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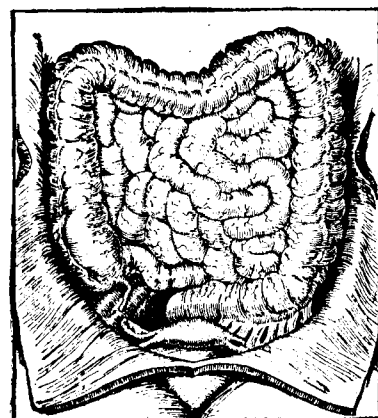
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Atony due to sigmoidal adhesions



Spastic bowel; (a) showing ulcerations



Dyschezia due to fecal impaction

Lubrication Therapeusis IN DIVERTICULITIS

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THE MADRAS MEDICAL JOURNAL. NOVEMBER 1924.

IMPRESSIONS OF MY EUROPEAN TOUR.

[RAO BAHADUR DR. M. KESAVA PAI, M.D. & C.M.]

(Concluded from our issue of September 1924.)

The King Edward VII sanatorium at Midhurst which is over 50 miles from London is an institution constructed for the higher class of patients and on a lavish scale. The single room for each patient is a spacious one facing the south with a large glass door and windows and an open balcony on the southern aspect to which the patient's cot can be wheeled on during fair weather. The rooms are built in rows in 3 stories with accommodation for over 100 cases. There are elaborate arrangements for sterilization of sputum flasks, linen, plates, etc., and the cooking is done by steam and gas. The whole building is warmed by central steam heating and there are well equipped laboratories, a pathological department, X-ray equipment, etc. The gardens are beautifully laid out and there is an open air chapel for the Sunday services. Graded exercises are given to the patients on the same lines as in other sanatoria.

FARM COLONIES THE BURROW HILL COLONY.

Two other classes of institutions for the after cure of tubercular patients are the farm colonies and the training colonies. I shall describe briefly one institution of each kind that I visited in England. The Burrow Hill Colony

is an example of the former. It is situated at Finley not far from the Brompton Hospital Sanatorium and is run in connection with the National Association for the Prevention of Tuberculosis. It contains about 120 acres of land partly meadow land and partly forest on the southern slope of a hill. It has accommodation for 80 patients, about 20 of whom are bed patients taking open air treatment and rest and the remaining 60 are trainees who are being taught a variety of healthy avocations including gardening, bee keeping, poultry and pig farming, dairy farming, laundry washing, carpentry, etc. The patients lead a pleasant social life within the colony running their own recreation clubs, billiard rooms, etc. In fact a farm colony of this type serves two purposes, viz., the training in healthy modes of life for tuberculous ex-soldiers and their training in healthy open air avocations enabling them to eke out their living after discharge from the colony.

TUBERCULOSIS SETTLEMENTS—PAPWORTH INDUSTRIALS.

The other type of colony is the settlement for tuberculous persons, which is practically a self-contained village or hamlet, inhabited by the tuberculous who live there permanently pursuing their respective avocations and living often with their families in their own little houses. The best of its kind which I visited was the one at Papworth near Cambridge which is now run by one of the most enthusiastic of tuberculosis workers, Dr. Varrier Jones. The settlement, which is named the Papworth Industrials, so that, it may not be stigmatized with the name of "tuberculosis colony," consists of a long strip of open country partly wooded, with a broad road running right through the middle about a mile or so long. On either side of this

road are constructed the picturesque cottages built on fine open air lines for the use of patients living with their families, hostels built for the use of bachelor patients and for single women, a large hospital and sanatorium with wooden shallies, where patients in different stages are treated—houses for the resident medical officers and nurses, stores where provisions are sold for the residents of the settlement, vegetable gardens, poultry farms, piggeries, green houses, etc., a laundry, a school for the children of the patients, a church, a theatre, social clubs, carpentry shops, joineries, a printing press, a tailoring shop, a boot and leather trunks factory, a jeweller's shop, a small bank, etc., all these institutions being run by the tuberculous settlers and ex-patients. In fact the leather goods and boots turned out and the furniture manufactured in this tuberculosis settlement are quite as decent as those turned out by factories outside and command a very good sale. The printing press executes a good deal of work for the University of Cambridge and the sign board painters and draftsmen of the colony are busy attending to outside orders. Every individual living in the settlement with or without his family plies his own trade and earns his own living under proper medical supervision and in cottages, hostels and chalets constructed on the best sanatorial lines which ensures the maintenance of good health. With the exception of a few training teachers the whole settlement is run by patients.

HOSPITALS FOR ADVANCED CASES.

Hospitals of this kind which I saw in London were the Colindale and Mount Vernor Hospitals, situated in the outskirts of London under the management of two able tuberculosis men, Dr. Marcus Paterson and Dr. Kelynaik.



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respectively and, accommodating between them over 400 patients.

THE TUBERCULOSIS DISPENSARY.

Last but not least must be mentioned the tuberculosis dispensary which is a very important centre for the detection of cases, the mapping out of areas wherein tuberculous infection exists in different parts of a locality, and administration of out-patients treatment to such of the patients as are able to move about. There are several such dispensaries in London of which I attended one of the oldest, the Paddington Tuberculosis Dispensary. In connection with some of these dispensaries are the open air schools where the children of the tuberculous in the early stages of infection are given instruction on open air lines, so that, they may grow up into healthy individuals and be able to mix with the healthy community without danger of infecting them.

SYNOPSIS OF ANTI-TUBERCULOSIS MEASURES ADOPTED IN WESTERN COUNTRIES.

You will thus have an idea as to how the anti-tuberculosis campaign is carried on in England, which has enabled that country to reduce its incidence and mortality from tuberculosis considerably during the last century. The teaching of hygiene in schools, the location of tuberculosis dispensaries in all areas for the detection of early cases with an agency of health visitors, nurses, etc., to give personal instruction to the infected individuals not only as to how to look after themselves, but how to prevent their infecting others, compulsory notification of tuberculosis cases, the starting of open air schools for children in the earliest stages of tuberculosis, the location of sanatoria for the treatment of cases convalescing from

tuberculosis, and of hospitals and asylums for the advanced and hopeless cases, the opening of colonies and settlements wherein the arrested cases can learn to lead healthy and useful lives with happiness to themselves and safety to their fellow countrymen—these and other measures to prevent bovine infection are several of the important steps in the anti-tuberculosis campaign which we shall have to copy in this country if we are to progress on the same lines as the western countries.

LIGHT TREATMENT AT ALTON AND AT HAYLING ISLAND.

Before closing this part of my narrative of studies in England let me make a brief mention of some special methods of treatment of tuberculosis, *viz.*, by sunlight and artificial light. Though carried on on a small scale in a number of institutions, there are a few where it is a speciality and is conducted on a large scale. Such is the Lord Major Treolar Hospital at Alton, where Sir Henry Gouvain has now equipped his large institution for the sunlight and artificial light treatment of surgical cases of tuberculosis. Alton is about 70 miles from London in a quiet open country place far away from the fog and dust of cities. The Finsen light, the Carbon arc light and the Quartz lamp on are used by Sir Henry Gouvain in this institution, especially as sunlight is not always available even in summer in England. At Hayling Island on the south coast of England, Sir Henry Gouvain has started a similar small institution for treatment with the sun's rays.

EDINBURGH POST-GRADUATE COURSES.

From the South of the United Kingdom let me now take you to 'Bonnie Scotland' where I spent about 2

months of my study leave. Professor Sir Robert Philip is in charge of the Tuberculosis Department of the Edinburgh University which in collaboration with the Royal College of Physicians and Surgeons holds post-graduate courses twice a year in many subjects including tuberculosis. I cannot say that the therapeutic methods adopted at Edinburgh compare favourably with those in London, but I must say to the credit of this Scottish University that the methods of clinical instruction are of a high order and I benefited by my two months' course at Edinburgh perhaps more than I did in my 6 months' stay in London where no post-graduate course worth mentioning is given in Tuberculosis. *Sir Robert Philip* is one of the foremost authorities on tuberculosis and the pioneer in the adoption of systematized anti-tuberculosis measures in Great Britain. The so-called "Edinburgh scheme" the outlines of which I have already given above is due to Sir Robert Philip whose methods are now recognized and copied even in America. It is due to him that Tuberculosis has been made one of the subjects of instruction both for undergraduates and for the D.P.H. Students in the Edinburgh University and with the help of his assistants the post-graduates get a thorough grounding not only in the clinical aspects of Tuberculosis, but in the preventive and administrative aspects of the disease. The first Tuberculosis Dispensary started in Great Britain is the one of Sir Robert Philip, called the Victoria Hospital Tuberculosis Dispensary which, with the Victoria Hospital Sanatorium and the Southfield Tuberculosis Colony form the anti-tuberculosis unit of Edinburgh, which has made this city one of the healthiest as regards the incidence

and mortality from tuberculosis. Edinburgh has been mapped thoroughly as regards its centres of tuberculous infection and all cases and contacts are kept closely under observation and control with the help of special tuberculosis officers and health visitors and nurses. The Edinburgh method of clinical classification of tuberculosis cases is more rational than the Turban Gerhardt classification and is now being adopted in many other places. Scotland has some of the best sanatoria in Britain which compare very favourably as regards their results and methods with others in different parts of Great Britain and Europe.

