REVIEWS

"*Leprosy, Its Challenge and Hope*", by R. G. COCHRANE, issued by the Mission to Lepers (i.e. To Leprosy Sufferers), 7 Bloomsbury Square, London, W.C.1.

This is a booklet of 35 pages and 12 illustrations, in which Dr. Cochrane sets out the challenge of the world leprosy problem as seen today, with perhaps 15 million leprosy sufferers existing in the world today, and the challenge to us of its curability, for not only are the standard drugs efficient but new drugs are becoming available. There is also the discovery of the prevention and cure of leprosy deformities by the use of physiotherapy and surgery. This pamphlet brings a message of hope to leprosy patients and a challenge to us to produce the personnel and the effort needed to eradicate leprosy in our time.

Sbornik Nauchnikh Rabot Po Leprologii i Dermatologii No. 13. (Collected Scientific Papers on Leprology and Dermatology No. 13); Rostov Experimental and Clinical Leprosarium of the Ministry of Health of the USSR, and the Chair of Skin and Venereal Diseases of the Rostov Government Medical Institute.

This symposium of papers is always of great interest. No. 13 contains 155 pages. Prof. N. A. TORSUEV on pp. 3–13 reviews *leprosy epidemiology*. He emphasizes the need of a comparative study of different endemic zones the regular use of the Mitsuda for contacts, the use of BCG vacination, and prophylactic sulphones. He thinks we need to find a perfect experimental model of human leprosy. G. TCHIRAKADZE, pp. 17–20 gives a paper on the *history of leprosy in Georgia* and deals of the documentary evidence of its existence there in the 11th and 12th centuries. R. A. TRAPEZONTSEVA and K. A. VESSELOVSKY, pp. 21–28 deal with *blood catalase in leprosy* and show that the level is reduced markedly, which is bound up with changes in the body in the processes of oxyreduction. R. A. TRAPEZONTSEVA and K. A. VESSELOVSKY also deal with the *metabolism of Bromine, Potassium, and Calcium in leprosy patients* (pp. 29–41). They carried out 1843 blood analyses and showed a reduced level of potassium and calcium in advanced lepromatous cases and at the same time a low Bromine level in any case of leprosy, of whatever type and stage. The alterations are probably connected with functional disorder of the nervous system. Prof. N. A. TORSUEV discusses on pp. 43–47 the use *of the preparation* RD *in leprosy treatment*. RD is the gamma fraction of oxydiphtherinic acid, and broadly speaking, is equivalent to use of salts of ethylesters of hydnocarpus oil. It is used in a watery solution of strength 0.25 to 0.5%, in a dose of 0.5 to 1.0 mg, given perineurally every second day to patients suffering from acute and subacute neuritis. It is said to cause a rapid disappearance of symptoms of pain. For intense pain he recom-

mends an endoneural injection. The use of a 1% solution is indicated by intramuscular injection in the case of neural disturbances, especially at the beginning. The injections are given every second day, up to a total of 20, at a dose of 0.2 mg. If the treatment is repeated, the injected dose increases each time by 0.2 mg. V. LOGUINOV and I. EFIMOV discuss the influence of the sulphones on the cardiovascular system of leprosy patients, pp. 48–51. They used electrocardiographic examination on 47 leprosy patients under sulphone therapy, and towards the end of treatment there were quite marked changes in 22. A. S. DICHKO, pp. 63–69 discusses *pruritis and changes in the peripheral nerve receptors in the skin in leprosy.* He used the dionine test to examine 29 leprosy patients. There does not appear to be much relation between pruritis and sensation to pain, temperature, and touch. In certain cases the application of dionine produced pruritis in a symmetrical zone on the other arm, which seems to indicate that pruritis is connected with cerebral cortical processes.

Vestnikh Dermatologii. Venerologii (*Journal of Dermatology and Venereology*), Nos. 11 and 12, Moscow 1960.

