ABSTRACTS

BCG Vaccination in Pakistan

[In view of the possible value of BCG in the prophylaxis of leprosy, the following abstracts from **Chronicle of World Health Organisation,** Vol. 10, No. 5, may be of interest.—Ed.]

In August, 1949, the Government of Pakistan, with the assistance of the International Tuberculosis Campaign (ITC), started to carry out a professional training and demonstration project with the aim of familiarising Pakistani doctors and nurses with the technique of BCG vaccination. At the end of 1950, the programme was being applied in all the provinces of the country and was favourably received everywhere.

When the BCG programme was launched in 1949, practically nothing was known as regards the tuberculin sensitivity of Asian peoples, and it was decided to employ the same technique as that used for BCG campaigns in Europe. The Mantoux test was used for case-finding, i.e. the intradermal injection of 1 TU, followed by an injection of 10 TU in the event of a negative reaction. The reaction was considered positive if the induration measured 6 mm. or more in diameter three days after the injection. Only persons who reacted negatively to both 1 TU and 10 TU were selected for BCG vaccination. This method, which required three visits, was simplified as soon as the results obtained by the Tuberculosis Research Office (TRO) with single injections of 10 TU or 5 TU became known. A dose of 5 TU has been used since August, 1950. The Moropatch test, which was applied at the outset to children under 12 years of age, was given up after a few months for various reasons, in particular because it was less sensitive in the case of Pakistani children than the Montoux test.

At the 1951 census, the population of Pakistan was 76 million; 12 million inhabitants underwent the tuberculin test between August, 1949, and December, 1954. Nevertheless, only 9 million attended for the reading of the test, so that a quarter of the tests were carried out in vain. Four million, or slightly less than half the persons completing the test, gave no reaction; and almost all of them (99 per cent) have been vaccinated.

The age distribution of the persons tested is as follows: under 7 years of age, 21 per cent; 7-14 years, 29 per cent; 15-19 years, 15 per cent; 20 years or more, 35 per cent. The corresponding figures for persons vaccinated are 32, 36, 13 and 19 per cent. As can be seen, the vaccinated population is, on the whole, younger than the tested population. This is due to the fact that a relatively

high proportion of older persons reacted positively to tuberculin and consequently were not eligible for vaccination.

Tuberculin testing during mass campaigns can give an approximate idea of the prevalence of tuberculosis in a community. For this purpose, the population concerned should be divided into two separate groups,. the infected and the non-infected. It may be asked to what extent classification according to the diameter of the induration enables such a distinction to be made. It is impossible to say with absolute certainty whether a person with a 4 mm. or 5 mm. reaction belongs to one or the other group. In West Pakistan it was found, however, that these " doubtful " reactions constituted only 4 per cent of the total. In East Bengal medium-sized reactions are much more frequent than in West Pakistan, and the distribution of reactions according to the diameter seems to indicate the presence of two types of tuberculin sensitivity; a high-grade sensitivity due to tuberculous infection and a low-grade non-specific sensitivity*. The presence of non-specific sensitivity (which has been observed, moreover, in other parts of the world) would seem to limit considerably the usefulness of the tubeculin test, since the largest non-specific reactions cannot be distinguished from the smallest specific reactions. In West Pakistan it is difficult to classify persons developing indurations of 4-5 mm. after the administration of a dose of 5 TU; in East Bengal the same problem arises for persons with reactions between 4 mm. and 10 mm., i.e. 40 per cent of the population tested.

In determining the prevalence of tuberculous infection on the basis of the number of persons found to be allergic to tuberculin, it was decided to exclude the figures for East Bengal, in view of the frequency of non-specific sensitivity in that province, as well as the data collected in the tuberculosis dispensaries and permanent BCG centres and during control tests.

Bearing these reservations in mind, the distribution of tuberculin-reactors of both sexes belonging to the age-groups 7-14 years and 15-19 years respectively, is as follows: 48 and 65 per cent in the provincial capitals, 45 and 52 per cent in the urban areas, 41 and 56 per cent in the rural areas. Allergy is generally more frequent among young men of 15-19 years than among girls of the same age. As to children aged 7-14 years, the study has revealed a very interesting fact, namely, that in the large towns the percentage of positive reactors is higher among boys than among

* Can this be partly the result of infection with leprosy which is much more common in East than in West Pakistan?—Ed.

girls, while in the other urban areas it is almost equal for both sexes, and in the rural areas it is higher among girls than among boys.