SIR ROBERT'S VIEWS REGARDING SANATORIUM
TREATMENT AND LOCATION OF SANATORIA.

Sir Robert Philip holds the view that altitude and dryness of the air are comparatively unimportant factors in sanatorium treatment and that free perfusion of air, devoid of dust and impurities is the real essential of sanatorium treatment. Sanatoria in Scotland are thus situated at all levels and in all conditions of dryness and humidity of the atmosphere. The Victoria Sanatorium is in fact situated within the city of Edinburgh, though in its outskirts, just a quarter of an hour's ride from the busiest part of Edinburgh. The results produced by this sanatorium are quite as good as those of others situated in the country and at higher altitudes.

PARIS, A GREAT PLACE OF LEARNING APPLIED SCIENCE,
MEDICINE, ETC.

You will now kindly follow me across the English Channel to the Continent of Europe. The first city you visit is Paris, the queen of modern cities in Europe and

a great centre of culture, art, civilization and modern methods in all branches of applied science and medicine. One without a working knowledge of French no doubt feels rather handicapped, for the Frenchman is as much of a foreigner to the English language as the Britisher is ignorant of French. Anyhow you will never feel quite helpless, as you will always find somebody who will come to your succour in every place on the continent with a working knowledge of English sufficient to enable you to go through the different medical institutions. The first institution I visited in Paris was that great place of Pilgrimage to men of science from all quarters of the globe, the scene of the labours of Pasteur called after him as the Pasteur Institute. It might be of interest to know how highly the name of Pasteur is held in veneration by Frenchmen. He is their God in the world of science just as Napoleon still remains their idol as the builder of the French nation. The effigy of Pasteur is still borne on one type of postal stamps of France, the 75 cents stamp. Pasteur lies buried within the Pasteur Institute building in a quiet room tastefully but plainly decorated, the walls bearing inscriptions of his life's work. Dr. Roux and Dr. Calmette are the Director and assistant Director of the Pasteur Institute. As neither of them could talk to us in English we were introduced to Dr. Bessedka, the Senior Assistant who speaks very good English and who took us round the Institute. Of the interesting features of the Pasteur Institute are the facilities given to post-graduate students of all nations. There is a big class room in which post-graduate courses in bacteriology are given every year which are attended by students from all parts of the world.

There is also a laboratory where seats are provided for workers. It was so gratifying to hear Dr. Bessedka speaking eulogistically of the Indian workers who attend the Pasteur Institute. Besides antirabic vaccination, a great deal of research work is being done at the Pasteur Institute in serology, immunology, vaccine therapy, etc. Dr. Bessedka has his own views regarding immunity conferred by vaccines and is an authority on the complement fixation in tuberculosis. There is a large library room in which busts and portraits of the renowned men of the Institute are found, including Pasteur, Metchnikoff, etc.

HOSPITAL LÆNNEC.

The Hospital Lænnec of Paris is the Brompton Hospital of France. It is an old institution built a century ago during the days of Lænnec, the founder of the modern methods of physical examination of the chest. Dr. Rist who is the Medical Officer-in-charge, a recognized French clinician in tuberculous diseases of the chest, speaks good English. He took us round the wards and shewed us his out-patients clinique also. Though a very old hospital, many of the wards have been rebuilt on modern open air lines and up-to-date methods of treatment including artificial pneumothorax are being practised. Radiographs of all cases are taken on admission and the A. P. cases are systematically screened and photographed in the course of their treatment. The chart by the bedside has graphs both for the temperature and pulse, as also for the number of pellets of sputum every day, which appears to me to be a more rational method of recording than the measurement of sputum which is necessarily an inaccurate procedure on account of its admixture with saliva and mucus

from the mouth and throat. Dr. Rist is one of the few persons who performs double A. P. taking care of course by a preliminary period of observation and X-ray screening that the process in the healthier lung is not progressive.

The largest and most up-to-date sanatorium in France is the one at Bligny, about 20 miles from Paris. It has accommodation for over 500 patients with separate blocks for men and women. The sanatorium is built from an endowment made by the wife of one of the philanthropic men of France who died of T.P. The Sanatorium consists of 3 storied blocks with open rooms and long "galeries de cure" which are absolutely open to the air on the southern aspect. The poor patients in the sanatorium are maintained by the State. There are steam radiators for warming the rooms, laboratories, X-ray rooms, up-to-date kitchens, recreation rooms, dental rooms, etc., and the most elaborate arrangements for sterilization of clothes, towels, spittoons, etc. The nursing staff consist partly of the sisters of mercy and partly of the discharged patients. They are all voluntary workers. Paid nurses from outside are only a few of the total number.

GENEVA AND THE SPAHLINGER INSTITUTE.

About 12 hours by train from Paris brings one to the foot of the Swiss Alps and within a few hours later the Lake of Geneva is reached. Not far from Geneva which is situated on the lake is Mon-H. Spahlinger's Institute for the preparation of anti-tuberculous serum. Most of you must have read in the medical papers of Mon-Spahlinger's work. He is a young man of about 40 years, a non-medical bacteriologist, very enthusiastic and earnest in

his work. His laboratory is a fairly well equipped one but his methods cannot be said to be absolutely scientific. At all events he has not yet been able to satisfy the leading bacteriologists of Europe either as regards his vaccines and sera or as regards the results obtained from their use. Mon. Spahlinger took us round his laboratory and through the animal rooms where his highly immunized cows and horses are kept. On account of financial stress Spahlinger had to stop his work and sell many of his valuable animals so that since the outbreak of the great war he had actually to stop manufacturing the serum. He has again begun to inoculate the animals and hopes within the next year or more to have his completed anti-tuberculous serum. He has cows in his laboratory, which have been so highly actively immunized with the vaccine that they can now stand inoculation with living virulent T.B. without getting infected. Many of his horses are of the jet black variety; for these he has special preference as he alleges that these yield better antituberculous sera than the ordinary horses. The principles of Spahlinger's treatment are active and passive immunization against tuberculosis. Active immunization is effected on the same lines as with the tuberculins, but Spahlinger lays special stress on the preparation of a variety of products of the T.B. which he considers give a joint immunity against the disease. His sera about twenty in number are similarly prepared by immunizing horses against a similar number of T.B. products prepared by complicated methods, each serum having its curative effect against a particular group of symptoms in the course of the disease. Thus certain sera are effective in checking the fever of caseous T.P., others in the fibroid type, still others in the intestinal or

renal or glandular types, etc. His combined serum prepared by blending all the different types, he considers, will answer for the treatment of any case. The sera are used for the treatment of the toxic stage of T.P. when there is hectic, etc., but once the case loses toxicity the vaccines are used to set up active immunity. The active immunity is of course the real and permanent cure of the disease. The efficacy of Spahlinger's serum treatment is still doubted by the majority of workers in tuberculosis. His sera have been used by several Sanatoria in Switzerland and by hospitals in England and elsewhere. Opinion is not unanimous, but at Montana I met Dr. Stephani, Dr. Hudson and others who shewed me the records of cases shewing that the serum was of positive value in several cases. Spahlinger's sera are effective not only against tubercle bacillus toxins, but also against those of the secondary organisms in tuberculosis so that he has in all about 28 different anti-sera including about 6 against secondary infection. Unfortunately for the scientific world Spahlinger has so far refused to divulge the details of his work or to lay them before experts for their investigation and the mystery in which his work is so far involved as made it difficult for us to judge whether his sera and vaccines are of real value, but the general impression I obtained during my visit to Switzerland was that the serum has a future before it and it will be possible to make use of it in the treatment of T.P. with a certain amount of success.

LEYSIN AND ROLLIER.

