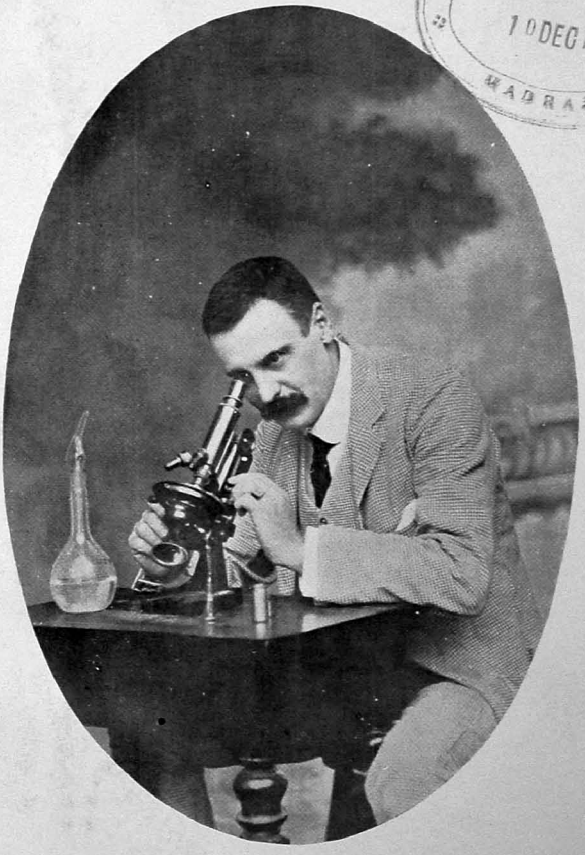
THE GOLDEN JUBILEE OF THE DISCOVERY

OF

The Micro-Organism of Kala-Azar in 1903

BY

Major C. DONOVAN, M.D.
Second Physician, Government Hospital and
Professor of Physiology, Madras Medical College.



DONOVAN

The indefatigable Investigator.

★ "The point at which a man lived, in space and time, the environment, and the historical movement, are of extraordinary importance. The individual then appears as exponent of these forces, as a representative of a trend of a period."

Henry. E. SIGERIST,

(*History of Medicine Vol. 1.*)

The Scientific Background

Advances in Tropical Medicine in the second half of XIX Century.

THE 19th century is rightly regarded as the Century of Progress in all branches of human activity, including advances in Medicine like development of Anaesthesia, Haemostasis, birth of Bacteriology, Antiseptic and Aseptic surgery, and preventive inoculation and control of spread of disease. It was, however, the last quarter of the 19th century that witnessed the most brilliant discoveries in tracking down the micro-organisms of Epidemic and Endemic diseases of the Tropics and the agents that spread the diseases, like filaria, Malaria, and 'Kala-Azar.'

A new era in history of medicine was commenced when superstitions, speculations, dogmas and doctrines in tropical medicine were replaced by observation, experiment and scientific demonstration. The harbingers of this New Age in India were Vandyke-Carter and Lewis, whose researches deserve to be better known to the present generation. Manson's pioneer work in connection with Filaria is better known. Having noted the nocturnal periodicity in his patient, and correlating the exact time of appearance of brown mosquito of Amoy, Manson deduced and forecast that this insect might act as a carrier of Filaria. This theory, he proved to be correct, by his experiments and demonstrations of the life history of Filaria Bancrofti, in Culex Mosquito, in 1879.

On 6th November 1880, Alphonso Laveran, a French Army Surgeon, working at Constantine in Algiers, made the great discovery of the parasite of Malaria. 'It was in some degree, a chance discovery' says Manson-Bhar. Though the Italian Malariologists to whom the preparations were shown were still highly sceptical, Laveran's finding was confirmed in 1882. There were still divergent opinions regarding the transmission of Malaria. The turning point in the investigation of malaria occurred in 1894 when Manson published mosquito hypothesis "In it, with cold logic and cogent argument, Manson drew an analogy between transmission of Malaria and that of Filaria". Then commenced a remarkable "partnership in science", beneficial to the Tropical World. Manson wrote a series of letters in which the veteran instructed, guided and encouraged youthful Ronald Ross, full of enthusiasm and energy but

lacking knowledge and experience in medical research. On 20th August 1897, Ross discovered in a small laboratory attached to a hospital Secunderabad, pigmented oocysts in the stomach wall of dapple winged mosquitoes (Anapheles Stegomaya). The rare and precious preparation was sent to Manson in London, who confirmed Ross's findings and cabled back the assurance "You are on the right track at last". Under the capable guidance of Manson, Ross started and continued his experiments in Calcutta on bird malaria. The complete cycle was worked out in the sparrow and the liberated sporozates were traced to the salivary glands of the mosquito. But an unexpected obstruction blocked further investigation. On account of intense local prejudice, Ross was not able to complete, at that time and at the same place, the enquiry into the transmission of Human malaria. In 1898, the Italian workers, by working on human volunteers observed pigmented oocysts in a mosquito fed in Rome on a patient harbouring crescents in blood. They also succeeded in infecting a volunteer with malaria by mosquito bites. In 1900, Grassi, who had no medical training, published a monograph on transmission of malaria by exposing his son, P. T. Manson, in London, to the bites of a mosquito infected in Rome by Grassi. Manson also performed the reverse experiment by the erection of a mosquito proof hut in Ostia in Roman Champagna in which three of his pupils lived during the most malarial months, July to October, 1900, without contracting malaria.

Towards the beginning of this century, the attention of medical investigators in Africa was focussed on Trypanosomiasis while the American workers were struggling to prevent the devastation caused by Yellow fever. This was the background of medicine when Captain Donovan joined the Madras General Hospital as a physician and found cases of long continued fever which baffled investigators at that time.

The exact sequence of events leading to the announcement of the discovery of the causative organism of Kala-azar by Major C. Donovan, and the naming of the parasite as Leishman-Donovan body deserves to be retold during the semi-centenary, of the discovery by Capt. Donovan, at Madras.

An article in B.M.J. (May 40, 1903) by Major W. B. Leishman, then Professor of Pathology in the Royal Army Medical College, Netley, referred to the then recent discovery of Trypanasomiasis in Africa and suggested the possibility of the occurrence of Trypanasomiasis in India. He spoke of certain class of cases which he called, for want of a better name, cases of Dum Dum Fever, Dum Dum being a notoriously unhealthy station seven miles from Calcutta. Leishman writes, "I had a short personal acquaintance with this station in 1890 but the present remarks refer to the features of this form of Indian fever as presented by soldiers invalided on account of it from Dum Dum to Royal Victoria Hospital, Netley, during the past three or four years..... The cases were, as a rule, regarded

as malarial in origin and presented on admission, an extreme degree of cachexia.... clinically these cases presented no very definite features distinguishing them from other and commoner forms of Tropical Cachexia, the chief symptoms being an irregularly, remittent type of fever, grave anoxmia progressive muscular atrophy and great enlargement of the spleen. In none of these were malarial parasites found in the blood, which I now think to have been due to Trypanosoma infection. It was at the necropsy of one of these cases of Dum Dum fever that the appearances described below were noted in the spleen. Private J. B., aged 23 years, invalided from Dum Dum, was admitted to Netley Hospital in April 1900 and died 7 months later after presenting all the features of the Dum Dum fever. Repeated examinations of blood smears did not reveal any parasite. At the necropsy, the spleen was found to be greatly enlarged (2 lbs. 7 ozs.) and much congested. Spleen pulp was extremely soft and friable, the organ sterile on culture. To quote Leishman again " on making smear preparations on the splenic pulp, I was struck by the curious appearance, among the spleen cells and red corpuscles, of enormous numbers of small round oval bodies, 2-3μ in diameter which corresponded to nothing I had previously met with or had been figured or described. They stained faintly with methlene blue and with hematin showing with these stains a sharply contoured circular or oval shape but no definite structure, but on staining them by Romanowsky's method they were found to possess a quantity of chromatin of a very definite and regular shape which clearly differentiated them from blood platelets or possible nuclear detritus..... These little bodies were freely scattered among cells—as a rule isolated one from the other but here and there aggregated into clumps composed of 20 to 50 members. As to their meaning I was at the time completely at a loss, not could other observers to whom I have from time to time shown give me any clue as to their nature". That was in 1900.

After cases of Trypanosomiasis in man were reported in parts of Africa in 1902 and 1903, Leishman was studying the disease in rats. On examining a rat which died of Trypanosomiases, he found in the blood and organs, bodies practically identical in shape and staining reactions with those found in the spleen of Dum Dum fever. Leishman therefore considered these " Chromatin bodies represented the macronucleii and micronuclii of the adult trypanosomes ", and that these structures were practically all that remained of the parasite, the rest of the body and the vibrator membrane being less resistant to degenerative changes, having disappeared ". As Dum Dum fever or kala-azar might be due to Trypanosomiasis, he suggested that necropsies, in such cases should include staining of smear preparations from spleen and liver for degenerative forms of parasites and also careful examination of blood films of fever patients with the newer techniques and modifications suggested by Laveran, Ross and Leishman.

The Mysterious Fever

Individual and official enquiries and reports on a new epidemic fever of Eastern India in the last century.

THE history of the recognition and of the repeated enquiries to track down the ultimate mysterious cause of a new variety of Fever, extends over a century, and the hub of all the investigations has been Bengal and its adjoining regions, Assam and Bihar. The actors in this epic fight against Kala Azar were all men of great energy, ability with scientific training. The numerous false clues and fallacies accepted at least provisionally as facts and truths should form an instructive chapter in history of Medicine, to warn the Scientific tyro of the possibilities of pitfalls in the unbeaten track through the forests of Tropical Medicine.

As early as 1832, one of the medical pioneers of Bengal, Twining, had described a fever, with many clinical features of K. A., in his book "Clinical Illustrations of the more important diseases of Bengal, with the result of an enquiry, into their pathology, and treatment" (Calcutta, Baptist Mission Press). About 1850, a fever with similar features swept over Bengal making its appearance in Jessore District. A fever, which from its signs and symptoms, resembles K. A. existed in Rangpur and Dinajpur areas of Burdwan from 1862 and Dr. French gave a description of it in 1872-3, under the title "Endemic Fever in lower Bengal" in Indian Annals of Medical Sciences, Vol. 16, p. 419-485.

In Assam, the disease first attracted attention about 1875, some believe that it was the first appearance of the disease, while others consider that it had existed in the region before. The fever started in Garo Hills and spread to villages at the foot of the hills, and the valleys. About this there, appeared in Indian Medical Gazette a series of articles on "Burdwan Fever" and these were ultimately printed in 1876 as a book "Causes, symptoms and treatment of Burdwan Fever or Epidemic Fever of Lower Bengal" (New Edi. Churchill - 1876). It took some time for the official Medical officers and administrators to appreciate the presence of a new disease. Kala Azar (Blacksickness) was first mentioned in The Annual Sanitary Report for Assam for 1881 written by Dr. Clarke in 1882. In a similar report for 1882, a full description of the disease was given, based on a report by "Mr. McNaught, then civil Medical officer at Tura, Garo Hills, Assam, who studied 120 cases of disease". The report of the Sanitary Commissioner for Bengal for 1882 also contained an account of the fever, as a separate entity.