Treatment of Ulcer of the Foot, by Rev. C. C. Pande and Dr. J. N. Banerjee, Bankura Leprosy Home.

With simple dressings and rest of the foot, chronic foot ulcers may heal within six or eight weeks, where there is no underlying dead bone. Shoes are used with a packing of sawdust and rubber solution paste in the sole of the shoe to prevent pressure at the ulcer points on the sole of the foot. The shoes give comfort and check development of the ulcer, as long as the sawdust paste remains spongy. This paste slowly becomes hard, but remains good for 3 to 4 months. As it is expensive to supply a patient with shoes two or three times a year, simple dressings were tried and found very satisfactory.

On 7.10.55 six patients (three male and three female) with ulcer of the foot were selected. Two had very bad anaemic superficial ulcers. The margins of the ulcers were cleaned and dead tissue was removed. The ulcer was rubbed with methylated spirit and dressed daily with lint soaked in 5 per cent aqueous solution of sulphetrone. Two patients who had oedema and slight discharge at the beginning were given magnesium sulphate baths for a week, which cured the discharge.

The patients' movements were restricted. The area of the ulcers began to diminish from the third week, and by the seventh week all the ulcers had healed. One patient, the oldest of the six, did not restrict his movements and had small ulcers in two places. All the patients are now allowed moderate walking and to date (February, 1956) no ulcers have recurred.

*** Trop. Dis. Bull., Vol. 53, No. 1, Jan. 1956**

An Attempt to Control Leprosy by BCG Vaccine in the Loyalty Islands, by **Lacour.** 1955. Noumea, New Caledonia: South Pacific Commission.

The Loyalty Islands were considered particularly suitable for the trial because of the stability and homogeneity of its population, and because there was already accurate knowledge of leprosy and detailed records of annual case-finding. The total population is 12,612. Leprosy entered the islands in 1880 when a teacher

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returned from Guama (Maré) infected with the disease. In 1899 there were 125 cases on Maré, 60 to 80 on Lifou, and in 1924 there was an index of 5.39 per cent on Ouvea. In 1953 the census gave 338 on the three islands, and in October 1954 there were 319, of which 98 were considered contageous and were isolated, the remaining 221 were placed under medical supervision in the villages.

The operational work was the lepromin test on the 1st day, recording the lepromin test and doing the tuberculin test on the 21st day, recording the tuberculin test and BCG vaccination (if necessary) on the 25th day. Preliminary BCG vaccination had been contemplated but was abandoned for lack of staff. The BCG vaccine used was dry frozen BCG from the Pasteur Institute, Paris. It was applied in parallel skin scarifications made through drops of vaccine suspension applied to the forearm. The vaccine had to travel over sea, a 30 to 36-hour trip, in thermos flasks, but was found on culture to show no loss of vitality.

Work was begun on Maré Island and, after a two days' survey, 2,639 of the 3,602 inhabitants were lepromin tested and 2,611 tuberculin tested. Some inhabitants were absent fishing and on other employment: 1,321 were vaccinated with BCG. Similar work was done on the other islands.

The tuberculin, lepromin and other indices are given in tabular form. During the next years an attempt will be made to control and maintain tuberculin allergy, study Mitsuda reaction, test those not seen originally and the newly-born, and study carefully all new cases of leprosy through clinical, immunological and bacteriological procedures.

Study of the Staining of Acid-fast Bacilli with Sudan Black, by **R. Chaussinand** and **M. Viette.** Ann. Inst. Pasteur. 1955, Sept., Vol. 89, No. 3, 28089.

The authors describe a method of staining acid-fast bacilli with Sudan black in alcoholic solution, and decolourising with acetone, then contrast staining with Pyronine or Safranine. With this tubercle bacilli are stained black, leprosy bacilli are not stained at all, rat leprosy bacilli gray, paratuberculous bacilli different shades from black to Safranine. The *Myco. marianum* was stained more or less like the paratuberculous bacilli. It is hoped to use this method for classifying acid-fast bacilli.