Without tasking your patience much I shall now try and rush through my further tour in Switzerland and

other countries in Europe. From Geneva to Leysin, now famous on account of the work of Rollier, is a few hours by train *via* Lausanne and the mountain railway *via* Aigle. It was the depth of winter when we visited Leysin, and snow was lying 6 and 8 feet deep. Leysin is about 5,000 feet above sea-level and in spite of the snow and the cold, the sun was bright and the climate very pleasant, the air being dry and bracing. Leysin is full of Sanatoria for the treatment of pulmonary as well as surgical tuberculosis. Dr. Rollier, the greatest authority living on "Solar Cure," has about 32 clinics under his charge for the treatment of surgical tuberculosis by open air and sunlight. His clinics are frequented for study by students from all parts of the world including America, Japan, China, India, Australia and Africa. I do not wish to go into the details of the sun-treatment just now, but suffice it to say that Dr. Rollier has obtained the best results in his clinics in the worst type of cases of surgical tuberculosis, many of them having already been unsuccessfully dealt with by surgeons. We saw several cases of Pott's disease, knee and hip disease, glandular and bone tuberculosis, lupus, dactylitis, peritonitis, etc., all treated by sun's rays and without any surgical interference. Accurate records of the progress of the cases including skiagrams have been carefully kept by Dr. Rollier so that there can be no question whatsoever regarding his results, but the sceptics still maintain that these results are due more to the salubrious air and the surroundings of Leysin than to the sun-treatment. Dr. Rollier uses the minimum of surgical appliances like splints, etc., so as to expose the affected part to sunlight. Mere extensions without actually covering the

limbs to any great extent are used in the treatment of the different bone and joint conditions.

THE ECOLE DU SOLEIL.

What interested me a great deal was the Ecole du Soleil, the school in the Sun situated in the Valley of the River Ormort about 5 miles from Leysin and conducted under the supervision of Dr. Rollier himself. It corresponds to the open air schools in England and elsewhere. The children mostly with a tuberculous diathesis or actually showing the first signs of infection are given the benefit both of the open air and of the sun. There were about 40 children when I visited the place belonging to Europe and America, mostly English, French, German and American boys and girls. The school consists of a building with 4 storeys, the ground-floor containing the kitchen, dining room, waiting room, recreation room and solarium where the children spend their rest hours after breakfast. Many of the classes are held in the open sun, the children being bare bodied in the summer and lightly clad in the winter. The bed rooms are on the upper storeys and the staff is accommodated on the top floor. The classes in summer are held in the open air under the trees or in the forest close by. When we visited the place it was winter and the children were having their sledging and skiing exercises on the deep snow. Breathing exercises are also given to the children to enable them to develop the chest properly and grow up.

The largest sanatoria at Leysin were the Mont Blanc, Grand Hotel and Sanatorium Populaire and amongst Dr. Rollier's clinics the chief ones are Miro Mont and Les Frenes, two high class sanatoria with solarium and equipments of the highest order. Dr. Rollier in colla-

boration with the other tuberculosis specialists of the Swiss Alps holds special post-graduate clinics and gives special demonstrations in the treatment of tuberculosis every year and these meetings are attended by medical men from all over the world. The Societe Climaterique of Leysin runs most of the larger sanatoria of Leysin as a business concern so that these institutions are built in thorough up-to-date style wherein the patients can command the maximum of comfort and obtain the best of medical assistance. The different alpine stations like Leysin, Montana, Davos, Arosa, etc., are in fact places where all the houses are built for the use of tuberculosis patients with open balconies on the southern aspect, the larger ones being equipped with the best X-ray apparatus A.P. facilities, etc. Attendants of patients are allowed to stay in the sanatoria and are supplied with separate rooms if required. It is all a matter of payment of high boarding and lodging charges. There are lending libraries in the larger sanatoria for the use of patients with special arrangements for the sterilization of lent books by formaline vapor before being reissued to others. Dr. Rollier's chief clinic Les Frenes is a luxuriously furnished building of four storeys with electric lifts, library, reading and recreation rooms, with a Cinema for the instruction and amusement of patients, billiard room, concert hall, solarium, X-ray room, operation theatre, Laryngoscopic room, quartz light room, violet light room, with a demonstration room wherein photographs of patients in different stages of treatment with stereoscopic films and lantern slides are kept for view. There is an orthopædic shop in connection with this clinic in which splints, etc., ordered by Dr. Rollier are made by good workmen.

I might mention that the mountain scenery all round is simply enchanting and at the time of my visit, the snow-clad peaks and valleys with the firs and pines covered with snow and looking dazzling white in the bright sun added grandeur to the view. Such picturesque surroundings by themselves have a beneficial effect on the patients, apart from climatic considerations.

MONTANA AND DAVOS.

The Alpine station of Montana is about 5,000 feet above sea-level. The Victoria Sanatorium under Dr. Muralt, the English Sanatorium under Dr. Hudson, Dr. Stephani's Sanatorium where Spahlinger's serum has been used on a large scale with apparently good results, are amongst the chief sanatoria there.

Another important Alpine Sanatorium station is Davos, which is about 6,000 feet high. The Sanatorium Schatzalp at Davos is situated on the top of a peak and is reached by a funicular railway. It is under Dr. Neumann and is a grand palatial building with 120 beds. Sanatorium Schweizerhof and the German Sanatorium are the other large sanatoria in Davos, as also the sanatorium of Dr. Turban, a great authority on tuberculosis whose classification of P.T. into 3 stages is now adopted in the majority of hospitals and sanatoria all over the world. Davos is also famous for the Research Institute for physico-meteorological investigation under Professor Dorno who has done a great deal of work on ultraviolet rays and atmospheric electricity, etc. Professor Leowy has recently established another Research Institute at Davos where medical, bacteriological, chemical and biochemical research is conducted by different specialists.

DENMARK—VEJLEFJORD.

I should now like to take you across the frozen belts of sea with little ice bergs round the peninsula of Denmark and up one of the frozen fjords through which our boat cut its way with a sawing noise to the picturesque station of Vejle where Dr. Gravesen, till lately employed at Madanapalle, is working the Vejlefjord Sanatorium started by the late Dr. Saugmann, a great authority on sanatorium treatment, A.P., thoracoplasty, thoracoscopy, etc. The sanatorium is situated on the slope of a hill overlooking the fjord. At the time of my visit snow was lying several feet deep round about the sanatorium and the fjord was frozen several inches deep. Dr. Gravesen gave me several demonstrations of his methods, including an operation of thoracoplasty. The Danes are a very simple, sincere and hospitable people and during my stay there every facility was given me by Dr. Gravesen and his staff whose guest I was all the time. There is accommodation for over 100 patients, with X-ray equipment, arc lamp, quartz light, etc.

ANTI-TUBERCULOSIS LEAGUE OF DENMARK—

DR. OSTENFELD.

The National Anti-tuberculosis League of Denmark under Dr. Ostensfeld as Director is doing excellent work on the same lines as similar leagues in Britain, America, France, etc. It is in Denmark that the important experiments were first conducted to prove that calves isolated immediately after birth from tuberculous cows remain healthy, an observation which has resulted in the practical extinction of bovine tuberculosis in Denmark, which to-day is second to no other country in its comparative freedom from human tuberculosis.

THE FINSSEN INSTITUTE AT COPENHAGEN.

At Copenhagen the Finsen Institute is the great centre for the treatment of Lupus, etc., with Finsen rays. The large light hall of the Institute has more than a dozen powerful arc lights with telescopic cylinder arrangements round each light for the treatment of 4 patients. The hospital attached to the Institute is full of cases of Lupus. It has separate rooms for light baths in which the patients with surgical tuberculosis are exposed naked to the open arc lamp light.

HAMBURG—THE KRANKENHAUS.

A few hours trip partly by train and partly by boat across the frozen sea took me to Germany, where I stayed at Hamburg, one of the largest centres of navigation, commerce and education in Germany. The Krankenhaus at Hamburg is one of the largest hospitals in Germany with about 3,000 patients accommodated in about one hundred pavilions situated in an extensive compound and park. This Krankenhaus is attached to the University of Hamburg is under the direction of Professor Brauer, a great German authority on Tuberculosis. It has different sections in which different classes of diseases are treated, the ophthalmic, maternity, and gynaecological pavilions, the general medical and surgical pavilions, tuberculosis pavilion, etc. There is a very large X-ray department where there are several types of apparatus for screening, photographing and treating cases, and for ultraviolet therapy, Finsen light therapy, nose, throat and ear therapy, bacteriological department, biochemical department, etc. On account of the centralization of medical instruction it is comparatively easy for any post-

graduate not only to specialize in one branch of medicine, but at the same time to try and get a general knowledge of other subjects also. Professor Brauer, an old man of over 65 years of age, is still a steady operator and does thoracoplasty, thoracoscopy, etc., in which he has specialized, one of the methods of the former operation being called by his name. He speaks English fairly well and was so kind to me that he gave me special demonstrations in English on thoracoplasty, artificial pneumothorax, etc. Students from India, Japan, China, Turkey, Denmark, South America, Africa, Egypt, etc., come to Hamburg and before the war, I was told, students from other countries also studied in the hospital and the University. There are 10 chief assistants and 40 junior assistants working under Professor Brauer in the hospital.