But, in the years following the discovery of malarial parasite by Levaran (in 1881) the fact that malarial parasites were found in blood of some of these fever patients led to considerable confusion between Malaria and Kala Azar. Again, there was some recrudescence of fever and revival of controversy regarding its nature in an article on "Kala Azar or Black death of Garo Hills" in I. M. G. Vol. XX, p. 83-84. "Commentary on the Diseases of India" by N. Chevers (Churchill—1886) referred to the fever. The Government felt the need for a careful investigation and Major Giles was entrusted with this work. After investigation of the epidemic in Assam, Giles submitted "A Report of an investigation into the causes of disease known in Assam as Kala Azar and Beriberi (Shillong, Assam Secretariat Press, 1890) A review of this report is printed in I. M. G. 1892, Vol. XXVII, p. 170. Giles expressed the view that the disease was "Undoubtedly Ankylostomiasis" Ross in his auto-biography comments as follows about this hasty report of Giles "Apparently, the reason why Giles considered K. A. to be hookworm disease, was that he never met McNaught and was presumably never shown true cases of K. A." The local medical officers, who had seen many cases of Kala Azar resisted and opposed the opinion of Giles, frequently and vigorously. The Government then sent in 1896, Capt. Leonard Rogers to make further investigations, Rogers compared and reviewed the "Lower Bengal (Burdwan) epidemic fever with the present Assam Epidemic malarial fever (Kala Azar)" (I. M. G. Vol. XXXII, p. 401-408) Roger's conclusion was that the fever was Malaria. Stephens discussed Roger's report, in the same number of I. M. G. but differed from Rogers, and maintained that the fever was a separate entity. It was at this stage that Ross comes into the field. In 1898, the Government asked Ronald Ross to conduct further investigations and submit a report. At that time, Ross was engaged in intensive research on mosquito (Anaphelene) as the carrier of malarial parasite. He was ordered to start investigation, on Kala Azar also, and both enquiries had to be completed in 6 months. Ross felt that he could not attempt or satisfactorily carry out two enquiries at the same time. He represented that he wanted some more time for careful clinical work on Terai Sickness and suggested that Kala Azar enquiry may be postponed for a while. Ultimately, he begged to be relieved of his duties of investigating K. A. on account of severe strain on his eye sight due to the numerous microscopic examinations of the various types and parts of mosquitoes for malarial parasites. The D. G. I. M. S. simply replied that the work on malaria should have precedence but said nothing about Ross being released or excused K. A. duty. Ross lost his patience and in his reminiscences comments "With unconscious cruelty of stupidity or indifference, both requests were rejected" Ross also describes the situation in the following caustic but picturesque language "Columbus having discovered America, was ordered off to discover North Pole."

Ross started on what he calls "this wild goose chase" and reached Nowgong in the middle of September 1898. The passage in his auto-biography is worth quoting "It was now the centre of Kala Azar, which had

moved hither from Garo Hills. Dr. McNaught himself was in charge of the Hospital. I remained there, examining a number of cases, doing post-mortems, and taking depositions until October 21st. The only question now was whether K. A., was merely malaria or something quite different. The early stages were indistinguishable by me then; no wonder, because, most of them had double infections. But the later cases of K. A. showed an enormous enlargement of spleen and liver, with continued fever, which were, at best, not common, in simple malaria. On pricking these organs, in living patients at this stage, and also in half a dozen autopsies, I seldom found malarial parasite or pigment and hence might have rightly but rashly concluded at once that they were not malaria. Indeed, this was my opinion for some weeks". But, there was another possible explanation for the absence of malarial parasite—establishment of personal immunity to malaria. So Ross was misled into the view that it was malaria.

Ross went to Umluki, Silghat, Tejpuri, to take depositions of Dr. Lavertine, Dodds-Price, and McNamara, all men of great experience with regard to Kala Azar. Finally, towards end of October, Ross reached Kurseeng, where he commenced to draft his report.

In addition to the actual time spent on field work and investigations, the writing of the report took 3 months—due to the necessity of examining innumerable pathological details, or consulting various authorities. Ross's report on K. A. covers 90 foolscap pages in close print. (Government Press, Calcutta, 1899).

Nearly quarter of a century later, contemplating and analysing the reasons for his mistakes and failures, Ross regrets that he narrowly missed an opportunity of making another discovery—of the germs of Kala Azar. "The difficulty of my task may be gauged from the fact that most cases of Kala Azar were also heavily infected with hookworm and malaria.....that at that time, we did not generally use in India, the Romanowsky method of staining, which is essential to distinguish Leishmania. Even Manson, scarcely recommended it in the first edition of his book on Tropical diseases (1898).....I ought to have used it; if I had done so, I should doubtless have found the Leishmania myself, besides being able to stain my "Proteosoma —Coccidia" and germinal thread, better than I had done; but I had really no time to study new staining methods while in the midst of making fundamental differential experiments.....I think I saw Leishmania several times in small quantities of spleen pulp, which I often extracted from patients by means of a hypodermic syringe on payment of a *douceur* of 2 or 3 annas but I cannot be sure because the stain was not used".

One would like to conclude this neglected aspect of Ross's work with a passage which clearly brings out his humanitarian zeal and scientific enthusiasm. "But the malady was worse than either (Hookworm or

Malaria). Whole families, villages, Coolies' quarters, were affected and it was dreadful sight to see the poor wretches, nothing but skin and bone, living skeletons with enormous abdomens, children and adults, trying to keep alive by living in sunshine and death was almost inevitable. It is sights like these which make the medical investigator ". May we add here that such sights are still common today in and around Madras.

The XX century brought new investigators into the field and fresh explanations were put forward. In 1902, Bentley, misled by agglutination reactions, wrote on " Epidemic Malta fever in Assam—a short preliminary notice of certain recent discoveries relating to the true nature of Kala Azar." He suggested that it might be Malta Fever. (I. M. G. XXXVII, p. 337). In the first half of 1903 studying experimental trypanosomiasis in rat and reviewing postmortem findings in a case of Fever from Dum Dum area in 1900, Leishman suggested the possibility of occurrence of trypanosomiasis in India responsible for fevers in the Dum Dum area (B.M.J. I, p. 1252).

Madras, State or city, was not considered as an endemic focus of the new disease or variety of fever (Kala Azar) and no official Enquiry or investigation in this region was ever even contemplated, till, all of a sudden, Donovan announced his finding of unusual microscopic forms in the blood smear from the Spleen, of a boy who was suffering from Irregular Pyrexia, with no malarial parasite in peripheral blood and later repeatedly confirmed his first observations, by finding similar microscopic organisms in the smears of spleen juice, from cases of fever, in Endemic areas of Kala Azar in Bengal and Assam. It was the fruit of spontaneous voluntary and individual effort, and not the outcome of any official investigation or organised scheme of Research, financed and sponsored by any Scientific Body. If Donovan had submitted a scheme or asked for any financial assistance, he would have been laughed at, censured or transferred. With the life and work of Manson in China and of Ross in India, as ideals before him, Donovan, dreamed, dared, devilled and discovered the mysterious cause of the fatal disease—Kala Azar (Black Disease or Black Death) in 1903.

Myself when young did eagerly frequent
Doctor and Saint, and heard great argument
About it and about ; but evermore
Came out by the same door wherein I went.

—Omar Khayyam.

The Environment of Discovery

The General Hospital and Medical College in 1900—1903

ANY discovery in Medicine or any Science cannot be appreciated if it is viewed isolated from its background and environment, which is as vital as soil and climate to a flowering or fruitbearing tree. The discoveries of Vesalius, and Harvey, of Claude Bernard, and Helmholtz, of Pateur, Lister, Koch or of Laveran, Ross, Gorgas and Noguchi are the fruits of the physical and intellectual efforts of the entire epoch. The discoverer, is only a person or instrument, who has reacted in the most useful manner to the needs and problems of the times, endeavouring to be the most worthy representative of the age and generation, and was fortunate enough to succeed in unravelling the baffling mystery of the day.

To get a complete picture of the gross and subtle influences that led Donovan to embark on investigations, leading to his discovery, one must take a peep into the medical conditions of Madras and its adjoining regions and the set-up, of the medical chess-board in the city and the staff of the General Hospital and Medical College.

The most brilliant and versatile member of the I.M.S., Ronold Ross working as a medical officer in Station Hospital, in South India had been so distressed at the heart-rending sights around him that he wrote about 1890—95 a few stanzas, worthy to be rescued today from oblivion and printed in gold or painted in bold letters in the wards of the Hospitals, for the benefit of the budding medical scientists.

"INDIAN FEVERS"

"In this, O, Nature, yield I pray to me,
I pace and pace, and think and think, and take
The fever'd hands and note down all I see.
That some dim distant light may haply break.

"The painful faces ask, Can we not cure?
We answer, No, not yet; we seek the laws.
O,God, reveal thro' all this thing obscure
The unseen, small, but million murdering cause

Ross who was first impressed by the mosquito swarms in Bangalore started collecting various types and dissecting them for malarial parasites during his holiday in Nilghiries and made his discovery in 1897 in Secunderabad. Ross was stationed in Madras city for many years and later was a frequent visitor and a friend of Medical Officers in Madras.

Donovan, who graduated as M. D. in 1889 from Trinity College, Dublin, entered I.M.S. in 1891. After active service in the army for 4 years he acted as D M. and S.O. on West Coast for some years till he came to Madras in 1898 as Personal Assistant to S. G. He joined the staff of G. H. and Medical College in 1900. He was undoubtedly one of the most inquisitive minds and sensitive souls that responded, as Ross did, to the sights and suffering around him. With his training and his energy, his ambitions and ideals, with the epochmaking discoveries of Laveran and Ross to inspire and sustain him, Donovan also resolved to search for the "unseen small cause" of Unknown Fevers, so common in G.H. in the opening years of this century. But even the most powerful intellect, or the best equipped mind often fails to achieve the objective, or the maximum good, unless there is proper human environment, receptive, co-operative, at least, non-interfering and unobstructive, in the scene of activities. In retrospect, one feels grateful to Providence, for the "fair weather" and "Congenial atmosphere" in G. H. when Donovan was engaged on his research. The medical officers, all of them belonging to the I.M.S., the assistants, Anglo-Indians and Indians, the students and nurses, all played the game as a team and scored a goal over the rest of India. Personally, I prefer to compare the spirit and the achievement of the staff and students of G.H. 1903 to the building of a Temple by a guild of Artisans, full of fervour and faith. The Temple was for Medical Science for the cure relief or alleviation of suffering in India.

In 1900, the staff of the General Hospital, consisted of one administrative officer 2 surgeons 2 physicians, and a resident medical officer,—all posts reserved for and filled by European I. M. S. officers, who were transferred from one post to another in the Hospital, or in the City Medical Institutions or in the districts, in the Madras Province, according to the exigencies of service. These officers had collateral duties in the Medical College as professors and other medical duties as district surgeons, in charge of city institutions.