Is it Possible to Reinforce the Positivity of Mitsuda Reactions Brought about with Dilute Antigens without Losing the Specificity of their Response? by **H. Floch.** Bull. Soc. Path. Exot. 1955, Vol. 48, No. 3, 372-5.

Using a Mitsuda antigen of 1/750 dilution it was found, upon comparing the results with this alone and those when 2 per cent of liquid paraffin and 12 per cent of glycerine were added, that of 102 tests 42 were the same, in 9 the supplemented antigen were inferior, and in 51 it was superior to the unsupplemented. In 12 the reaction was negative with both antigens. It is therefore concluded that the diluted antigen effect is enhanced without the specificity of the reaction disappearing.

Can Vaccination with Myco. marianum be used in the Prophylaxis and Treatment of Leprosy? by **R. Chaussinand** and **M. Viette.** Rev. Coloniale de Med. et Chir. 1955, Vol. 27, No. 238, 158-62.

Three suspensions of acid-fast bacilli killed by heat, B. fleole, Myco. marianum, and BCG, were injected, each into six guinea-pigs. After the third injection they were all submitted to the lepromin test. There were 4 reactions with Myco. marianum, and 5 with BCG, and the sizes of the nodules produced were considerably larger with BCG. It is therefore considered that this is evidence that BCG is superior to Myco. marianum in the prophylaxis of leprosy, especially as the former can be used alive.

*** Trop. Dis. Bull., Vol. 53, No. 2, Feb. 1956**

Six Months Treatment of Leprosy in South Vietnam with 4,4' Diamino-diphenyl Sulphoxide and 4,4' Diethyloxythiocarbanilide, by **N. P. Buu-Hoi, Nguyen-Ba-Khuyen** and **Nguyen-Dat-Xuong.** Bull. Acad. Nat. Med. 1955, Vol. 139, Nos. 15/16, 275-80.

The former of these drugs (styled DDSO for short) was tested for six months on 34 patients, of whom one was of the indeterminate type, 6 were of the lepromatous type, and 27 mixed [no definition is given of this term.] The daily dosage was 0.1 gm. given orally from the beginning of treatment and continued throughout. In 19 of these the treatment effects were watched throughout, and in 13 there was more or less marked improvement clinically. In 2 cases the skin smears became negative, and in 14 the nasal smears

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became negative. There were no toxic symptoms, and there were no reactions except in 2 patients in which it was evanescent and soon disappeared when they were put on reduced doses of 0.05 gm.

The second of these drugs (styled " dialide " for short) was tested on 13 patients, of whom 2 were indeterminate and 11 mixed. The dosage was the same as for DDSO. There was clinical improvement in 11 patients, all signs almost disappearing in one and nearly so in another. Thickening of nerves quickly became less. In 2 patients an eczematous rash came out all over the body and treatment had to be stopped. In 2 patients the skin smears became negative and in 11 the nose smear became negative.

Later, a group of 300 patients living at home has been treated with dialide, and they have stood the treatment well, except for a few who had eczematous eruptions at the beginning of treatment, which disappeared when the dosage was reduced. In all these the improvement was similar to that in the former group. The authors consider that the nasal smears became negative more quickly than under treatment with other drugs.

May we use Vaccination with Myco. marianum in Prophylaxis and Treatment? by **R. Chaussinand** and **M. Viette.** Bull. Acad. Nat. Med. 1955, Vol. 139, Nos. 7/8, 165-9.

The only justification for the use of a vaccine prepared from Myco. marianum would be if it produced a stronger sensibility to lepromin than does BCG, and the authors have shown by comparative trials that it does not do this. This organism belongs to a vast ill-defined group of mycobacteria known as paratuberclous, many members of which group have been tested in the treatment of leprosy, but never with any beneficial results. It would, therefore, not be right to deprive leprosy patients of the value of sulphones in order to test the questionable therapeutic effects of Myco. marianum.

Bacteriological Interpretation of Skin Smears and Biopsies in Leprosy, by **D. S. Ridley.** Trans. Roy. Soc. Trop. Med. 1955, Vol. 49, p. 449.