GEESTHACHT SANATORIUM.

The Geesthacht sanatorium situated about 15 miles from Hamburg has about 500 beds and is the largest institution of its kind in the principality of Hamburg. It is built on the river Elbe, on the slope of a hill sheltered from the north winds. There are pine woods and fine walks for the patients and the best equipment including X-ray apparatus and color lights.

BERLIN—WASSERMANN'S LABORATORY.

At Berlin I had an opportunity of visiting Professor Wassermann's laboratory at Thiel, a suburb of Berlin. Wassermann is conducting experiments on the causation and cure of cancer, complement fixation in tuberculosis, etc.

CONCLUSION.

Before concluding let me make a request to you all in the interests of the service and of the profession. Make

it a duty to visit Europe at least once in your service. It broadens your outlook and opens your eyes to what the advanced nations in the west have achieved and are achieving in the realm of medicine. One might read a great deal in books and journals but such second hand knowledge gives but a vague impression. There is nothing like seeing things with one's own eyes. A visit to European countries is in itself an education and a first hand study of the methods practised by the best men will not only enable us all to benefit ourselves in our practical work, but will in the aggregate lead to the progress of our own country in the field of medical knowledge. To cultivate the habits of observation, to get into the grooves of scientific research, to study first hand what the western nations have developed in the course of centuries of steady and progressive work, to realise what we ourselves shall be capable of achieving if only we try to follow the example set by the advanced nations of Europe, to be able in a few words to keep abreast of the times in the realm of medicine we should each and each of us take his turn of study leave and thus benefit ourselves, our profession and our country.

GLEANINGS.

THE DYSENTERIES OF INDIA.

The following extracts are taken from a very able and exhaustive Article contributed to the July number of the *Indian Medical Gazette* by Majors H. W. Acton and R. Knowles, I.M.S., of the Calcutta School of Tropical Medicine.

DEFINITION.

The term *dysentery* is not the name of a disease, but of a symptom-complex in which there are frequent stools containing blood and mucus, whose passage is accompanied by pain and tenesmus. It is important to note the words "mucus" and "tenesmus" in this definition, since the mere presence of blood alone in the stool is insufficient to establish the diagnosis of dysentery. Thus we have known cases of intestinal tuberculosis and even of internal hæmorrhoids treated with emetine by the clinician because there was blood in the stools, whilst such other conditions as fistula-in-ano and rectal syphilis and carcinoma may also lead to the appearance of blood in the stools. On the other hand, in many cases of true dysentery, whilst the presence of mucus is visible to the naked eye, that of blood, it may only be possible to detect under the microscope.

Of the causative agents of dysentery in India, we can at once eliminate schistosomiasis, since *S. mansoni* is not indigenous in India. *Fasciolopsis buski* is said to be a cause of dysentery, but, although this parasite does occur in India,—(e.g., S. M. Lal, 1923),—it is sufficiently rare to constitute an exceptional curiosity. The position with regard to *Balantidium coli* is still obscure. Sinton (1923) has recently recorded symptomless infection with this parasite in a Pathan prisoner in Lahore jail; we have recently encountered *Balantidium* of the pig in the faeces of two out of four pigs examined in Calcutta; whilst Ramsay (1923) considers *B. coli* to be a common intestinal parasite of pigs and even of cattle in Assam, and that balantidial dysentery may be not uncommon in India. Although we have encountered *Balantidium* infection

in Mesopotamia, yet during many years of work in India we have never encountered the infection in this country. In one instance referred to us, the ciliate protozoon present was not *Balantidium*, but a free-living *Chilodon* accidentally present in the stool from extraneous sources.

The dysenteries associated with malaria and with kala-azar we believe to be of either amœbic or of bacillary origin. During the past three years we have frequently examined the stools of such cases and have often identified either *E. histolytica* or dysentery bacilli as the causative agents, and we regard the dysenteries of malaria and of kala-azar as due to secondary infections with dysenteric organisms. With regard to the intestinal flagellate protozoa, Dobell and O'Connor (1921) shew clearly that all of them—(with the possible exception of *Giardia intestinalis*, which may possibly be an occasional cause of diarrhoea, but never of dysentery, and which is usually harmless),—are non-pathogenic. To all intents and purposes, the dysenteries of India are due to infection with either *Entamoeba histolytica* or with the dysentery bacilli, or with both.

RELATIVE FREQUENCIES.

During the earlier years of the war, it was commonly believed that most of the dysentery in the Eastern theatres of war was of amœbic origin. The careful work of Dobell, Wenyon, O'Connor, Ledingham and several others, however, soon shewed that such a view was entirely erroneous. Throughout Mesopotamia and India, probably indeed throughout the East in general, bacillary dysentery is some five to six times as common as is amœbic dysentery.

Further, whilst we cannot definitely establish any seasonal variation in the types of dysentery commonly

met with in Calcutta, yet there appears to be a definitely different geographical incidence in the two types. Thus amœbic dysentery is relatively frequent in wind-swept desert regions, where the infective cysts are swept on to foodstuffs by hot and arid winds, whilst bacillary dysentery is relatively more common in communal and city conditions, and especially where water supplies may come to be contaminated.

DIFFERENTIAL DIAGNOSIS.

The medical practitioner cannot treat a case of dysentery properly until he has correctly diagnosed the type of dysentery from which the patient is suffering. Hence the true diagnosis can only be established by laboratory examination, although a fairly accurate guess can often be given upon purely clinical grounds. It is therefore necessary for us to take in turn each element in the differential diagnosis of dysentery.

Clinical Symptoms. Bacillary dysentery, especially if due to Shiga's bacillus, is—as a rule—an acute and febrile disease, with fairly sudden onset. Further it is especially the dysentery of in-patients, since such patients are at once prostrated by toxæmia. As has been shewn by Acton, Chopra and Boyd (1923) the Shiga bacillus, when present in a substrate rich in proteids and proteoses such as results from mixed or meat diet, can manufacture poisonous pressor bases with a profound action on both the cardiac and respiratory mechanisms. Essentially bacillary dysentery, in the acute phase, is a febrile disease, which sends the patient to bed, unable to cope with the degree of toxæmia present.

On the other hand, amœbic dysentery is characteristically walking dysentery, or out-patient dysentery.

It is only when secondary infections supervene, or when grave gangrenous lesions of the colon are present, that the amoebic dysentery patient is compelled to take to bed. Usually, he keeps at work, however incommode. Admittedly subacute and chronic cases are less easy to diagnose; they are not infrequently amoebic, especially when associated with palpable thickening of the colon; sometimes, however, they are due to infections with Flexner's bacillus. These will be dealt with later.

In general it may be said that acute bacillary dysentery is a disease which at once sends the patient to bed with fever, prostration and symptoms of toxæmia; whereas typical amoebic dysentery is a disease of more gradual onset, and the patient is often able to carry on his daily work, although his colon may be ulcerated. A single instance of the latter condition may suffice to shew how the colon may be ulcerated and eroded, even in the absence of all clinical symptoms of dysentery:—

During the war in Mesopotamia in 1917, six lascars were accidentally suffocated in the bottom of a barge—where they had lit a fire and closed the hatches before going to sleep. On post-mortem examination, one of the six shewed two small ulcers in the cæcum, each about the size of a four-anna bit, with numerous *E. histolytica* present in the cæcal contents, and also in nests in the submucous tissue of the cæcum wall, as seen on section. A second shewed a small ulcer in the region of the splenic flexure, with cysts of *E. histolytica* in the gut contents and vegetative forms found in sections of the gut wall. Both these men were on the active list, had not been recently in hospital, and would have been classified as being in ordinary good general health.