The administration of the Hospital and the College was vested in the Senior Medical Officer, who was superintendent of the Hospital, and principal of the Medical College. He was free from any professional or professorial responsibilities and was assisted by the R. M. O. in the work of the Hospital and by an Anglo-Indian senior assistant surgeon, on the staff of the College, who functioned as assistant to the Principal. Col. W. R Browne, who had been S. M. O. in 1901-2, was succeeded by Col. J. Maitland, who was for many years the senior surgeon (first surgeon) and professor

of surgery. Col. Maitland was one of the I. M. S. officers who came under the influence of Patrick Manson, collaborated with him in the publication of some scientific papers, and himself published a monograph on "Filariasis". Maitland's services to the Hospital and College were commemorated by a ward in the hospital and a medal in the College.

When Col. Maitland was promoted as S. M. O. the post of the senior surgeon and Professor of Surgery was filled by Capt. G. G. Gifford, who had been on furlough in Europe to visit Institutions and learn the latest methods of surgery. Later, Gifford occupied, with great distinction, the post of the superintendent of the Govt. Maternity Hospital and retired as Surgeon-General of Madras, in the early twenties, after the advent of Panagal Ministry. He has become a legend in Madras. It was he, who, with great foresight and courage, reorganised the old Maternity Hospital, extended and improved it beyond recognition, raised the standard of training to medical students, nurses and midwives.

The best local monument to his untiring efforts is the "Gifford School of Midwifery". The real monument, however is the reputation of the Hospital as the best in the East and one of the best in the world, for undergraduate and postgraduate training.

Col. Allison, had been for many years Second Surgeon and Professor of Anatomy. When he went on leave, Captains R. H. Elliot, Kirkpatrick, Niblock, acted for short intervals of time, till Major Simpson assumed office in 1903.

Major Robertson was First Physician and Professor of Medicine practically throughout the period. The second physician was usually Professor of Materia Medica. In 1900, Major F. J. Crawford held this post. When Crawford went on leave, Capt. Donovan who was P. A. to S. G. acted as the second Physician for a short while, and as Professor of Hygiene & Bacteriology, before he also went on furlough. It was during this stay in Europe that young Donovan visited the Hospitals, Medical Colleges, interviewed older and seasoned medical investigators, learned the technique of microscopic examination, through which he became the discoverer of K. A. bodies. It would be interesting to know where he worked and learnt his haematologic technique, whether he spent sometime with Manson, Ross, Laveran and other authorities in Tropical Medicine.

The R. M. O. of G. H. was also the Professor of Pathology in 1900 and the officer holding this post was H. St. John Fraser.

Having mentioned the posts, officers, who had duties both in G. H. and Medical College, in the opening years of the XX century, a few words have to be added about the other posts and officers in the city with teaching

duties in the Medical College. Even tn those days, as ever since the beginning of the College, the Chemical Examiner to the Government of Madras, was the Professor of Chemistry in the Medical College. He was also the lecturer in Medical Physics. Major J. L. Van Geyzel had been in that office from 1890. His long connection with the College is commemorated by a prize in Chemistry. Major A. E. Grant, was the Professor of Hygiene, though he was attached to the Sanitary Commissioner's Department (now D. P. H.) He had edited the Hand book of Hygiene by Col. King When Maj. Grant was sent on other duty, in 1902, Capt. Cornwall succeeded him, as professor of Hygiene.

Lt. Col. W. B. Browning, Surgeon of the Fourth District, Superintendent of Royapettah Hospital, was Professor of Medical Jurisprudence and Surgeon, to H. E. Governor of Madras and when he was on leave, Capt. Molesworth officiated. Col. A. J. Sturmer, was the Superintendent of Maternity Hospital and Professor of Midwifery, Diseases of women and Children. He had worked with Ronald Ross and was adept in spotting malaria parasite. Capt. LeePalk, Superintendent of Lunatic Asylum, was Lecturer in Mental diseases and during his absence on leave, Capts. C. B. Harrison, and Bryson, acted for him. Col. T. H. Pope was Superintendent of Eye Infirmary (Ophthalmic Hospital) Professor of Ophthalmology and also Professor of Physiology. There was one post which seems to have existed then, though abolished a little later, with the advancement of civilisation in Madras. There was a post called "Lecturer in Midwifery for female Students". Miss V. Adams, M.B. & C.M. was the proud but solitary member of the fair sex on the staff of the Madras Medical College.

Between 1900 and 1901, the staff of the Hospital and college was reorganised and augmented, to meet the needs of an uptodate teaching Medical Institution worthy of recognition by British Colleges As an illustration, the changes that were introduced to improve the standard and efficiency of teaching Basic Sciences, Physiology and Pathology may be briefly mentioned. When Col. Pope who had been Professor of Physiology and Ophthalmology from 1894 went on furlough Capt. R. H. Elliot, was posted to act as Supt. Ophthalmic Hospital and Professor of Ophthalmology. Elliot reorganised the Hospital, planned School of Ophtalmology and won world wide recognition as a pioneer in his field. For the first time in the history of Medical College, the teaching of Physiology was separated from the Professorship of Ophthalmology. Major F. J. Crawford, who was then Second Physician, G. H. was appointed Professor of Physiology. When Crawford went on leave, Donovan was also on furlough, and Capt. F. D. S. Feyrer, posted as Second Physician, was also the Professor of Physiology for a short while. Major Crawford returned to Madras, in 1902, as Second Physician and Professor of Physiology.

On the medical side, two new posts were sanctioned, the posts of third and fourth physician. The R.M.O., was relieved of his duties as Professor of Pathology, attached to the post, and the third Physician was made Professor of Pathology. Capt. H. St. John Fraser, who was acting as R.M.O. & Professor of Pathology was appointed to fill the new post. In that vacancy, Capt. Miller and Capt. Elwes acted as R.M.O. When Fraser went on furlough, Capt. C. Kirkpatrick, took his place as third Physican and Professor of Pathology. The older generation of medical men in Madras will remember with pleasure their teacher of pathology who was also the Master at whose feet the Doyen of Indian Pathologists, Dr. Tirumurthy, himself learnt the art of postmortem examinations. Kirkpatrick, however, is known to the rest of the world, as an eminent authority in Ophthalmology, a competent and worthy successor to Col. R. H. Elliot as Superintendent of Ophthalmic Hospital. The fourth Physician in G. H. was allotted duties as Professor of Materia Medica & Pharmacy (there was then no subject like Pharmacology). Capt. G. G. Gifford was the first incumbant of the new post. When he went on furlough, Capt. P. C. Gabbett and Capt. F. D. S. Feyrer, were acting for a short while in 1901 and 1902 respectively. Then, in 1903, Capt. Symons became the fourth physician and Professor of Materia Medica. He later rose quickly through official ladder, became Second Surgeon and Professor of anatomy, first surgeon and Professor of Surgery, Superintendent of G.H. Surgeon General, Madras and retired as D.G.I.M.S. On the surgical side, the post of third surgeon was newly sanctioned and Capt. Niblock, was appointed. He was also Professor of Biology in the College.

A few words may be added here about the assistants in the various departments of the Hospital and College. From 1900, Capt. V. J. Staggs, I.M.D. was assistant to the Professor of Materia Medica and was also Senior assistant in charge of Principal's office while Assistant Surgeon, F. A. Wynne was asst. to the Professor of Medicine and Pathology, Lecturer in Medicine to the Hospital assistants department, Curator of Museums, and Lecturer in clinical Medicine, Native Infirmary. Assistant Surgeon C. B. Rama Rao, whose portrait is adorning the Physiological laboratory, was assistant to the Professor of Physiology, lecturer in physiology to Hospital assistants Dept., and to the first year pupil of the apothecary class. He had been on the staff from 1889. Civil Apothecary G. Rama Rao, the first Indian Professor of Anatomy, commemorated by a medal, was demonstrator of Anatomy and general biology, Lecturer in medical jurisprudence to Hospital assistants Dept., from 1890. Civil apothecary M. C. Koman, was assistant to Professor of Chemistry and to lecturer in Physics, and was also lecturer in surgery to Hospital assistants' class from 1900. Civil apothecary T. Narayanaswamy Naidu, was assistant to Professors of Surgery and Medical Jurisprudence and Lecturer on Anatomy & operative Surgery to Hospital assistants Dept., and lecturer in clinical surgery, in Native Infirmary (Royapuram) from 1897. Senior grade Hospital assistant,

N. P. Ramaswamy Naidu, was assistant to Professors of Midwifery, Ophthalmology and Dental Surgery and to the lecturers on Mental Diseases and Midwifery to female class. He was, in addition, lecturer in Materia Medica, and Pharmacy and Minor Surgery, to Hospital assistants class from 1895. Dr. P. S. Chandrasekhar, B.A., M.D., & C.M. was assistant to the Professor of Hygiene and Bacteriology, Lecturer on Hygiene to Hospital assistant Dept. from 1895. He is the only veteran of the XIX century, still happily amidst us, though very old.

In 1903, Crawford was on other duty and Capt. Donovan, who returned from furlough, equipped with newer knowledge and zeal was posted as Second Physician and Professor of Physiology. It was in the wards of G.H., as second Physician, he watched the cases of fever examined the blood smears repeatedly for malaria, followed some of the cases to the postmortem room, secured sections and smears of orgâns like spleen and liver. His industry, skill in laboratory work, his initiative and perseverance would have been assets to any medical man and Institution but combined with his uncanny knack in clinical diagnosis, his capacity for intense work, and his passion for scientific investigation, these qualities marked him out as an investigator and one who was bound to be a discoverer. That he was a careful observer is indicated by the fact that he was able to remember and cite the minute details of post mortem appearance of some cases of fever that died in April 1903, though at that time, he had not the faintest idea of what these meant. Donovan had a fleeting vision of the deadly enemy, hidden and mysterious, in April. Leishman's report on the microscopic appearances in the rat with experimental trypanisomiasis, and the resemblance of these microscopic bodies to those he had seen in 1900 in the smears from the spleen of a soldier who died of Dum Dum Fever, immediately spurred Donovan to reexamine his earlier observations, to intensify his search for similar bodies in the postmortem as well as in antemortem smears of perepheral blood and splenic juice, till, on 17th June, good fortune smiled on him. He saw the same microscopic forms in the blood from splenic puncture of a boy suffering from irregular pyrexia. There was clinching evidence that these were not postmortem degenerations of trypanosomiasis as Leishman had suggested. For another six months, Donovan followed the clues, examined blood smears, took smears in p.m., and secured for his own examination, smears of splenic and peripheral blood from endemic areas of Kala Azar in Bengal and Assam. He studied these slides with a fanatic's zeal till the nature of the microscopic bodies was settled by him and confirmed by Ross, Laveran and Leishman. How exciting, how thrilling, how interesting and inspiring, to the students and staff to watch the birth of a discovery in Medicine in our wards in Madras! Donovan and his small circle of admiring staff and students must have felt like Gods in Heaven, far above the clouds, watching the Human Ants carrying their loads hither and thither.

Lieutenant Colonel Charles Donovan, I.M.S.