It was found in histological studies of leprosy patients, 11 in number, that the result of treatment did not at first diminish the density of bacilli in the leproma, but led to invasion of the leproma by the surrounding healthy corium, while the uninvaded portion remained densely bacteriologically positive. In this way many nodules disappear during the early stages of the treatment. It is

considered that serial biopsies at 2-month intervals, and using improved methods of staining sections, give a more accurate estimate of improvement under treatment, though multiple smears provide a more rigorous test of cure.

Isoniazid with Sulphones in Lepromatous Leprosy, by **W. H. Jopling** and **D. S. Ridley.** Trans. Roy. Soc. Trop. Med. 1955, Vol. 49, p. 453.

Four batches of lepromatous (one was border-line) patients were tested, 3 on sulphones, 3 on sulphones with isoniazid, 3 received the combined treatment followed by sulphones alone, and 2 received sulphones followed by combined treatment. The result failed to establish an advantage for either of the 2 types of treatment at the end of 2 years. The only side effect of isoniazid was an elevation of the glucose tolerance curve, followed by a return to normal after the cessation of treatment.

Radiological Bone Changes and Angiographic Findings in Leprosy, by **D. E. Paterson.** Journal of the Faculty of Radiologists, 1955, Vol. 7, No. 1, 35-46.

A study has been made of 542 films from 116 selected patients. Bone changes are divided into: bone destruction, joint changes, bone absorption, and osteoporosis. Bone destruction may be local and in the form of " cysts " due to foci of lepra bacilli, especially when lepra reaction occurs. A destructive lesion in the medulla may cause expanded cortex similar to tuberculous dactylitis. Joint changes are commonly the result of infection with lepra bacilli in the subarticular bone. But bone destruction is most commonly connected with injury resulting from the diminution or absence of sensation. The patient fails to take precautions after such injury and secondary infection enters then spreads to the bone.

Bone absorption is shown by radioscopic evidence to be evenly and smoothly removed from the ends or from the subperiosteal layers of the bone. The author does not believe that this change, which was found in 97 of the 108 cases, can be termed " atrophic," for it is found in other diseases such as acute osteitis, periostitis and osteomyelitis in which there is not neural involvement.

By using angiograms, after intra-arterial injection of diodone, studies were made of the vessels of the fingers. Digital arteries were found to be narrowed in badly deformed fingers of leprosy in a way similar to what is found in rheumatoid arthritis, but this may be due to want of use or to former non-specific infection.

Evidence is quoted for the theory that bone formation and destruction can be caused by nervous stimuli. " Where there is a nerve lesion it is known that trophic changes take place in the skin. In sensory loss there is absence of normal reflex stimuli that may well influence the mechanism of tissue repair and replacement. There may well be a similar reflex nervous mechanism controlling the balance between osteoclasts and osteoblasts. There is no evidence, however, that the bone changes in leprosy are *primarily* due to loss of such a nervous mechanism. It is also shown that the type of concentric " atrophy " seen in leprosy, tabes and syringomyelia can also occur in mycetoma and non-specific ulceration where there is no disease of the nervous system. " It is thought that in cases of concentric absorption there is occlusion of the vascular end-loops in the soft tissue and in the periosteum as a result of periostitis, haematomas, or devitalised tissue. Blood supply to the periosteum is therefore affected in such a way that osteoclasts rather than osteoblasts are at work. The vascular end-loops and the veins draining the medulla may be protected from this process, and so in the medulla compensatory new-bone formation can take place."

The article is illustrated with 35 figures.

The Medical Problems of Easter Island, by **G. Roberto.** Rev. Med. de Valparaiso, 1954, Sept., Vol. 7, No. 3, 302-9.

This little island, nearly 1,900 miles to the west of Caldera on the coast of Chili, has an area of about 69 square miles. It was annexed by Chile in 1888. The population does not exceed 800. The chief sanitary problem of the island is leprosy, which is supposed to have been brought by Polynesians, originally from China. In 1952 there were 34 leprosy patients (12 women and 22 men), 27 of whom were between 20 and 30 years of age. There is a leprosy hospital with 3 wards and 20 beds, and the condition of the patients is now very much better than it was 20 years ago. There are now 14 in the hospital, 21 on ambulatory treatment with DDS, and 17 under observation. There is no word of syphilis in the reports. Tuberculosis has not been introduced, and it is suggested that the inhabitants should be protected by BCG vaccination. Virus epidemics are often spread rapidly after the arrival of ships, the infection returning to the crew with increased virulence after spreading through the inhabitants.