Macroscopic Examination of the Stools. As shewn by Cunningham (1923), such examinations for the presence or absence of visible traces of mucus are of value, not only for the detection of cases of dysentery, but also of latent dysentery carriers. The bacillary dysentery stool may vary much in character, but—essentially—it is an inoffensive stool composed mainly of bright red blood and mucus, with few other elements. In amoebic dysentery the macroscopic characters of the stool may be very varied. It may be simply diarrhoeic: it may be semi-formed with, or without, adherent traces of blood and mucus: and its colour may vary from deep brown to greyish-green. It is often a small stool, dark and tarry in colour. As a rule the blood and mucus—the former of which may be invisible to the naked eye—tend to mingle more intimately with the faecal matter than in the bacillary stool. Further, as a rule more faecal matter is present than in the bacillary stool. Taken all round, however, an inoffensive stool consisting of only bright red blood and mucus is usually from a case of bacillary dysentery; whilst an offensive stool with adherent or admixed blood and mucus and much faecal matter is usually from a case of amoebic dysentery.

Further, in bacillary dysentery the blood tends to be of a bright red and unaltered colour; in amoebic dysentery the blood tends to be of a darker and more brown colour, owing to the conversion of hæmoglobin to acid hæmatin.

Reaction. In amoebic dysentery the stool is usually acid to blue litmus paper; whereas in bacillary dysentery it is usually alkaline to red litmus paper. This easily applied and most useful test deserves further trial than it



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has hitherto secured. The point is of considerable importance, since—in the acid amœbic stool, the hæmoglobin of the red blood corpuscles is changed into acid hæmatin, which leads to the dark brown or tarry colour of the blood in the amœbic stool. In the alkaline bacillary dysentery stool the blood is bright red, and the hæmoglobin unchanged. As will be seen later the point is also important from the point of view of treatment and prognosis.

Correlated with this go the pH findings in the two classes of stools. It has been shewn previously by Knowles, Napier and Das Gupta (1923) that the pH of the amœbic stool is usually in the neighbourhood of 6.3; whilst that of the bacillary dysenteric stool is markedly alkaline.

The microscopic characters of the exudate in the stool in amœbic dysentery are as follows:—

(a) The total cellular exudate is, in general, scanty. A few polymorphonuclear leucocytes, some coarsely granular eosinophile leucocytes, and clumps of red corpuscles comprise the picture. *E. histolytica* secretes a powerful proteolytic ferment and this results in semi-digestion of cellular elements. Thus, as well described by Anderson (*loc. cit.*), the chief elements in the field are pyknotic residues, red corpuscles reduced to half or quarter of their original size, polymorphonuclear leucocyte nuclei and nuclear remnants lying free in the fluid. Anderson states that such pyknotic cell remnants comprise 83 per cent. of the total leucocytes seen. (b) Macrophages may be occasionally present, but they are very scanty in number, and only rarely seen. (c) A few intestinal epithelial cells are usually present, but in scanty numbers. (d) The few polymorphonuclear leucocytes present shew marked degeneration; they present a "mouse-eaten" appear-

ance due to proteolytic digestion, are shrunken and disintegrated,—a process finally going on to the production of pyknotic residues and free nuclear remains. (e) The bacterial picture may vary. Sometimes the only extraneous organisms seen are occasional chains of streptococci and scanty yeasts,—the latter identified as such by their multiplication by budding. Sometimes, however, an amœbic stool may be loaded with bacteria, and in such stools the motile *E. histolytica* die off very rapidly. The degree of bacillary infection in an amœbic stool may, indeed, exceed that in one due to bacillary dysentery. (f) Secondary infections may be present. Of these, infections with hæmolytic streptococci and with Vincent's infection are the most important. In quite a number of cases of amœbic dysentery an infection with Vincent's spirochæte and the fusiform bacillus supervenes—usually as a transient phenomenon—on amœbic ulceration. Spirochætes in general are not at all infrequent in amœbic stools; and if daily examination of the stools be conducted, it will frequently be found in amœbic dysentery that at about the 4th or 5th day of the disease, the stool swarms with Vincent's infection, and that this infection clears up within another 36 or 48 hours.

The most important change, however, concerns (g) the red blood corpuscles. In amœbic dysentery there appears to be a marked change in the erythrocyte membrane, which becomes sticky and agglutinative. As the stool is generally markedly acid, and the hæmoglobin in it is being converted into acid hæmatin, the limiting membrane of the erythrocyte appears to degenerate. The red blood corpuscles tend to appear, not singly or in rouleaux, but agglomerated together into half-fused masses. We may

here give a striking instance of this degeneration. In November 1923 our attention was called by Dr. B. M. Das Gupta, Assistant Professor of Protozoology at the School, to a most unusual appearance in a fresh amœbic stool. The stool was full of actively motile *E. histolytica*, pushing their way through their environment, as Dobell well describes it, "like slugs moving at express speed." But in every single microscope field in six consecutive preparations examined there appeared two or three red blood corpuscles which appeared to be motile and which presented exactly the appearance of a *Trichomonas* with an undulating membrane. If present in only a part of one film, such an anomalous appearance would, of course, suggest an artefact; but this curious and aberrant appearance was present in every field in the six films examined. Stained preparations were made, and a study of these shewed the nature of the artefact present. The stool was full of spirochaetes with regular, even curvature,—presumably *S. eugyrata*. Owing to the adhesiveness of the red blood corpuscles many of these spirochaetes were adherent by either one or both ends, or by their whole length, to the edges of the red blood corpuscles, and their movements gave the curious appearance of an erythrocyte with a marginal undulating membrane.

This adhesive character of the erythrocytes in the amœbic stool is so marked, that, if it be present in a stool which otherwise shews the cellular character of a bacillary dysentery infection, it should arouse the question of the possibility of mixed infection.

Anderson sums up the characters of the acute amœbic stool as shewing a very small proportion of polymorphonuclear leucocytes,—7½ per cent. in the differential

count; many coarsely granular eosinophile leucocytes,—an average of 2 to 5 per cent. in the differential count; an absence or rarity of macrophages; and a high proportion of pyknotic cell residues.

The microscopic characters of the stool in bacillary dysentery present an entirely different picture. Here the whole microscope field is full of cells. Of these (a) some 90 per cent. are polymorphonuclear leucocytes. Although degenerated, they present a totally different appearance to that of the scanty polymorphonuclears in the amœbic stool. To quote Anderson (*loc. cit.*) "they appear to die *en masse*"; their cytoplasm becomes full of refractile fatty globules, the cell outline is well preserved however, and the nuclei as seen in saline shew up as dull greenish masses. There is not here,—as in the amœbic stool,—partial digestion and marginal disintegration, but rather fatty degeneration and swelling. Many of the polymorphonuclears in a fresh stool, however, are normal. (b) Intestinal epithelial cells are fairly numerous; they are either columnar or squamous, and are usually somewhat swollen, but with clearly visible nuclei. (c) Endothelial cells are usually present in some numbers like the polymorphonuclears: they shew similar degenerative changes, being usually vacuolated with breaking down nuclei. (d) Macrophages are present in some numbers,—about 2 per cent. of the differential count according to Anderson. (e) The red blood corpuscles are unaltered; they shew up as isolated cells or in normal rouleaux, and the tendency to adhesion and agglomeration seen in the amœbic stool is here absent. (f) "Ghost" cells are a prominent feature of the exudate, i.e., cells which have lost all structure, but not their outline, and which shew a

clear, definite cell wall, almost devoid of cell contents,—mere shadows of their original selves. Many, if not most, of them are derived from breaking down polymorphonuclear leucocytes. Finally (*g*) the waterways between the cells shew a very scanty bacterial content. In the early and acute case, bacteria are extraordinarily scanty; a few non-motile bacilli are seen in each field on focussing, sometimes in the fluid at a higher level scanty clusters of non-motile bacilli of the dysentery group.

Anderson sums up the characters of the bacillary stool as being preponderance of polymorphonuclear leucocytes, absence of eosinophile leucocytes, the presence of prominent macrophages, and absence of pyknotic residues. To these characters we would add absence of any change in the red blood corpuscles, which shew their normal dichroic yellow-green colour.

It should be added, however, that the microscopical characters of the bacillary dysentery stool may vary (*a*) with the specific organism concerned. Thus in Flexner bacillus infections, the stool is not infrequently faeculant and with less cell exudate; (*b*) with the stage of the disease: Thus Manson-Bahr, Perry and the late Sir Patrick Manson (1922), give the following as the characteristic cell-picture during the stages of a bacillary dysentery case of average severity:—

Stage 1. First three days of the disease.—Preponderance of polymorphonuclear leucocytes, fresh red blood corpuscles, macrophages, endothelial cells, intestinal epithelial cells, and calcium phosphate crystals. Few visible micro-organisms.