(Contributed By Mrs. HELEN O'NEIL—Col. Donovan's daughter)

CHARLES Donovan, born at Calcutta on 19th September 1863 died at Bourton on the Water, Gloucestershire, on 29th October, 1951, aged 88. He was the eldest of eleven children of 'Judge' Charles Donovan of the Bengal Civil Service, the latter, on retiring, residing at Ummera House, Timoleague, Co. Cork, Ireland.

Charles Donovan attended schools in Dehra Dun and Mussoarie before being sent to England in 1879. During his childhood in India, his chief interest was centred in natural history, particularly birds. Sailing from Calcutta he passed through the Suez Canal, opened for shipping since his parents' journey to India in 1862, when the latter had to proceed by 'diligence' from Alexandria to Cairo and thence by camel-cart to Suez.

On arrival at London Docks he went with his uncle to Birmingham en route for Dublin and Cork where he went to live with his grandfather the Rev. Charles Donovan, Rector of Ballinadee, near Bandon, Co. Cork. Here he received a sound grounding in the Classics from his grandfather before going up to Queen's College (Royal University of Ireland), Cork in 1880. He obtained his B.A. in 1885. After a year's medicine in Cork he went on to Trinity College, Dublin, getting his M.D. in 1889.

In July 1891 he received a commission in the Indian Medical Service and was sent to Netley, in Hampshire, for further training.

Sailing for India in the troopship, "Crocodile" from Portsmouth on 30th September, 1891, he arrived in Bombay four weeks later and was ordered to Madras. On arrival in Madras he was sent on to Mandalay in Burma, where he was stationed in Fort Dufferin until the following June. He then returned to Madras to join the 27th Madras Infantry at Royapuram, remaining here for nine months until offered a permanent position as medical officer to the 10th Gurkhas, then stationed in Burma. Proceeding to Mandalay he found the Regiment at Fort White in the Chin Hills. After a month at Fort White the Regiment moved on to Tiddim where they remained until transferred to Maymo in January, 1895. Twice during 1894 he obtained sick leave, first for malaria, when on one occasion

he was taken for dead and secondly for dysentery. After six months in Maymo he was transferred to Madras to take up a civil appointment at Quilon, on the West Coast of India. Arriving too late he was sent to Calicut instead and later to Cannanore and Mangalore.

In 1897 he saw active service on the Tirah Expedition (North-West Frontier) being attached to the Gordan High landers. Six months later he returned to Mangalore and in 1898 was posted to Madras to take up a civil appointment, first as Personal Assistant to the Surgeon-General. In 1901, he went on Furlough on leave. During the leave of 1901 he studied Practical Chemical Physiology in King's College, London, afterwards visiting Paris, Edinburgh and Liverpool to meet the great authorities of tropical medicine. Later he was posted as Second Physician in the Government General Hospital in Madras with collateral duties as Professor of Physiology in Madras Medical College.

On his return to Madras early in 1902 he continued his researches on tropical diseases, especially the study of Kala-Azar, which was prevalent in Georgetown. After a year's work on the disease he sent a short note for publication in the British Medical Journal (11th July, 1903, p. 79) announcing his identification of a parasite as the cause of Kala-Azar. In November of the same year Ronald Ross in a note to the B. M. J. (November 28th, 1903, p. 1403) suggested that the name of Leishmania donovani should be accorded to the new body, to which Dr. Laveran had already given the name of Piroplasma donovani. A paper on "Human Piroplasmosis" in the Lancet, (September 10th 1904, p. 744) gives an account of the discovery. Resarch on the Delhi Boil was also carried out by him. He was in touch with all the great personalities of the day on tropical medicine, as Leishman, Ronald Ross, Leonard Rogers, W. S. Patton, S. R. Christophers, J. W. Cornwall, Laveran and Mesnil. He was in England, again on leave in 1906 and 1911.

In 1912 he attended the All India Sanitary Conference held in Lucknow, contributing a paper and earlier attended a conference at Simla. In 1919, he carried out a research at the foot of the Nilgiris in connection with malaria in monkeys a report on which is in Indian Journal of Medical Research, Vol. VII, p. 717. He remained in Madras until his retirement in August 1919, working in the General Hospital till 1910 and thereafter as Superintendent of the Royapettah Hospital in Madras. He was also Professor of Physiology in the Madras Medical College till he retired.

On his retirement in 1919, he lived in Faringdon in Berkshire for three years and for the rest of his life at Bourton on the Water, Gloucestershire. He was now able to return his full attention to a life-long interest, natural history in all forms and especially to entomology. A collection of

Indian butterflies had been made in Madras and the Nilgiris. But this valuable collections were unfortunately damaged during his voyage home in 1919. Specimens from the collections were presented to the Hope Collection in the University Museum, Oxford. About 1920, my father consented to the Wellcome Museum of Medical Science acquiring a great many of his paintings on diseases. After his death in October 1951, most of his drawings, notes and papers on his medical work were given by us to the Wellcome Historical Medical Museum and library.

He had two sisters, Mrs. G. E. Lucas and Miss. B. Donovan, who were both living in south of Ireland and keenly interested in entomology and made many notable contributions as entomologists. Donovan paid many visits to his sisters in their home at Ummera House before he published his monographs. A collection of the Lepidoptera of Gloucestershire enabled him to prepare "A Catalogue of the Macrolepidoptera of Gloucestershire" published in the Cotteswold Naturalists Field Club, (Vol. XXVII, p. 153, 1941). He also published "A Catalogue of the Macrolepidoptera of Ireland" in 1936. Donovan was pre-eminently an able field lapidoptsist, his most spectacular achievement being his rediscovery of the haunts in Co. Kerry of Laucodonta bicoloria, the White Prominent, first taken by Peter Bouchard in 1859. Another of his outstanding discoveries was the existence of Nonagria Sparganii Webb's Wainscott in certain coastal bogs in Co. Cork.

He married in 1891 Mary Wren Donovan, daughter of Dr. Henry Donovan of Kilfinane, Co. Limerick, Ireland and had one son and two daughters.

Here lies one,—who laid others low,
A most learned doctor
Of that art so fatal to the living.
Say paternosters for him
Many through him have their inheritance
They and their heirs gladly say them.
He waged war on every age and sex,
With his bleedings and poisoned draught.
....
....
Health fled like a hare,
In front of him she doubled the pace;
Death was the only end
He put to a fever;
A true basilisk, he killed with a look,
And Cut the threads of the best lives;
He would not have spared his mule,
If the mule had been ill,
....

—*Benserade* (1613—1691)

Human Piroplasmosis

By C. DONOVAN, M.D., R.U.I.

Major, I.M.S.; Second Physician, General Hospital, Madras.

(Reprinted from "THE LANCET" September 10, 1904 & Jan. 21, 1905.)

AFTER a year's experience of the disease caused by the sporozoan parasite, classified by Laveran and Mesnil in the genus Piroplasma, the new species of which they have paid me the great honour of naming after me, I now give a description of the malady as observed by me in the General Hospital, Madras. Of the identity of the disease in Madras with kala-azar there can be no doubt; as I shall show later, the causa causans is the same

It was on June 17th 1903, that I first found these organisms in blood taken by punctures of the spleen during life; I had, however, previously, on April 9th, 23rd and 24th 1903, obtained the same bodies from smears of the spleen taken post mortem; relative to this details will be found in the body of my paper. From June 17th, 1903, to date of writing this contribution, June 16th, 1904, there have been admitted into my wards 72 cases suffering from this disease all diagnosed by examination of blood from splenic puncture; the admissions for the same period have been 1304, giving a percentage of 5·52 for Eurasians and native collectively; separately, Eurasians 2·38, natives 6·79. The death-rate has been 22, or 30·55 per cent. No Europeans were admitted into my wards for this affection but in the other physicians' wards there were a couple of cases. The disease is especially prevalent in the congested and insanitary part of the native quarter called Blacktown; cases, however, come from other parts of the city of Madras. Two were admitted from a village about 20 miles north of Madras but none from any other part of the Presidency. Three came from outside these limits: to wit, one from Rangoon (?), one from Hyderabad, and the other from Bassein (Burma). The disease is equally common amongst poorer Muhammedans and Hindus; the Eurasians, being generally better housed, are not so often victims of the disease. The sexes are equally amenable and age is no bar to infection. It may be mentioned that only male adults and boys of 12 years and upwards in age are admitted into my wards; the statements as to sex and children below 12 years are based on cases in the other physicians' wards. Very few Europeans are attacked owing to their better social conditions.

I shall now describe how I was led to discover the parasite. I had noticed many cases of chronic irregular pyrexia, with enlargement of the spleen and occasionally of the liver, bronchitis, oedema of the feet, subcutaneous haemorrhages, chiefly of the petechial type, diarrhoea of a dysenteric nature, and cancrum oris. The treatment was most unsatisfactory, no drug having the least beneficial effect. Such cases were being registered in hospital as chronic malaria, but as I was not a believer in the pyrexia of malaria unaccompanied by parasites in the peripheral blood, I for the nonce, classified the cases as enlargement of the spleen, cause unknown. Notwithstanding, I had still a lurking suspicion that there might be some at present undiscovered stage of the malarial haematozoon which might be the cause of these irregular pyrexias, that there were resistant forms of the genera Plasmodium and Laverania.

With a view to remove this doubt I attended the post-mortem examinations and took smears of blood from the spleens of cases said to have died from chronic malaria. On the first day, April, 9th, 1903, I found in a slide containing such a smear numerous peculiar round and oval ring-like little bodies, with two masses of chromatin situated on opposite poles. Convinced as I was of their parasitic nature, I could not, however, refer them to any group of the protozoa. I thought I had discovered the long-sought-for resting stage form of the malarial parasite in man. But on procuring the same bodies in two other cases on April 23rd and 24th, 1903, I changed my views and considered that they might be post-mortem degenerations of nuclei of the splenic pulp cells.

On June 15th, I received the British Medical Journal of May 30th of the same year and in it, on page 1252, was an account by Major W. B. Leishman, R.A.M.C., of organisms identical with mine. I at once recognised the similarity of what Leishman called generations of the trypanosomata to the bodies found by me in the splenic blood smear of the three cadavers above mentioned. Major Leishman discovered his parasites in November, 1900, in a smear taken post mortem from the spleen of a soldier who is said to have contracted the disease at Dum-Dum near Calcutta, and it was not till May, 1903, nearly two and a half years afterwards, that he communicated an account of his find. About the middle of June, there was in my wards a native boy, Dorasami Mudali by name, aged 12 years, suffering from irregular pyrexia of two months' duration, enlargement of the spleen half way down to the umbilicus, no malarial parasites in his peripheral circulation, after very careful examinations of stained (Romanowsky) specimens, although there was a well-marked increase of mononuclear leucocytes. To discover the cause of the enlargement of this viscus and of the irregular temperature I punctured the spleen of this boy on June 17th, 1903, and found the bodies in the blood thus obtained identical with those found in the splenic smears post mortem. The forms were larger, more varied in appearance, and more clearly defined.