These two issues contain a total of 194 pages, and there are several paper on leprosy. In No. 11, pp. 3–6, N. V. NIKITINA, A. A. STUDNITSIN, and V. K. SHUBIN discuss "The Tasks of Leprosy Control in the U.S.S.R." In No. 12, pp. 3–6, Prof. N. A. TORSUEV has a paper on "Nerve Endings in the Human Skin", a subject of great importance in human leprosy.

Etude des Mutilations Lepreuses (*Study of Leprosy Deformities*), 1961. M. LECHAT.

This monograph contains 276 pages with an atlas of 85 X-rays and arteriograms. It is written mainly in French, but there are Summaries in English and Spanish. There are 221 References. The illustrations are of excellent quality, and well described. This valuable monograph should be in every library, personal or scientific and has appeared just as the right time in history when attention to leprosy deformities and honest attempts to prevent and relieve them have at last become a joyous part of the "Zeitgeist" of world leprosy.

Premier Colloque International Sur Les Mycobactéries (*First International Symposium on the Mycobacteria*), 4–6 Dec., 1959, Institut de Medicine Tropicale Prince Leopold, 155 Rue Nationale, Anvers. This booklet contains 198 pages, mainly in French, German, and English.

Prof. L. M. G. GUERDEN opens with *Introduction a L'Etude des Mycobactéries et des Mycobacterioses*, and states that mycobacteria are characterized by their acid-fastness which is conditioned by their waxy envelope. There are 3 groups, poikilotherms, homoiotherms,

and saphrophytes. They are identified by culture, animal inoculation, sensitivity to antibiotics, phage typing, histopathology, biochemical and antigenic structure, etc. They vary in pathogenicity and in stimulation of allergy and diagnostic procedures include bacterioscopy, culture, antigenic reactions, and serological tests. The present position includes the discovery of the "atypical" mycobacteria and of pathological conditions and epidemiological facts which do not conform to the classical picture. The author recommends research by different disciplines on a comparative plan. Dr. A. DEVOS discussed *Les Techniques D'Isolement des Mycobacteries* and surveyed the different media and current methods for isolation of mycobacteria. The choice of the medium and of the homogenisation technique should depend on the number of mycobacteria present in the pathological material and also on its degree of contamination by fungi and bacteria. It is necessary to use different media and different temperatures to allow the mycobacteria to obtain the most favourable conditions for growth. I. W. LESSLIE reported on *Purified Protein Derivatives from Mycobacteria.* He includes also PPD from *M. johnei.* The problem of non-specific reactions in animals free of tuberculosis has been solved in UK by the use of avian tuberculin, naturally taking into consideration the history of the herd and its environmental factors. The non-tuberculous mycobacteria are widely present in nature. Acid-resistant mycobacteria of rapid growth have been isolated in 2.5% of cases out of 5000 samples examined, all from a herd free of tuberculosis. From tuberculous mammitis of cows 3 different types have been isolated and from cattle a certain number of chromogenic strains of slow growth have been recovered. Three PPD preparations from saphrophytic mycobacteria (*M. smegmatis*, *M. fortuitum*, *M. phlei*) have been tested by intradermal injections in guinea pigs and with sensitized cattle. The specificity was shown to be useful and reliable for the rapid identification of saphrophytic mycobacteria. Cows and calves, experimentally infected with cultures of these 3 strains, developed an allergy uniquely corresponding to the respective PPD. The reactions obtained with *balnei* PPD increased in intensity thrice that to human PPD in animals sensitized previously with *M. balnei.* The specificity tests showed, that in guinea pigs sensitized by means of *M. johnei*, the reaction with *johnei* PPD was 2.9 times stronger than with avian PPD, and with those sensitized per *johnei* PPD and avian PPD, six times stronger with avian PPD than with *johnei* PPD. The differences between *johnei* PPD and avian PPD were not as marked in cattle as in the guinea pig. A fairly high proportion of animals clinically attacked gives a negative reaction. The author will continue his researches with PPD of new mycobacteria, and comparative studies with tuberculin PPD could contribute greatly to our knowledge of the allergic reactions, in animals as well as man.