Stage 2. Second three days of the disease.—Disintegrating pus cells, red cells, bile-stained columnar

epithelial cells, disintegrating macrophages, calcium phosphate crystals, many motile bacilli visible.

Stage 3. Third three days of the disease.—Disintegrating red cells, free hæmatoidin crystals, pus cells in an advanced stage of degeneration containing fat particles with active Brownian movement, large numbers of motile bacilli, and often flagellate protozoa, or it may be active *E. coli*.

As the acute attack of dysentery subsides and convalescence sets in, certain changes occur in the character of the cell exudate as seen under the microscope.

In the *amœbic stool*, the most prominent feature is the appearance of Charcot-Leyden crystals. These are of four types; (*a*) thin, sharply pointed, whetstone-shaped crystals, varying from 5 to 50 μ in length; (*b*) short, almost diamond-shaped forms; (*c*) forms similar to the type (*a*), but with the ends truncated; and (*d*) long, acicular forms. In all cases they shew up with a green, clear, refractile look, and stain an intense jet black with iron-hæmatoxylin staining. In iodine preparations they shew up badly. Chemically Charcot-Leyden crystals appear to consist of ethyl-imine; and to be a product of tissue digestion by *E. histolytica*. As shewn by Acton (1918), and by J. C. Thomson and Robertson (1921), the appearance of Charcot-Leyden crystals in the stool is almost pathognomonic of amœbic infections, and they may persist in the stool long after even cysts of *E. histolytica* have ceased to be found. So characteristic, indeed, of amœbic infection do we regard these crystals that their appearance in an acute dysenteric stool together with that of actively motile *E. histolytica*, we regard as evidence

of true relapse in amoebic infection,—as distinct from re-infection of a previously cured patient.

In the *bacillary dysenteric stool*, as the acute symptoms subside, the secondary intestinal protozoal parasites become prominent. Motile, vegetative *Endolimax nana* and *Iodamoeba butschlii* are frequently seen at this stage, whilst such stools often shew vegetative *Entamoeba coli* in considerable numbers. The two commonest organisms in such stools, however, are *Trichomonas hominis* in its motile, vegetative phase, and *Blastocystis hominis*—a fungus of high type, and a source of considerable confusion to the laboratory worker,—which often appears in profusion. In the meantime the pH of the stool is rising towards the normal of about 7.2 in the amoebic case, and falling very slightly to about 7.5 to 7.8 in the bacillary case.

MIXED DYSENTERY.

If such a condition as “mixed dysentery” truly exists, we believe that it merits most careful definition. During the last two years we have had several instances of patients who have passed through an attack of amoebic dysentery, have been treated and apparently cured, but who have returned to hospital from 6 to 12 weeks later suffering from an attack of bacillary dysentery. On the other hand, amoebic dysentery appears to be a less common sequel of bacillary dysentery.

If “mixed dysentery” really exists, the term should be reserved for cases where *both E. histolytica* and the dysentery bacilli are present in considerable numbers and in a *pathogenic* phase.

We believe such a condition to be relatively uncommon. What is common, on the other hand, is a transi-

tional phase associated with a rapidly changing pH,—bacillary dysentery setting in in a convalescent amoebic case, and the stool becoming more and more alkaline; or amoebic dysentery setting in in a convalescent bacillary case, and the stool becoming more and more acid.

It cannot be too sufficiently emphasised that *every dysenteric stool should be examined both microscopically and by cultural methods*, and that any less examination is inadequate. The finding of vegetative *E. histolytica* does not exclude infection with dysentery bacilli, whilst an amoebic infection may easily be missed upon a single examination.

In many instances the specific organism or organisms concerned cannot be identified, whilst the cellular exudate picture is uncertain. This is especially the case where the stool is not examined until some hours after it has been passed. *To all intents and purposes, the examination of a stool more than two hours after it has been passed, is useless.* In such cases the only possible line of procedure is repeated daily examinations of the fresh stool.

Before leaving the subject of diagnosis, it should be noted that a diagnosis of acute dysentery can often be made by a distant laboratory. Two perfectly clean glass slides are taken, and a portion of the blood-stained mucus of the stool squeezed between them. The slides are now drawn apart so as to leave a thin film of the mucus upon each. They are then dropped into a jar containing either rectified spirit, or—better—Schaudinn's fixative (one part of absolute alcohol to two parts of saline saturated with corrosive sublimate, and with 5 per cent. of glacial acetic acid added),—and despatched by post to the laboratory. On receipt of such material, the films are stained

by Haidenheim's iron-hæmatoxylin method and examined for vegetative *E. histolytica*.

TREATMENT.

A diagnosis—either proved or reasonably probable—of the type of dysentery present having been made, treatment should be appropriate and not random.

The *first* and most important indication is to send the patient to bed. No surgeon would think of permitting a patient with a severe ulcer of the leg to walk about, and in acute dysentery the gut is severely ulcerated. To permit even a mild case of dysentery to walk about is to invite disaster, to convert the acute into chronic dysentery,—a condition which is one of the most difficult to deal with in tropical medicine. The patient must be kept in bed for ten days, no matter how trivial the symptoms, and no matter what are his wishes. Further, a bedpan should be used, and the patient should not be allowed to get up to visit the latrine.

In both types of dysentery the value of the stock "dysentery mixture" of aperient sulphates is considerable. In both they flush the colon, whilst in the amœbic case they tend to increase the alkalinity of the colon mucosa,—a condition inimical to *E. histolytica*. On the other hand, in amœbic dysentery, since such saline aperients render the passed stool more alkaline, the *E. histolytica* in them tend to become sluggish and non-motile, and microscopical diagnosis is thereby rendered more difficult.

Emetine is of no value in bacillary dysentery: in fact its action here is only to increase peristalsis, and that often in an irregular manner, thus leading to increased colic.

TREATMENT. (A) ACUTE AMŒBIC DYSENTERY.

The mode of action of emetine upon *E. histolytica* remains to this day a mystery.

Whilst emetine is a most valuable drug in the treatment of amœbic dysentery, yet its administration must be most carefully controlled. As shewn by Chopra and Ghosh (1922), and others, its effects are cumulative: it increases peristalsis, it is a cardiac and central nervous system depressant, and the maximal course which is permissible for administration to an adult male in relatively fair health, should not exceed 12,—or at the most 15,—grains. It is true that one often comes across patients who have had courses of 18 or 20 grains or more, but such cumulative doses have been known to prove fatal, whilst, even when they do not, emetine diarrhoea may ensue, the practitioner may consider that this is due to insufficient dosage, and may push the emetine administration to dangerous extremes. We know of one instance during the war where a military medical officer was accustomed to give as much as 5 grains of emetine to all his dysentery cases per diem, on the supposition that if this cured the dysentery it must have been of amœbic origin, whereas if it did not, it must have been of bacillary origin. How many patients he killed, we do not know.

When given orally, the action of emetine is most uncertain, and for this reason we have abandoned oral administration. We have not yet had an opportunity of testing the newly-introduced emetine periodide, but it seems to us that if the true ætiology of amœbic dysentery be considered, with the pathogenic entamœbæ lying deeply buried in the submucous tissue of the colon, it is futile to expect that emetine, when administered orally,

can ever affect them. Sellards and Leiva (1923) strongly advocate the use of emetine per rectum, and record the actual cure of experimentally infected kittens by this method; yet such a method is unsuitable for large scale practice in dispensaries, and it is doubtful whether such injections in man, under ordinary circumstances, would reach much further than the splenic flexure. What is desired in actual large scale practice in India is some ready, reliable and efficient mode of administration by the mouth or hypodermically. (If given intravenously, emetine is too toxic to be tolerated in any but absolutely minimal doses.)

Our present method of treating cases of amoebic dysentery is of necessity, under such circumstances, a compromise between what we consider to be desirable, and what we believe to be safe. It is as follows:—

(1) The patient is kept strictly in bed for 10 days; and is told to use the bedpan. This is to give the ulcerated surfaces as complete rest as possible.

(2) The diagnosis of amoebic dysentery having been confirmed in the laboratory, the patient is placed upon a milk diet, and is treated as follows for the first six days:—

(a) In the early morning, a full dose of saline aperient, to clear the colon.

(b) Deeks' bismuth treatment. As far as we can ascertain, when large doses of bismuth salts are administered by the mouth, but little is absorbed into the system. On the other hand, such administration tends to convert the acidity of the colon contents in amoebic dysentery into alkalinity; and we have found experimentally in cats that the administration of large doses of bismuth salts slightly increases the alkalinity of the

portal blood stream. Accordingly two drachms of bismuth carbonate are given every four hours. It is best administered suspended in half a glassful of water, or preferably soda water.