On June 18th I sent an account of my discovery to the British Medical Journal, which appeared in that paper on July, 11th, 1903, page 79. Incited by Leishman's statement that these bodies were degeneration of the trypanosomata I carefully searched for this class (Mastigophora) of the protozoa but without success, nor up to date has anything bearing the least semblance to these organisms been found. (For further remarks on this point see the critical portion of my paper). I was at the time well acquainted with the appearance of trypanosomes, especially with the species Evansi, Lewisii, and one commonly existing in the blood of the Indian squirrel (Sciurus palmarum), so knew what to look for. On July 16th, 1903, I sent Ross three slides of these bodies (called for the time, "Resistant bodies," as they resisted the action of quinine and indeed of all other drugs), together with two temperature charts of cases Nos. 1 and 2 and a water-colour painting. On September 28, 1903, I received their acknowledgment dated 9th idem and was informed that the slides would be carefully looked into next week. I sent M. Mesnil of the Pasteur Institute, Paris, on September 23rd 1903, a slide containing these bodies and asked for the favour of his obtaining Laveran's opinion as to their nature: to this I had a reply, dated October 15th, 1903, and received by me on November 1st, 1903, to the effect that he had examined the slides and had procured Laveran's decision, which was: "L'avis de M. Laveran est de plus net: il s'agit dium protozoaire nouveau, de genre Piroplasma. Puisque la ponction de la rate est faite intra vitam, il ne saurait s'agir de formes d'involution de trypanosomes. M. Laveran 'ecarte' egalment l'idee de formes appartenant an genre Plasmodium, c'est a dire a l'hematozoaire du paludisme."

I received Ross's opinion on Nov. 9th, 1903. His letter is dated the 21st of the previous month and in it he says: "We have all studied your excellent preparations and I have read the articles by Leishman and you. I have also sent your drawings and specimens to Leishman and inclose a copy of his reply. You will see that he considers the parasites found by you to be the same as his. I think the bodies are certainly parasites but I cannot see any evidence at all that they are related to trypanosoma..... Hence I feel very strongly that the parasite is an entirely novel one and therefore consider that the discovery is one of great importance..... It is possible that the parasites are the cause of the fever in the cases, and this fever appears to me to resemble that of kala-azar".

In the Bulletin de l'Academie de Midecine, Paris, No. 35 seance du 3 November, 1903, Laveran described my parasite and he and Mesnil gave it the name of Piroplasma Donovani. On 5th Nov. a contribution was sent by me to the British Medical Journal, "On the Etiology of One of the Heterogeneous Fevers of India," which appeared in that periodical of Nov. 28th, 1903, p. 1401. In this I stated that the bodies had been determined by Laveran and Mesnil to belong to the genus Piroplasma, species new.

The symptoms caused by these organisms appeared to me from the very commencement to be like those of kala-azar but not having seen a case of this disease of Assam I was chary of coming to any decided opinion. My students of their own accord often discussed with me, Manson's small book in hand, the similarity of the two ailments With the hope of obtaining blood from the spleen of kala-azar cases, I sent a letter on Nov. 10th to the Indian Medical Gazette, "On a Possible Cause of Kala-azar," which was duly published in December, 1903. In this I mentioned that the symptoms of my cases, which had then amounted to 17, tallied very closely with those of kala-azar and that I was led to believe the cause might be identical, and at the same time I requested medical officers in endemic areas to send me slides of smears of spleen juice or blood obtained by puncture intra vitam. On Dec. 23rd I received a wire, despatched on the 22nd idem, from Dr. C. A. Bentley of Assam to the effect that "similar bodies to those described by Leishman and you found intra vitam in kala-azar." This find a piroplasma in kala-azar was evidently the result of my letter to the Indian Medical Gazette of December. Subsequently Dr. Bentley very kindly sent me a slide containing the splenic blood of a case of kala-azar, in which piroplasmata Donovani were present in large numbers. Thus my surmise that these so-called malarial cases in Madras were identical with kala-azar was correct. In the beginning no definite parasites could be found in the peripheral circulation, but latterly I was able to procure them. I sent a slide containing blood from the finger of Case No. 23 to Laveran and Mesnil and they confirmed my opinion.

In the peripheral blood the parasites are of a different form, very rarely found, and only when the temperature is high, between 103 degrees and 104 degrees F. On Feb. 13th, 1904, I found the organisms in ulcers of the skin of patients suffering from piroplasmosis. I was led to look for them in such skin diseases by the discovery of Wright (of Boston) of bodies very similar to, if not identical with, mine in scrapings from Oriental sore (Delhi boil). The most characteristic feature about this disease is an enlarged spleen, irregular pyrexia of from two to six months' duration unaffected by quinine, and the absence of malarial parasites in the peripheral circulation. To enter more fully into the chief symptoms they may be taken individually. The temperature is of an irregular type with occasional periods of apyrexia; in the beginning it is markedly intermittent, varying from 97 degrees to 104 degrees, of daily occurrence associated with shivering; in the latter stages it takes on more of a hectic type with night sweats. In a few cases, the intermittent temperature occurs twice a day, morning and evening. When any complication is present, as pneumonia or cancrum oris, the pyrexia is continuous or subcontinuous. On occasions, without any recognisable cause, the temperature sinks to normal or subnormal and remains so for a week or ten days rarely even for a month. The spleen is enlarged in the vast majority of the cases; in five only out of 72 was no enlargement of this viscus noticed. The

enlargement is as a rule not very great, the spleen extending half-way down to and to the level of the umbilicus; in half a dozen cases did the extension take place into the pelvis. The size of the spleen varies according to the temperature; in some instances the variation in size has been marvellous. With fever the spleen has been below the umbilicus and in a week or ten days on the onset of apyrexia the organ has contracted and disappeared underneath the ribs. This diminution is but temporary; on the recrudescence of fever the former enlarged proportions are assumed within a few days. The liver is not so invariably affected in size; it was only in 28 cases that an increase in bulk was noticed, usually to the extent of from one to two inches below the costal arch. Diarrhoea was present in more than half the cases (40 out of 72); the motions were of a dysenteric character with slime and blood. This intestinal symptom was not always a constant feature but recurred with the severity of the disease. In the stools occasionally ankylostomata, rhabdonemata, and balantidia were found, but they apparently had no connexion with the disease. The large intestines were often the seat of ulcerations; their perforation gave rise to peritonitis and death in some cases.

Skin eruptions were very common. The skin was dry, furfuraceous, and covered in places with small ulcers simulating those in scabies; the marked pruritus consequent on these skin affections brought about in several cases an extension in size of these ulcers which had then, indeed, a great resemblance to Delhi boils. In ten of the number, subcutaneous haemorrhages or petechiae were noticed, especially over the chest and leg; these came and went and were as a rule a prognosis of bad augury. In the greater number, pigmentation of the skin in some form or other was detected on the palms of the hands and the soles of the feet; in a few cases was such a change observed in the buccal mucous membrane, the tongue, and the bulbar conjunctivae. A general pigmentation of the skin of the whole body is better marked in light-complexioned, Eurasians. In native patients who are not carefully tended or washed the dry furfuraceous skin remains on and becomes in time dirty and black looking. This is not probably the darkening or blackness of the skin spoken of in connexion with kala-azar. In two of my Eurasian cases the whole of the skin took on an icteric tinge a day or two previous to death. Cancrum Oris, inflammation, and ulceration of the gums and hard palate, and very occasionally suppurative tonsillitis were observed in 22 cases; associated with these affections of the mouth and pharynx were four in which suppuration of the middle ear occurred.

A very constant feature of the disease is oedema of the feet; considerably more than half of my patients suffered in this way. In the majority bronchitis was present. Amongst other affections of the lungs there were 12 cases with pleurisy with serous effusion and one with haemothorax and two had broncho-pneumonia. There was rarely ascites;

only two cases were recorded. In another there was a considerable amount of blood in the peritoneal cavity; this was detected before splenic puncture and therefore was not due to that operation. As to the mortality, 22 died, eight were removed moribund, and the remainder were discharged at their own request, invariably in a much worse condition than on admission—indeed few of these had any prospect of surviving more than a month or two. The causes of death were six from general infection, one from cancrum oris, one from oedema of the glottis, six from diarrhoea, five from peritonitis, one from broncho-pneumonia, one from tubercle of the lungs, and one from haemorrhage after splenic puncture.

The blood examination in cases of piroplasma infection alway shows a marked decrease of the red blood corpuscles; these vary from two to 2,000,000 in the cuble millimetre. There is no actual increase of the leucocytes but a relative one of the mononuclears, much more marked than in malaria. The urine contains albumin and invariably pigment. Quinine has been given by the mouth, hypodermically, and intramuscularly ad nauseam, with no appreciable result. The same may be said of other less suitable drugs—*i.e.*, arsenic, salicylate of sodium, carbolic acid, creasote, tincture of iodine, & c.

The conditions found post mortem are generally an enlarged pigmented or unpigmented spleen; the liver is enlarged, congested, or cirrhosed—at times there is pigmentation present; and the intestines, especially the large, is deeply congested, inflamed; or ulcerated. Details of the necropsies will be found with the nine selected cases. (Omitted in this reprint).

From the date of first finding the piroplasma in the blood of the spleen taken by puncture during life I practised this small operation in all cases in may wards suffering from irregular pyrexia and enlargement of the spleen. During this period 110 punctures have been made; the cases in which piroplasma was not found contained either the gametes or the latent forms of the genera plasmodium and Laverania; in others no recognised organism was detected. Amonst this number the enlarged spleen in three cases of leukaemia was also punctured; this attempt was made to discover Lowit's parasite, Haemamoeba leukemiae magna vel parva, with ineffectual results. The puncturing of the spleen had, as a rule, no ill effect. I regret, however, to report the death of one case undoubtedly consequent on the operation. The facts are: Patient No. 22, a fairly healthy, big-boned man, was punctured at 8 a.m. He remained quite well till 3 p.m. when he was allowed to get up and leave his bed. While walking in the verandah to get a drink of water he slipped and fell and was picked up in a dazed condition. At 5 p.m. he was noticed to be very bad, gasping for breath, and in a few minutes he expired. A post-mortem examination showed extensive haemorrhage into the peritoneal cavity, obviously from the spleen puncture. The capsule of the spleen, an enlarged one, was greatly

thickened and the pulp was unusually diffluent. Since this regrettable accident patients were kept for 24 hours flat on their backs and were not allowed to leave their beds; at the same time chloride of calcium was administered in a 15-grain dose immediately after puncture and repeated twice at intervals of three hours. The results so far have been satisfactory.

The number of organisms in the blood taken by splenic puncture during life varied from one to 30 or more in a field (Zeiss's apochromatic objective two millimeters and compensation eyepiece No. 4). In some instances the slide had to be examined for a quartet of an hour before half a dozen parasites were found. The number, although varying with the amount of blood taken up in the syringe, is not dependent on the severity or otherwise of the disease or the size of the spleen. Patients very ill and with marked high pyrexia may have but few and, on the other hand, mild cases with no appreciable rise of temperature show the piroplasmata in large numbers.

(Concluding part)

The piroplasmata are found in the peripheral circulation, the spleen, the liver, the bone marrow, the submucosa of the large intestine, ulcers of the skin and large intestines, and occasionally in the kidneys and the suprarenals.