Prof. P. HAUDUROY also discussed classification in his paper *Essai Sur la Classification des Mycobactéries.* He mentions some of the names, *Mycobacterium phlei*, *M. lacticola*, *Smegmatis friburgensis*, *M. smegmatis*, *M. butyricum*, *M. ranae*, *M. tuberculosis var. hominis*, *M. bovis*, *M. avium*, *M. leprae*, *M. ulcerans*, *M. balnei*, *M. kansasii*, *M. johnei*, *M. paratuberculosis*, *M. enteritidis chronicae pseudo-tuberculosis bovis*, *M. tuberculosis var BCG*. Mycobacteria as a whole possess group characteristics. Differences in the types (*hominis*, *bovis*, *avium* and *johnei* are shown by certain biological characters, such as possible pigmentation of cultures, tolerance to temperatures at different stages of growth and with different media, initial resistance to certain antibiotics, lack of pathogenicity to the guinea pig, etc. "Mixtures" with mycobacteria are a source of fatal errors. Strains that have been isolated should be lyophilized and preserved in a collection. The International Centre should preserve sample strains and be ready to supply them. In classification the only general agreement is on acidfastness. Classification needs much further study. The author proposes the formation of a study group for the mycobacteria.

Prof. G. PENSO gave a paper on *The Identification of the Mycobacteria in the light of their Antigenic Constitution.* His own research has been on the immuno-electrophoretic study of the pathogenic and saphrophytic mycobacteria. By electrophoresis the number of antigens was found to be constant for each species. There is a generic antigen in all the mycobacteria, and another specific one for the pathogenic strains. The bovine mycobacterium has the most complex antigenic structure. Each strain has a whole series of antigens specific for it. Phage-typing gives a very clear parallel result to electrophoresis. Strains sensitive to a phage have also a common antigen.

J. ASSELINEAU gave a paper on *Composition de la Partie Peripherique du Bacille Tuberculeux.* He studied the composition of the superficial lipids of *M. tuberculosis*, particularly the "cord factor", the cell wall, and Wax D extracted as per ANDERSON. He concludes that the D waxes are constituents of the cell wall. This explains the hydrophobic nature of *M. tuberculosis*, its acidfastness, the differences in the behaviour of the virulent and avirulent strains to neutral red, the parietal localization of the factor responsible for sensitivity to tuberculin. In spite of certain discordances one can say that *M. tuberculosis* has a cell wall rich in lipids, which at least in the virulent strains is itself covered by a lipidic film containing the "cord factor".

Prof. G. PALLASKE discussed the *Pathology of Mycobacterial Infections in Animals and Man.* He said that in man and animals a tuberculous infection causes inflammatory reactions which are proliferative, or exudative, or all stages between. In the horse the disease

is proliferative, as also the disease in the swine caused by the avian type. It 's the same but less so in carnivores, monkey, giraffe, mouse, rat, hedgehog, hamster, and guinea pig (sometimes). The exudative form is often typical in bovine and caprine tuberculosis but rarely in other animals. Johne's disease, or bovine hyperthrophic enteritis is striking because it is limited to the intestines and mesenteric glands. It is chronic and is invariably fatal. The cutaneous nodules of bovines have been studied in the U.S.A.: acidfast bacilli are always present and on culture they have never been found to be tubercle bacilli. These cutaneous nodules show a certain resemblance to those of leprosy.