(c) Two and a half hours after the first dose of bismuth for the day, one grain of emetine hydrochloride is given subcutaneously. It is very difficult to know whether such injections should be given subcutaneously or intramuscularly. If given intramuscularly, the immediate pain and reaction are less, but subsequent induration is more, and often leads to localised, painful, small lumps: if given strictly subcutaneously the immediate pain is more, but the reaction less, whilst absorption is probably more rapid. We prefer the latter route accordingly. Cawston (1922) recommends dissolving the tabloid of emetine in one per cent. carbolic acid, which, he states, renders the injection quite painless and does not interfere with its efficacy.

The timing of this injection is important. The senior writer has found that, as with quinine, so with emetine, the alkaloid exerts its maximal activity when the environment is on the alkaline side. Two and a half hours after the administration of large doses of bismuth salts to experimental cats, there is a slight rise in the alkalinity of the portal blood stream. What we wish to attack are not the *E. histolytica* which have come out into the lumen of the colon, and which have ceased to have opportunities for tissue-destruction; but those which are causing tissue-destruction and ulceration. Hence we desire to throw emetine into the portal circulation and the colon submucosa, if possible, at the moment when the blood stream here is in its most alkaline tide.

(3) After six days of this treatment, all treatment, except the administration of a morning saline aperient, is suspended for three days. Treatment (2) is then repeated for a further three (or six) days. During this period, examination of the stools is useless, since few if any *E. histolytica* are to be found whilst the patient is under full emetine treatment.

(4) The patient has now received nine (or twelve) grains of emetine hypodermically, or nearly as much as he can safely stand. The emetine is accordingly discontinued. The early morning aperient and the bismuth treatment may be continued, the latter if there is still any looseness of the bowels. We prefer, at this stage however, to administer *Yatren* or other intestinal antiseptic.

Yatren, No. 105 Behring Werke, is iodo-oxy-quinolin-sulphonic acid, and is a fairly stable compound. For an adult male of average weight one of the $7\frac{1}{2}$ grain pills may be given three times on the first day; two of them three times on the second day; and two or three of them three times on the third and subsequent days. Clinically, we have found that this compound is of value; and its value is presumably due to liberation of quinoline in the colon. The drug has a tendency to cause diarrhoea if pushed to large doses, and its administration should be supervised. On the other hand, it appears to be of definite value in amoebic cases; and its administration tends to check the secondary bacterial infections to which such patients are liable.

(5) At this stage daily examinations of the patient's stools for *E. histolytica*, in either its vegetative or encysted phases, are commenced. With the examination for cysts of *E. histolytica* we hope to deal in a subsequent paper.

(6) If six consecutive daily examinations of the stool have failed to shew *E. histolytica*, the patient is by this time usually ready for discharge from hospital. But it by no means follows that he is absolutely cured, or that the *E. histolytica* infection is eradicated. Much more probably the infection has merely been so reduced that all clinical symptoms of dysentery have cleared. The infection is still latent, and relapses may—and very often do—occur. On the other hand such “relapses” are not infrequently instances of reinfection. We would like to particularly emphasise this point. If a medical officer in charge of a regimental mess or hostel, etc., gets a number of consecutive cases of amoebic dysentery and of relapses, examination of the mess or hostel servants will almost always shew that one or more of them are *histolytica* carriers; and attention to this matter will save many cases of infection.

The patient is usually discharged from hospital at this date. He is told to take three times daily for three weeks a dose of two drachms of *Extract Kurchi Liquidum*, or the corresponding dose of the Burroughs, Wellcome and Co.'s tabloid of the same drug. *Kurchi* is an indigenous Indian drug with some value in dysentery. It is not a cure for either amoebic or bacillary dysentery, as the incidence of relapse cases in our series assures us; but it will usually keep the clinical symptoms of dysentery under control, whilst it is harmless and non-irritant.

The patient is further instructed to send one stool every week to the laboratory for examination; for at least six, but preferably for eight weeks. The stools are examined for cysts of *E. histolytica*. (The question of relapses will be dealt with later however.)

Whilst such a line of treatment may not sterilise the majority of cases of *E. histolytica* infection, yet we claim that it is safe and free from dangers of overdosage, that it will cure the vast majority of cases as far as clinical symptoms go, and that it is well tolerated. Also, it is applicable in any dispensary. If Yatren be not available, the patient can be put directly on to treatment with *Kurchi*, after the nine or twelve doses of emetine have been given. If infection still persists on re-examination, the entire course of treatment should be repeated after an 8 to 10 day interval to allow of elimination of all emetine from the system.

TREATMENT. (B) ACUTE BACILLARY DYSENTERY.

Here everything depends upon whether the infecting organism present belongs to the Shiga or to the Flexner group. In either case, the first essential is ten days' complete rest in bed in order to allow the ulcers an opportunity to heal. This should be an invariable rule in all cases of dysentery, of whatever character, and whether acute or chronic.

(2) As regards diet, everything depends upon the nature of the infecting organism present. The Shiga and Flexner bacilli both produce endotoxins. But, as shewn by Acton, Chopra and Boyd (1922), the Shiga bacillus, if grown in a medium rich in proteoses, such as results from a meat diet, also produces an exo-toxin of the nature of a pressor base, which induces a condition of profound shock in the patient. Hence, whether an infection with the bacillus of Shiga may result in a fulminant and fatal attack of dysentery, or merely in a mild diarrhoea, may depend very largely upon the richness of the substrate, i.e., of the contents of the colon in proteoses or

otherwise. In a Shiga infection animal proteids should be absolutely eliminated from the diet and carbohydrates administered instead. The diet should in general consist of arrowroot, barley water, Mellins' food, glucose feeds, tea and coffee with very little milk, and possibly light biscuits.

In a Flexner infection, on the other hand, proteids may be given freely; and meat extracts, chicken broth, citrated milk, gelatine and jellies may be given. These cases often shew intolerance to carbohydrates, and carbohydrates should accordingly be eliminated.

(3) *Specific Treatment.* In Shiga infections the specific anti-serum should be given immediately, and is only of value during the first 48 hours of the attack. It should be given intravenously and in doses of from 40 to 100 c.c., depending upon the severity of the attack. If so used, it acts like a charm. The number of stools is immediately reduced; the symptoms of toxæmia disappear; the temperature comes down, and the patient passes from a critical condition into one of relative comfort. It is a curious fact that India to-day is entirely dependent upon other countries for this much needed and valuable remedy. Further, the transit of such serum through the Red Sea during the hot weather months may perhaps lead to a lowering of its potency. There seems no valid reason why all the anti-dysenteric serum required in India should not be manufactured in this country.

(4) *The state of the bowels.* If the case be seen early, the best purgative to give is castor oil with a little tinct. opii. added to it, as it acts upon the small intestine, clearing out the contents, which are rich in amino-acids and sugars, the products of proteid and carbohydrate digestion. As

soon as the oil has acted, a change should be made to saline purgatives, and magnesium or sodium sulphate given in one drachm doses every two hours. Although such saline aperients are often regarded as specifics, they act by mechanical removal of bacilli and their toxins, and may also so alter the pH of the contents of the colon as to interfere with toxin production.

As soon as the pain and tenesmus have passed off, the sulphates should be given only every four hours. When the stools have become faecal and are free from pus, the bowels should be kept open daily by a morning dose of saline or an evening dose of liquid paraffin. The latter aperient is perhaps the best of all for repeated use after dysentery, as it is entirely non-irritant. After-constipation must be avoided for at least three weeks. A daily dose of *bæl*-sherbet is a pleasant way of accomplishing this.

(5) *Sedatives*. As soon as the stools become faecal in character, it is time to omit salines (except for the daily morning single dose), and to turn to sedatives. Here the best line of treatment is repeated doses of bismuth salicylate and pulv. ipecac. co., until the stools are black and becoming formed and a good prognosis assured, when the dose may be reduced or the bismuth discontinued. *Iysuf-gul* or *bæl*-sherbet may next be given and act as demulcents.

Stimulants are rarely necessary except in very acute cases, whilst with severe collapse, hypertonic salines on the lines used for cholera may be necessary.

With regard to *relapses* in both amoebic and bacillary dysentery, they must be treated along the lines given for the primary attack in either case; and with even more care and thoroughness than in the primary attack, since

the infection is here more established and more difficult to eradicate.

CHRONIC DYSENTERY.