In the peripheral circulation the parasite is met with in the red blood corpuscles and in the polymorphonuclear and mononuclear leucocytes; it is only when the temperature is high, between 103 degrees and 104 degrees F. that their occurrence in this situtation is noticed. Their numbers vary and are never at any time great; in an examination of a slide for half an hour six might be found in the red blood corpuscles and double to treble that number in the leucocytes. In the red blood corpuscles the organism is small, 1 u to 1½ u in diameter, in shape bacillary, pearshaped, oval or spherical, with one chromatin mass oval or oblong, always placed at the circumference. The forms represented in Fig. 7 of the coloured plate attached to the first portion of my paper depict their different shapes. The red blood corpuscles containing the one-chromatin parasite are not altered in shape, size, or in staining reaction from the normal uninfected cells. Here also may be found rarely shrunken red cells stained blue instead of greenish yellow, which contain the double chromatin parasite to be described immediately below. In the polymorphonuclear and mononuclear leucocytes the organisms always possess double chromatin masses.

In the blood taken by puncture from the spleen during life the forms are varied and numerous, they occur free, in altered and unaltered red blood corpuscles, in the protoplasm of the mononuclear leucocytes and macrophages. The most typical form is either oval or spherical, measuring 2,5 u to 4 u by 1.5 u with two chromatin masses, staining deeply with

methylene-azure, especially the smaller of the two which takes on a clearer and more brilliant shade of the stain; the two chromatin masses are placed opposite each other, the larger, round or oval, has, as a rule, a looser texture than the smaller one which is more compact and dot or rod shaped (*vide* Fig. 1). With deeper Romanowsky staining a chromatin thread appears to connect the smaller mass to the periphery of the organism (*vide* Fig. 2) and at times a similar thread connects the two masses. In some preparations vacuoles appear to exist in the cell body but these I consider artificial (*vide* Fig. 2). The cell substance of the parasite is very clear and hyaline and not granular; it usually stains a light greyish pink with Romanowsky stain, the shade being darker at the periphery than towards the centre. However, if the preparation is well and carefully cleared with alcohol the protoplasm comes out a light blue, darker at the periphery with strands extending towards the larger chromatin mass. Such an appearance is shown in Fig. 3. Besides the above described there are pear-shaped and fusiform forms possessing one or two chromatin masses and stages in the multiplication (*vide* Figs. 1 and 5). A few of the organisms possess a very light-coloured larger chromatin mass with an accentuated dark smaller one; two are shown in Fig. 1.

The piroplasma when included in the red blood corpuscles brings about marked changes in the structure and staining properties of the stroma; as long as the parasite possesses a single chromatin mass the red cell is unchanged but on the advent of the smaller chromatin mass the infected cell alters in its staining reaction. The normal yellowish green colour of the cell assumes a blue tinge, beginning at the periphery and extending towards the centre till the whole infected cell is changed from a homogeneous yellowish green colour of the cell assumes a blue tinge, beginning at the periphery and extending towards the centre till the whole infected cell is changed from a homogeneous yellowish green disc to a finely reticular and blue-stained form (*vide* Fig. 4).

The altered red blood corpuscles at times increases in size when harbouring more than four or five parasites and at times decrease when containing a single individual. Appearances of double chromatin parasites included in unaltered red blood corpuscles I consider delusive; the organisms in such cases are superimposed. (But this statement I make with great reserve as those skilled and experienced observers, M. M. Laveran and Mesnil, consider them as inclusions)

The number of organisms in the mononuclear leucocytes vary from two or three to half a dozen, but it is in the macrophages that we meet with them in large quantities, where from 150 to 200 may be counted, crowded and packed in the protoplasm of one of these giant cells (*vide* Fig. 8) A few may be seen in the nucleus but these are probably superimposed. As a rule pigment is not associated with this piroplasma

but in about seven of the cases there was well-marked evidence of such an occurrence. The pigment was of golden-brown to vandyke-brown in colour, present both in the altered red blood corpuscles and the protoplasms of the mononuclear leucocytes and macrophages (*vide* Fig. 6). The pigment was not an artefact; special care was taken to exclude such an accident. In the above cases pigmentation was present in the liver and spleen examined macroscopically and microscopically. In the smears taken from the spleen post mortem the organism is not so well defined as during life; it is smaller and the outline of the cell of the parasite is by no means so well demarcated. The two chromatin masses in juxtaposition, however, draw one's attention to their presence in the preparation (*vide* Fig. 9). The likeness of the parasites to changes in the nodal thickening in the nucleus of the splenic pulp cells is marked and would give rise to confusion to an inexperienced observer. (*Vide* the nucleus of the splenic cell in the sinus below the long horizontally extended pseudopodium of the macrophage in Fig. 8, where this deceptive appearance is shown). I have not touched on the microscopical appearance of the tissues and organs found in this disease as leisure was denied me in entering into but a cursory examination of such preparations.

As to the nature of the parasite, I consider myself justified in adhering to the experienced and authoritative opinions of M. M. Laveran and Mesnil. The one chromatin forms in the peripheral circulation have the closest resemblance to piroplasma bigeminum but I have not so far succeeded in observing any enlarged spleens in calves suffering from "Texas fever" in Madras so cannot compare the full-grown double chromatin forms (probably gametes) of these species of piroplasma. I may say, however, that I exclude entirely the genus trypanosoma as having any relation to the disease. I have now examined carefully fully over 1,500 slides of blood of patients suffering from piroplasmosis and have never come across anything having the least resemblance to a trypanosome. Yet I do no not exclude a trypanosoma, or rather a trypanosomoid stage, in the life-cycle of piroplasma infection.

Doing easily what others find difficult is talent; doing what is impossible for talent is genius

—*Amiel.*

Reminiscences of Donovan's Colleagues adn Assistants

By Lt.-Col. H. KIRKPATRIC, I.M.S., (Retired),

Professor of Pathology in 1903 and later Professor of Ophthalmology, M.M.C.

THANK you for your letter of July 19th regarding Donovan's Discovery of the cause of Kala-azar. I am so sorry that I can give you, but little information as I lost touch with him and his family quite a long time ago. I well remember, however, his demonstration of the organism in the verandah of the staff office at the Govt. Hospital. He was using a very expensive Zeis microscope with apochromatic lenses which he had recently acquired at some sacrifice. I also remember his paintings of the slides, stained, I think, with Romanowsky Stain. He discussed the nature of the parasite and the conclusion then was that it was a piroplasm and we called the disease 'Piroplasmosis'. I think Donovan was lionised in Cork, Ireland. He always had a great taste for Entomology and at my first meeting with him in the Surgeon-General's Office in Nungambakkam (he was P. A. to Sibthorpe), he was reading a large book on the subject. After retirement he lived in a village called "Bourton—on the Water" in the Cotswalds, about 20 miles from Oxford and seldom left, except to attend seasonal meetings of an Entomological Society. The death of his wife was a great blow to him. She pre-deceased him by some six years or so. I will write to Sir E. Bradefield and ask him if he can give you any information and I shall always be glad to answer any question that you put if within my knowledge. I wonder what changes have been made in the buildings of the College. I certainly have very good wishes for its future prosperity. With kind regards.

Yours sincerely,

H. KIRKPATRIC.

Dr. P. S. CHANDRASEKHARA IYER, B.A., M.D.

Oldest Living Indian, who knew Donovan before and during the days of discovery and later Professor of Hygiene, M.M.C.

I first met Capt. Donovan in Surgeon-General's office in Nungambakkam when the latter was acting Secretary to Surgeon-General about the beginning of this century. As Assistant Professor of Hygiene, I was in an anomalous position. I was neither in the medical department nor in the educational department. So, I wanted to see the head of the Administration. Capt. Donovan, impressed me as a sympathetic and kind officer.

Donovan as a young Medical Officer in the opening years of the century and Dr. P. S. Chandrasekhara Iyer.

DONOVAN

(as a professor in academic robes just before retirement)

Sometime later, Donovan was appointed Professor of Hygiene in Madras Medical College, while Major Crawford was posted as Professor of Physiology, though Donovan was keen on Physiology. I thus became Donovan's assistant for one or two years. Most of the European I.M.S. Officers of those days had some prejudice against natives and did not treat them properly. But all the Irish officers like Donovan, Crawford and Gifford were very good men who had no superiority complex. I found that Donovan was well up in collateral sciences; probably the type of education in Dublin was a liberal one. Donovan was always pleasant, never appeared sullen and liked his assistants and students and tried to help them. Donovan had some regard for me. On one occasion, I asked Captain Donovan for a testimonial. Donovan turned round in surprise and remarked, "Am I to give a testimonial to you?"

Even after he became professor of Physiology he continued to frequent the Hygiene department, bring the blood slides from the wards to the Hygiene laboratory, then situated adjoining the Physiology department. Old students of this college may remember this room as the Pathology Professor's room and later as College office. The Professor of Hygiene at that time was Major Cornwall. The Physiology department was in the present Pharmacology demonstration room and the Hygiene laboratory was in a room across the terrace between the then Physiology department and the Chemical Examiner's office. It was in the Hygiene laboratory that he used to stain and examine his slides with a Leitz Oil Immersion Microscope, the only one available at that time in the college.

If anybody wanted to know how Donovan stained the blood film he told them to go to Chandrasekhar and learn. I can assure you that the discovery of Kala-Azar bodies was made in the Hygiene laboratory and not in the Physiology laboratory or in the Hospital Laboratory.

As Donovan was very much interested not only in Physiology and Medicine but also in almost all branches of Medicine, especially in Hygiene and Bacteriology, he fought for inclusion of many good books in the library indents. He himself studied French and German and ordered for journals and reference books in European languages and built up a good general library and a special one for Physiology. With regard to medical investigations, he took great interest in diseases of blood. In the course of his studies in Malaria he was searching for the parasite of the resting stage of the remittent fever.

Kala-Azar was then considered to be a form of Malaria and it was this intensive study of the blood of the patients suffering from fevers of doubtful origin, that led him to the discovery of Kala-Azar bodies. When he first spotted the microscopic bodies, he thought they were peculiar

forms of Malarial parasites. But he was not satisfied and did not rush into print. Later, when Major Leishman wrote the article in B.M.J. stating that he saw certain microscopic bodies in the smears from spleen, Donovan immediately recognised the significance of his earlier independent observations and confirmed the presence of microscopic bodies repeatedly in postmortem smears and splenic smears, from living patients, and then published a note in B.M.J. I think Donovan deserves credit for making his observations before Major Leishman. Donovan then contacted Dr. Raghavendra Rao of Bombay who was experimenting on monkeys with Delhi Boil. Donovan also tried to cultivate the organism.

Donovan's great characteristic was that he was persevering in his efforts. He had also very keen sense of humour. Donovan was a very powerful personality and fought and got what he wanted for the department. It was he who first introduced the Epidiascope and Microprojection apparatus etc., in the Medical College. Donovan must have met Ross during the latter's visit to Madras to attend B.M.A. meetings.

Dr. V. P. KAMATH, B.A., M.B.C.M.