Prof. Ch. GERNEZ-RIEUX gave a paper on *Le Sero-Diagnostic des Infections Provoquées par les Mycobactéries*. Either specific or non-specific biological reactions are caused by mycobacteria. The antigenic relationships between the various mycobacteria are one cause of the difficulty in identification of mycobacterial infections. The method of passive haemagglutination is the most sensitive, in which the red cells sensitized by an antigen or a haptene are specifically agglutinated by a serum containing the homologous antibodies. When alexin is present the agglutination is replaced by haemolysis. The antigens responsible are of 2 types, polysaccharides, and proteins. Group reactions are seen in man (tuberculosis–leprosy) and in animals (tuberculosis–hypertrophic enteritis). Though the phenomena are complex, the haemagglutination and the conditioned haemolytic reactions deserve to keep a high place in the serodiagnosis of mycobacterial infections. The precipitation reactions are useful for determining the atnigenic relationships between the various mycobacteria but so far it has not been possible to use them for clinical diagnosis. In serodiagnosis one must always be ready to take into account (1) cross reactions, (2) lack of antibodies due to changes in the general condition of the patient; (3) neutralization of antibody by excess antigen during long term infections.

Prof. J. MORTELMANS gave a paper on *Mycobacterial Infections in Animals in the Belgian Congo and Ruanda Urundi*. Human tuberculosis has been known a long time in these countries. The animal form is mostly sporadic, and Johne's disease still more sporadic. Skin lesions are sometimes caused by saphrophytic bacteria. The incidence of bovine tuberculosis is low, and indigenous cattle have only a very little. Avian tuberculosis is very rare. Bovine tuberculosis in Ruanda Urundi is widespread, as is human tuberculosis. In tuberculin testing, for European cattle in the country the position is much the same as in Europe, but there are many false reactions among the indigenous cattle, caused by the classical causes and also by mange, ringworm, demodecosis, skin microfilariasis, photosensitivity, eczema, ticks, skin trypanosomiasis, minute wounds caused by insects, actinobacillosis, etc. The influence of the tropical sun is a definite one.

Dr. H. HUITEMA discussed PPD *and Tuberculin Tests in Cattle.* He said that the only way to favour the eradication of tuberculosis in cattle was to suppress the animals reacting to tuberculin. To this end PPD tuberculin is a sufficiently trustworthy method: he gives his method of preparing and using it. He describes nonspecific reactions met with. He thinks it probable that the nonspecific allergy is caused by saphrophytic mycobacteria always present in the intestine.

Dr. M. J. QUERTINMONT gave a paper on *Les Plaies a Bacilles Acidoresistants* (*Ulcers due to Acidfast Bacilli*). He described a series of necrotic ulcers separating at the edges caused by unidentified acidfast mycobacteria in Maniema in the Belgian Congo. The disease is only mildly contagious and children are more liable to be affected. The lesions are destructive, accompanied by fever and intense osteoporosis and may result in functional deformities (in the disseminated as opposed to the localised form). By intradermal tests the condition seemed quite specific and not leprotic nor tuberculous. The pathology was of an acute infection of a predominately necrotic nature. Entracellular acidfast bacilli were found in the necrotic areas. These are *M. ulcerans* of a local form *M. kasongo* and the author thinks it is the only one to be disseminated by the blood stream and to cause bony or intra-articular lesions.

Drs. J. P. DELVILLE and S. R. PATTYN discussed the *Histology of Ulcers due to Acidfast Bacilli.* They studied 15 biopsies taken from ulcers. The bacteria may be found in the necrotic portions, which helps diagnosis from tuberculosis and leprosy. There is typically deep and extensive ulceration and chronic inflammatory lesions and massive necrosis of the subcutaneous fat.

Drs. F. SCATTOZZA and G. MONDINO described their attempt to grow tubercle bacillus on Hela cells. He studied the behaviour of certain strains of *M. tuberculosis* on Hela cells. Three strains were used and refreshed at regular intervals (8–12 hours) on a Dubos medium with tween-albumin. For inoculation, cultures at 5 to 8 days were used. The bacilli could be observed intracellularly. The Hela culture kept up well at least in the first stages of the infection. Results seemed to show the possibility of this method of culture, and behaviour of strains of mycobacteria can be differentiated by their behaviour on Hela cells.