Were all cases of dysentery seen and properly diagnosed and treated at an early stage, an endless amount of suffering would be saved to patients in India. With ten days of complete rest in bed and proper treatment, based upon full and accurate clinical and laboratory diagnosis, such a condition as chronic dysentery should never be seen. On the other hand, it is one of the most common complaints in India among patients of all races and both sexes. The patient who refuses to go to bed when suffering from acute dysentery or who gets up before the ulcers have had time to heal, or the patient who is inadequately and improperly treated is the typical victim of such a condition; a condition which is one of the most difficult to deal with in the practice of medicine in the tropics.

(A) CHRONIC AMOEBIC DYSENTERY.

The chronic amoebic case is especially characterised by thickening of the walls of the colonic flexures, palpable in the pelvic colon, at the splenic and more frequently at the hepatic flexure.

In the stools of such cases on repeated examinations almost every phase of *E. histolytica* will be found; quite frequently the stool is a non-dysenteric, pasty one with motile, pre-cystic and encysted forms of *E. histolytica* present simultaneously. Further, here the secondary bacterial flora is of considerable importance.

Now subacute and chronic cases of amoebic dysentery are not infrequently febrile. If a careful four-hourly chart be kept, it will be found that there are occasional

and irregular rises to 99, 99.5 or 100° F. These may arouse suspicion of early amoebic hepatitis, but they are usually due to invasion of the blood stream with streptococci from the bases of the amoebic ulcers in the gut. And with such "streptococcal showers" often go puzzling and but little understood symptoms, transient rashes, attacks of asthma due to invasion of the blood stream by pressor bases from the gut contents, joint pains, etc.

[To be continued.]

MEDICAL RELIEF IN RURAL AREAS.

The following is the Government Order on this subject:—

Fort St. George, October 22, 1924 (G.O. No. 1522, Public Health).

No. 1062.—The problem of bringing medical relief within easy reach of the rural population in the Presidency has been engaging the attention of the Government for some time. The existing facilities in this respect are extremely inadequate; roughly speaking, there is one medical institution for every 200 square miles of territory and for every 60,000 of population, the total number of medical institutions (excluding Madras City) being 734 for a population of about 42 millions; of these only a fraction are hospitals the majority being dispensaries without wards. There are only 7,635 beds provided on the whole. In Great Britain for more or less the same population, there are about 52,200 beds in 952 hospitals besides a large number of poor law infirmaries with 92,000 beds and private convalescent homes and a host of private medical practitioners with dispensaries of their own. The great mass of the village population has hitherto had no opportunity of coming into intimate daily touch with qualified doctors and has had to content itself to a great extent with the services of unqualified men. The Government feel strongly that some amelioration of the condition of the masses is urgently called for and that immediate steps should be taken to bring qualified medical aid within comparatively easy reach of the villagers.

2. The problem would admit of a very easy solution, if the Government had an unlimited supply of funds at their disposal; it would then be possible to establish and maintain a well-equipped public hospital or dispensary in almost every village or for each small rural area. Unfortunately, however, unlimited funds or even the funds required to start a sufficient number of hospitals and dispensaries on existing lines are not available at present, nor is there any

likelihood of their becoming available in the near future. In the circumstances, some alternative scheme has to be devised whereby something substantial may be done at once with the funds available at least as an earnest of the Government's desire to bring medical relief within easy reach of the rural population. Three different ways of doing this have suggested themselves to the Government, namely,

(1) the opening of a large number of Ayurvedic and Unani dispensaries;

(2) the starting of a large number of itinerating or travelling dispensaries; and

(3) the encouragement of private medical practitioners (Allopathic) to settle down in villages for practice by the grant of money subsidies and supply of medicines from public funds.

The first alternative, though it is likely to find favour with the public, is impracticable and unrealizable at present on account of the lack of a sufficient number of duly qualified and accredited practitioners of the indigenous systems of medicine. As regards the second alternative, the starting of itinerating dispensaries has been tried on a small scale but the results have not been encouraging. This method is costly and at the same time unsatisfactory. Patients cannot generally afford to wait for the periodical visit of the itinerant medical officer; he cannot generally be had when wanted and when he is present there may be nothing for him to do in the particular village. Moreover a medical man who is a permanent resident of the village will necessarily command greater confidence and be able to do more good not only in curing sick people, but also in improving village sanitary conditions than an occasional travelling doctor whose visits are few and far between and whom the villagers have no opportunity to know and appreciate. This alternative also must therefore be ruled out of account as one involving a good deal of expenditure without the corresponding advantage.

3. The third alternative, namely, that of subsidising private practitioners who agree to settle down in villages appears to be the cheapest and at the same time the best from many points of view. The idea is to divert to the villages the large number of unemployed medical men who now congregate in the towns for private practice. Besides affording efficient medical relief in rural tracts, this scheme has several other advantages; it will tend also to solve the problem of unemployment to a material extent. For the present, only registered medical practitioners will be admitted to the benefits of this scheme. The subsidy to be given will be low enough to compel the medical men to exert themselves and earn the confidence of their neighbours and high enough to serve as an attraction in the initial stage until they are able to build up a practice. The grant of the subsidy will be subject to the condition that the recipients agree to settle down in specified villages and treat the necessitous poor free. They will otherwise have complete liberty to accept such fees for

medical attendance and treatment as they can get. The scheme will not necessitate any expenditure on buildings or in the shape of leave allowances and pension charges since patients may be examined and medicines prescribed at the doctor's own private residence and the doctor will not be a Government servant. The scheme will also afford the best scope for the development of an independent medical profession in the country. In view of all these considerations the Government have decided to introduce the system in this Presidency as the only practicable means by which the demand for the extension of medical relief in rural tracts can adequately be met under present conditions.

4. Coming to the details, the Government consider that the amount of subsidy to be granted to medical practitioners may be fixed at Rs. 600 a year (Rs. 50 a month) in the case of medical graduates (L.M.S. and M.B.B.S.) and at Rs. 400 a year (Rs. 33-5-4 a month) in the case of practitioners with lower qualifications (L.M.P.). An additional subsidy of Rs. 100 a year will be given to such of the medical men who engage and maintain a qualified midwife in their village for affording maternity relief to the female population. A free supply of medicines to the value of Rs. 360 a year—which will be sufficient to provide drugs for a daily average of thirty out-patients—will also be given free of charge. The average cost of each village dispensary is thus not likely to exceed Rs. 1,000 a year. For the present the Government are prepared to find subsidies for about 220 new village dispensaries which will give an average of about two village dispensaries for each taluk board area. The actual working out of the scheme will be entrusted to the respective local boards; the villages will be selected by them and the medical men by their presidents. The cost of the subsidies will be met entirely by the Government and will be paid as a contribution to the local boards concerned, and they will be disbursed monthly by the presidents concerned. As regards the cost of medicines, the Government consider that local boards may reasonably be expected to meet this out of their own funds. The Government reserve to themselves the right of discontinuing the grant of subsidy in any case or cases after six months' notice or for breach of the condition that gratuitous treatment should be given to the necessitous poor. The District Medical Officers will inspect the dispensaries and submit their reports to the local boards as well as to the Government.

5. The Government trust that the scheme outlined above will meet with the warm acceptance of all local boards and that immediate steps will be taken by them to give effect to it at the earliest possible date not later than the 1st January 1925. They will be glad to be favoured with the views of all local boards on the subject, with information as to the extent to which they propose to introduce the scheme in their respective areas, the number of medical practitioners whom they propose to subsidise, the places at which they will be stationed

and the dates from which the subsidies will commence. The suggestions received from the District Medical Officers of certain districts in regard to the stations to be selected are forwarded to the presidents of the respective district boards for consideration and for communication to the local boards concerned.

6. The Government share of the cost of the scheme will be met from the grant of Rs. 50,564 voted for the purpose by the Legislative Council at its meeting held on the 17th October 1924.

REVIEWS.

A Comparative Hindu Materia Medica, by Mr. Chandra Chakraborty. Published by Ram Chandra Chakraborty, M.A., 58, Cornwallis Street, Calcutta (1923). Price 5s. net.

A timely and useful treatise, dealing with about 800 Indian drugs, their botanical description and therapeutic uses. At a time when there are clear signs everywhere of Indian Medicine coming to its own, this publication is especially welcome; and we recommend it to all those who are interested in Indian Medicine.

Race Culture, by Mr. Chandra Chakraborty. Published by Snsruta Sangha—177, Raja Dinendra Street, Calcutta (1924). Price Rs. 1-4-0.

This book is an attempt to deal with a difficult and delicate subject in a manner that would be beyond the usual criticisms levelled against such publication. It provides interesting reading even when the reader may not see eye to eye with the author.

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