Assistant in Physiology Dept. from 1910 to 1919 and Professor of Physiology (1919-20), M.M.C.

I had worked with Donovan for two months in the hospital as a medical student and I came into close association with him as his assistant in the Physiology Department from 1910 to 1919. My predecessor was Dr. C. B. Rama Rao. I can't give you any recollections about Donovan in his early days 1900—1909. I have no notes about him. All that I can say about him is that he was the best teacher of his time and the most beloved one. We loved him not alone for what he did but for what he was. He was an artist of a high order and when he mounted the platform in his gown to lecture, he was a fascinating figure. While lecturing he used to draw on the large black board, graphic pictures with ease and rapidity leaving lasting impression on the minds of students. He had a keen sense of wit and humour which made him a very interesting personality. He brought the Epidiascope for the first time in the lecture room. His hobby was the microscope and he taught every student the correct use of it, tube length, keeping both eyes open and so on. This may not appear much to you, but in those days several other professors didn't know anything about tube length etc. and when looking through invariably closed the right eye. It was Donovan that made, Experimental Physiology a success in the new buildings, as many students could work at one and the same time.

Gifford, Symons, Niblock, Elwis, Cornwall and Kirkpatrick were his colleagues. Korke of the Rockfeller Foundation and a student of Ross was sent to Madras for research work in Malaria. He worked in a room

in the Physiology Department with his microscope and had valuable tips from Donovan. Jambulingam was an attender in the Physiology Department but his work was so efficient that Donovan liked him very much and wanted to increase his status and pay.

Donovan was humble and never proud of his discovery. He used to say that what we know is nothing compared with what we do not know. Once he was the victim of calumny but he never lost his equanimity.

He was a revolutionary in all his doings. Once he condemned hundreds of books in the library costing thousands of rupees and ordered them to be burnt. The assistants in the college approached him with a request that they would take at least some of those books. He said, "Yes, but don't sell to anybody". Similarly, he condemned many of the old microscopes in the Physiology Department and allowed the assistants to take them at a nominal value. He ordered for 30 new microscopes for students. For him, cost was no consideration.

Donovan cared more for others than for himself. He did not care for money and remained poor, while other I. M. S. officers were always anxious to make as much money as possible in the shortest possible time. In treating patients he ministered to their troubled minds as well as to the sick body, though this psychosomatic treatment did not pay at that time.

He had a large number of German books, and he admired everything German. But when war broke out in 1914, he changed and said that cultured Germany was foolish, and that Turkey was foolish to have joined her. Donovan had no sense of racial superiority, a disease common in those days. As an Irishman, he had sympathy with Indians. I don't know anything about his activities after retirement, but I know he has reached his destination after a splendid journey. I have given you these very brief and random notes about Donovan more as a man and teacher than a discoverer, and you must be content so far as I am concerned.

Dr. M. A. KAMATH, M.B.C.M., Retired Civil Surgeon,

(An old student of Donovan in 1903-4).

My own impression about Col. Donovan, is that he was one of the best teachers I have ever come across, always inclined to be kind to students and help them in every way possible, except perhaps during examinations, at which he will play his usual tricks with the microscope for example, the object being not to baffle the candidate but to judge of the candidate's power of observation.

His lectures were very impressive and interesting, they were more demonstrations and were full of the well known Irish wit characteristic of the person. A probationer nurse marked the motions of the patient in the Temperature column of the chart. Col. Donovan wanted to know the temperature and remarked to the nurse—"I cannot make out his temperature because you have covered them all with his motions". The nurse naturally shyed before the students, of whom there were many.

To the patients, Col. Donovan was invariably kind and encouraging. A case of double pneumonia was admitted one morning and I was in charge of it. The patient was conscious and was crying for medicine for sleep. They were afraid in those days to give Morphia in such a condition. Col. Donovan assured him in his usual manner that he will give him the best medicine which will make him go to sleep at once; so he asked me to bring "the best medicine" and give it to the patient. I knew the trick, because the usual trick of Col. Donovan was to give a coloured sweet and nicely flavoured mixture—which he called a "placebo", to all waiting patients until their bloods are examined for malaria for example, so that they may not be under the wrong impression that they have not been prescribed "Good" medicine since admission. So I went to the Dispensary and brought a dose of Aqua Camphorae, coloured red with a few minims of Tr. Cochineal and sweetened with syrup, covered with a paper so that its aroma may not evaporate and gave it to the patient with the suggestion that he will go to sleep at once. This worked like magic and by the time Col. Donovan finished his ward the patient was fast asleep and snoring, and he slept till night fall.

The batch of student that preceded our batch was once the victims of the standard of classical joke of Sir William Osler, whose admirer Col. Donovan was and he prescribed for us Osler's "Medicine", although our text book was Taylor's medicine and we, all his students, had a copy each. While lecturing on the examination of urine, he dipped his right index finger in the urine and sucked the middle finger, and asked the students to do so. All of them, with the exception of one, dipped their index finger in the urine and sucked them. There was a peel of laughter all round. Then Col. Donovan remarked—"You all are wanting in the power of observation, I dipped in my index finger but sucked the middle one, and none has noticed it". This joke became too well known to be repeated afterwards in the Hospital.

Dr. P. KRISHNASWAMI, M.B., M.R.C.P.,

Assistant to Col. Donovan in the Wards of G. H (1909-12) and in the Dept. of Physiology (1912-16), Retired Professor of Medicine, S.M.C.

(i) DONOVAN AS A MEDICAL OFFICER

As a medical officer, attached to G. H., in 1909—10 Donovan arrived at the Hospital in the Brougham and entered the wards punctually at 7-20 a.m. He remained in Havelock Ward, (General Ward) till 10 a.m. walking from bed to bed, examining cases and discussing them with students, giving instructions to assistants, to carry out necessary investigations, and for any treatment, considered absolutely essential. Then, he left the general ward, but still accompanied by students, visited other wards and sheds, to watch the progress of old cases and to look at the new cases, making here and there a few observations or remarks till 11-20 a.m. He then left the Hospital and went to his Bungalow 'Dun Dun' in Nungambakkam High Road for his lunch, returning to the College at 2 p.m. to perform his duties as Professor of Physiology, Madras Medical College.

The most interesting characteristic about Donovan as a Physician was his remarkable faculty of lightning diagnosis. Standing in the wards surrounded by students, he would watch the patients walking in from a distance, observing their walk, their physical build and physiognomy and startle his listeners by remarks like "Kala Azar" "Diabetes" "Pulmonary Tuberculosis". A closer examination frequently confirmed his lightning diagnosis. Seldom was his first diagnosis faulty. Though he always had his stethescope at hand, he used it sparingly.

With regard to the care of the patient, he believed that much could be done by rest, good diet, nursing and kind words, and used drugs very cautiously. He gave the highest priority to nutrition and ordered liberal diet to patients causing, not a little annoyance, to Hospital administrative Authorities, who complained that the extra diet exceeded the sanctioned amount. Patients were weighed every week. Watch was kept on the general condition of the patient. Donovan frequently stressed what is now deemed a newer concept, that medical men in charge of wards should think of individual as a whole, his body and mind, and not limit one's attention only to the disease or organ, about which the patient complains. The attention Donovan gave to the history and symptoms narrated by the patient was most pleasing and soothing to the patient. He would watch the patient's movements, facial expression, question him on all sorts of things looking deep into the eyes and probing into the depths of the mind. He would say a few words of comfort and consolation and inspire confidence. Donovan was a practical psychologist—the first to practice psychosomatic Medicine in General Hospital nearly 50 years ago.

Donovan was a therapeutic Nihilist. It may be that he imbibed a bit of Osler's aversion to drug therapy. When he considered that drugs were not necessary, but felt that the patient would feel miserable or neglected, without any medicine, he would turn to the assistant, and seriously add "Repeat Mixture Saccharum etc. Aqua". The students and House Surgeons often wondered at the relief and cure of patients, with this mixture of sugar—It was a demonstration both of "Nature Cure" and "Faith Cure". When Donovan felt inclined to prescribe, he gave reason for his choice of the drug. Here is an example. When he started using "Donovan's solution" for Kala-Azar, he explained that he was giving it, not because it was known after another Donovan but because, it contained arsenic. Since Atoxyl, an arsenic compound had then been proved to be efficacious, in Trypanosomiasis, he preferred Donovan's solution, which was less toxic than atoxyl, for the treatment of protozoal infections like Kala-Azar. Later, he started using oral administration of Sodium bismuth tartarate for K. A. The other drugs employed by him, were Mercury, Potassium iodide, and Quinine in large doses.

He was more than a Doctor. He was a Humanitarian. He did not disdain lending a hand in lifting a patient, or carrying him. He would ask the students or assistants to lift the patient by the shoulder and head, himself supporting the lower limbs. Instances are known where he himself impressed the urgency for hospitalisation and took the patient to the hospital.

As a clinical teacher, he was unrivalled in that epoch. Once a week he gave general clinics attended by all students working in the hospital. These were full of latest information and based on his varied experience and critical study. But, it was the daily ward round and bed-side clinics which marked him out as a great clinician. Students from other wards, medical or surgical, flocked to his ward to bear him discourse on diverse subjects in the most interesting and instructive manner.

(ii) DONOVAN AS A PROFESSOR OF PHYSIOLOGY

As a Professor of Physiology, he had many advantages. He was tall and impressive, entered the class dressed in academic gown. He was a good actor, and a fine artist. As he talked about an organ or system he could draw, quickly and artistically, sketches, diagrams, to illustrate or elucidate what he was saying. He started with the structure of the organ as the basis of study and deduced the functions from the structure. He delivered his lectures from notes but they were spoken with animation, and histrionic ability. Physiology as taught by him was chiefly histology, hematology, with a few remarks on functions. Though the official calender recommended as text books, Kirke's Hand book (which later became

Halliburton's and now appears as McDowall's Handbook of Physiology and Biochemistry) and Foster's Text book of Physiology (in 4 volumes), Donovan preferred and followed Foster's great classic.

Donovan probably never believed much in didactic lectures. To make the students read, understand and remember the complex organisation of C. N. S., he introduced a new method of study. The students divided into smaller batches, were asked to draw with the aid of coloured chalks or compose with coloured paper, ribbons, gigantic diagrams, of the cross sections and tracts of spinal cord or the paths in the brain stem. This was his contribution to practical methods of education. The mammalian demonstration he gave were few and these consisted of opening up of a goat to show the contents of throax, abdomen etc., and the inner structure of the viscera. In the course of this demonstration, he would show the character of blood flow as well as the pressure exerted by the blood, when it spurts from the artery.

The practical classes for students were held between 2 and 4 p.m. Histology was the main subject for practical classes. There were some exercises in Chemical physiology, (now called Biochemistry). There were no experiments in amphibian physiology, till a very late stage and even then, they were only a few.

The examinations were tough. Though there were two examiners for Oral, the Professor questioned the student in the portions taught by him only, while the other examiner, usually another medical officer or Professor in the same Institution, sat smoking, dreaming or playing, and only occasionally putting a question. There were no practical examinations. Donovan was keen on maintaining a high standard and was considered a stiff examiner He tested the intelligence and grasp of the student rather than his ability to cram and repeat parrot-like.

(iii) AS AN INVESTIGATOR

In addition to his official position as Physician and Professor, Donovan was something far bigger than both. He was from the beginning of his service in G. H., an ardent scientist, an expert in microscopic examinations, laboratory procedures, with a passion for investigation. He spent hours in making or searching blood films for malarial parasites or Kala Azar bodies, and made his students and assistant also search as patiently and deligently as himself. When he was not satisfied with the result of examination of peripheral blood, he boldly started splenic puncture and recommended the procedure as a safe one. After performing 300 splenic punctures, he noted that he had lost 3 cases (due to internal haemorrhage). He tried liver puncture as a less risky method but after some further experience gave up even this procedure. He advocated bone

marrow smears, as a more safe and certain method for the diagnosis of Kala Azar. He attempted, though unsuccessfully, to culture the Donovan bodies, with a view to study the evolution or involution of the germs under different condition. He also studied the problem of transmission. When Capt. Patton postulated that bed bug was the agent, Donovan immediately retorted that the disease must be more common as the bug was ubiquitous. Donovan's early reports on Piroplasmosis are learned and highly original, showing his mastery over Medicine and Zoology. Had it not been for the bitterness caused by the question of priority of discovery, and the lack of proper appreciation of his talents and work by the colleagues and authorities in Madras, Donovan would have probably continued and extended his researches, with unabated vigour for many more years.

It matters not how straight the gate,
How charged with punishment the scroll,
I am the master of my fate:
I am the captain of my soul.

—*W. E. Henley.*

* * *

One catches more flies with a spoonful of honey than with twenty casks of vinegar.

—*Henry IV of France.*

* * *

The preservation of health is a duty. Few seem conscious that there is such a thing as physical morality.

—*Herbert Spencer.*

* * *

Were it not for imagination, Sir, a man would be as happy in the arms of a chambermaid as of a Duchess.

—*S. Johnson.*

* * *

To be ignorant of one's ignorance is the malady of the ignorant.

—*A. B. Alcott.*

* * *

I honestly believe it iz better tew know nothing than tew know what aint so.

—*John Belling.*

Kala - Azar

By Dr. K. S. SANJIVI, M.D.,

Professor of Medicine, Madras Medical College and Physician, General Hospital.

FIFTY years after the demonstration of the Leishmann-Donovan body as the protozoa responsible for the disease, we still find a considerable number of patients suffering from the fever in the City of Madras. Below are the numbers of cases treated in the two teaching Hospitals of the City during the last five years. (1948 to 1952).

Stanley Hospital	....	994
General Hospital	....	2,383

1. The reason for the persistence of the fever can best be explained by a discussion of the knowledge we still lack about the disease.

2. The classical text-book description of the case of Kala-Azar need not be gone into here. It is familiar to every student of Medicine.

3. Among the questions remaining to be answered, perhaps the most important is that of the diagnosis of the fever in its truly early stages. Even now, the fever is diagnosed only when the patient presents a marked enlargement of the spleen and liver with readily positive sternal marrow biopsy. Is it possible to make a diagnosis in the first bout of fever even before any enlargement of the spleen and liver can be made out? It should be stressed that spontaneous remission of the fever with fairly long periods of pyrexia is a common occurrence in the course of the illness. No patient who has a fever for more than a week should be labelled as a case of pyrexia of undetermined origin. Every effort should be made to ascertain the true nature of the fever even though the temperature might have touched normal without any specific treatment. At this stage of the disease, a great handicap is the lack of any specific laboratory test to clinch the diagnosis. One must depend largely on where the patient comes from, the double rise of temperature in the 24 hours which is perhaps best brought out on a two-hourly temperature chart, the ratio between the R. B. C. and W. B. C. being as 2000 : 1 rather than the normal 625 : 1 and finally the therapeutic response to Antimony treatment. The smear obtained from sternal puncture is often negative and a study in a number of cases of culture of the sternal marrow on the NNN medium should be undertaken to see if that will be helpful. On the few occasions the writer

has attempted this, it has not made much difference to the diagnosis. The Complement Fixation Test with the WKK antigen has not been as dependable as was suggested in the original Paper on the subject. The writer has known definite cases of Kala-azar being reported as negative and cases of other diseases, *e.g.*, Lympho - Sarcoma, reported as positive.

4. The method of transmission of the disease can be taken as established with the work of Swaminathan *et al.* Even so, there are certain workers who still appear to favour the theory of Droplet Infection through the naso-pharyngeal secretions. No experienced physician can support this theory of Droplet Infection as Kala-azar still remains rigidly confined to local areas even within a city. During four years in Madura I have diagnosed Kala-azar in about a dozen cases and every one of them had been in an endemic zone within the previous fourteen months, which has been the longest incubation period reported. If naso-pharyngeal Droplet Infection should be the method of spread of the disease in a community, the local residents in Madura who have lived in intimate contact with imported cases of Kala-azar should also have suffered from the illness. This is perhaps even more forcibly brought out from one's experience in the City of Madras itself. Not a single case of Kala-azar has been seen in permanent residents of Mylapore who have never spent a single night in North Madras.

5. The early diagnosis and treatment of the patient so that the sand-flies cannot obtain the Leishmania, is obviously one important step in the eradication of the disease. Considering the large number of long-standing cases still remaining untreated in several highly endemic pockets in the City, *e.g.*, Moolakotram near Basin Bridge, there is a clear and urgent need for squads undertaking house to house visits and scouring them for untreated cases. Even among the treated cases, I am afraid the criteria of cure have not been rigidly followed and patients who have had a course of treatment, have returned with the fever. Perhaps the best way of having a more efficient follow-up will be to organize a Kala-azar Treatment Centre under the supervision of a single medical officer, to which all cases will be referred for continuation of treatment after discharge from the hospital. It will be the duty of this Centre to maintain adequate records to contact, with the help of social workers, the patients defaulting to turn up for the injections and to carry out the necessary laboratory investigations to establish the criteria of cure.

6. Such a research centre can also carry out studies in biochemical reactions which undoubtedly play a very important part in the outcome of the disease. It will certainly be interesting to know what happens to the blood-constituents as the spleen and the liver enlarge and as they regress under treatment. N. K. Chakravarthy *et al* and Sen Gupta *et al* have made some contribution to this biochemical aspect already.

7. The Public Health aspects of the problem such as a vigorous campaign against sand-flies should receive more attention from the Health Authorities. Reports have appeared on the greater susceptibility of the sand-fly than that of the mosquito to D.D.T. It should therefore be possible to launch on an intense D.D.T. programme in known pockets of Kala-azar incidence along with the treatment of obvious on occult cases of the disease. A scorch-earth policy with reference to some of the oldest parts of Black Town and re-housing of the population in more modern tenements may provide an answer to Kala-azar and tuberculosis alike.

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There are four sorts of men:

He who knows not and knows not he knows not; he is a fool—shun him;

He who knows not and knows he knows not: he is simple—teach him.

He who knows and knows not he knows: he is asleep—wake him;

He who knows and knows he knows: he is wise—follow him.

—*Lady Burton.*

* * *

The lunatic, the lover, and the poet
Are of imagination all compact.

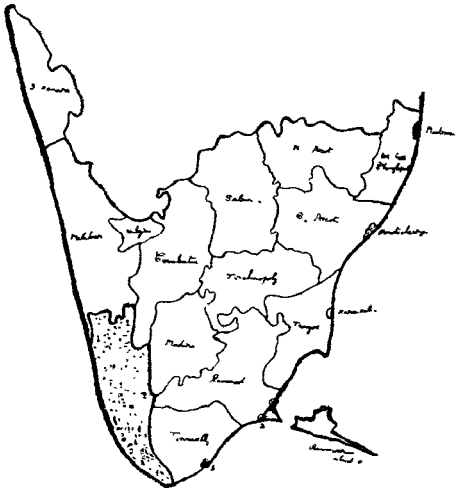
—*Shakespear.*

Prevalence and Control of Kala-azar.

Prevalence of Kala-azar, Madras city.—Since the discovery of the parasite three surveys have been carried out in Madras city, the first covering the period 1904—1911 by V. T. Korke (1912), the second covering the period 1930—'32 by Cunningham and Varadarajan (1923) and the third covering the period 1923—'31 by Napier and Krishnan (1933).

Outside the city.—Turkhud, Krishnan and Iyer (1926) carried out a survey in thirteen villages in Ramnad and Tinnevelly districts, particularly Kayalpatnam and Rameswaram island. The conclusion of Napier and Krishnan in their survey was that in Madras on the whole there was no evidence of any great change in the relative distribution of cases among the various divisions. In the areas outside Madras they found a reduction in the incidence of Kala-azar only in Rameswaram island and they ascribed it to the anti-malaria work that had been carried on in that island. In all the other areas, they found little evidence of any change in the incidence of the disease from year to year, and in some of them there was evidence of the existence of the disease for atleast fifty years. They have also suggested that dermal Leishmaniasis may be considered as a phenomenon of imperfect immunity response on the part of the host and because the proportion of dermal cases to visceral cases is higher in Madras than in Assam and Bengal ; that the oldest foci of the disease are in South India. They also suggest that the transmission of the disease in South India is entirely from dermal infections and so mass treatment of Kala-azar cases alone does not affect the general incidence of the disease.

KALA-AZAR IN MADRAS STATE



1. DEVIPATNAM.
2. ERVADI.
3. KAYALPATNAM.

Control of Kala-azar.—Hertig (1949) has recorded in his work in Greece and Italy that the standard method of house-spraying for malaria control with D.D.T. is also automatically a method for the control of Phlebotomus. Hertig and Fairchild (1948) have recorded in their work in Peru that the spraying of the inner walls of the houses with D.D.T. gave practically complete protection from the bites of sand flies, and constituted the most effective single method of control. Till now D.D.T. spraying has not been used in India as a general control measure against Kala-azar. Recently in Rameswaram D.D.T. spraying of all houses in an infected area has been started and the results are under study.

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When people's ill, they come to I,
I physics, bleeds, and sweats'em;
Some times they live, sometimes they die.
What's that to I? I let'em.

—*Dr. J. C. Lettsom "On Himself"*.

* * *

There is no excellent beauty that hath not some strangeness in the proportion.

—*Francis Bacon.*

* * *

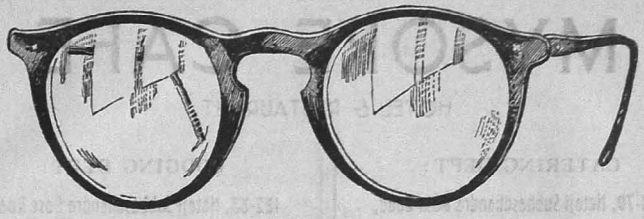
Remember that the most beautiful things in the world are the most useless; peacocks and lilies, for example.

—*John Ruskin.*

* * *

Capitalism did not arise because capitalists stole the land or the workmen's tools, but because it was more efficient than feudalism. It will perish because it is not merely less efficient than socialism, but actually self-destructive.

—*J. B. S. Haldane.*



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