* **Trop. Dis. Bull., Vol. 53, No. 4, Apr. 1956**

Serology in Leprosy: Antilipoid and Antisyphilitic Antibodies, by **G. Tarabini Castellani.** Rev. " Fontilles," Valencia, 1955, July, Vol. 3, No. 8, 572-7.

Serological tests were practised, using the sera of 20 leprous patients. All these sera were positive or partly positive to Bordet antigen and to the Meinicke, Kahn and Citocol tests. Using the Palida reaction (complement-fixation using an antigen derived from the treponema of Reiter) only 2 of the sera were positive and a third doubtful. From this it was concluded that only in those 2 (and doubtfully in a third) sera was there present antisyphilitic antigen, though in all of them there was antilipoid antigen.

* **Trop. Dis. Bull., Vol. 53, No. 5, May 1956**

Leprosy in the United States, by **L. F. Badger.** Pub. Health Rep. Wash. 1955, June, Vol. 70, No. 6, 525-35.

No nation-wide case-finding programme has ever been conducted in the United States to find out the prevalence of leprosy. The data in this paper are based on the records of patients admitted to the National Leprosarium at Carville from its opening in 1921 up to 1953. Patients were admitted from all but 8 of 50 States. Of the 1,465 admitted, 326 were from Louisiana, 324 from Texas, 294 from California, 158 from New York, and 102 from Florida. Of the 1,465 total, 822 were born in the continental United States, and 637 in foreign countries. A number of foreign-born persons in whom clinical leprosy developed after their arrival in the U.S. were not admitted to the leprosarium; thus of 248 cases in California who were born in Mexico, only 100 were admitted. Of 50 States, 15 are recorded as non-endemic, that is without records of patients being born in them, though 7 of these have sent patients born abroad to the leprosarium. " Of 158 patients admitted from New York, 140 were of foreign birth and only 18 were born within continental United States. Of the latter only 2 were born in New York." During the period 415 patients were admitted from non-endemic States and the District of Columbia. Of these, 288 were born outside continental U.S. and 126 were natives of the U.S., the birthplace of one was not known. Of 521 known cases in California, 436 were of foreign birth, 41 were born in other States, and only 34 were born in California, the birthplace of 10 are unknown. Not only is leprosy confined to a few States, but it is

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also confined to a limited area in each of these States. In Florida, cases were recognised among residents of only 11 of the 67 counties during the 33-year period, and of only 8 counties during the last 10 years. It has been concentrated in one country, Monroe, and within this county, in Key West. Of 96 Florida-born patients, 44·5 per cent resided in Key West at the time of diagnosis. Of the foreign-born patients admitted 100 were from Mexico, 52 from the West Indies, 49 from the Philippines, 28 from China, 23 from Greece, 18 from Italy, 10 from Russia, and 8 from Spain. Nearly half of the patients admitted were admitted more than 5 years after the onset of the disease, and 17.5 per cent more than 10 years after onset, the period being considerably longer in the case of European-born patients than in patients born in the West Indies.

Leprosy: Pathological Changes observed in Fifty Consecutive Necropsies, by **C. S. Powell and L. L. Swan.** Amer. J. Path. 1955, Nov.-Dec., Vol. 31, No. 6, 1131-47.

Of the 50 cases necropsied, 2 were of the tuberculoid and 48 of the lepromatous type, the type most common in the Carville Leprosarium and in the United States. Changes of secondary amyloidosis were seen in 23 of the cases in one or more tissues, the organ most affected being the kidney. When the kidney was involved by amyloid change it was usually quite markedly altered. In 19 cases as a result, death was from renal insufficiency. Out of 49 spleens sectioned 8 contained miliary lepromas. In 3 cases amyloid change was prominent in the mucosa and submucosa of the stomach. The pancreas was not involved. Acid-fast organisms with lepromas were found in 5 of the 46 cases in which adrenal sections were available. In 16 of the adrenal glands sectioned, amyloid change was noted, principally between and replacing cords of cells in all three layers of the cortex. In 6 of the 32 bone marrows sectioned *Myco. leprae* was demonstrable in lepromas, and several of the more active cases with widespread miliary lesions had very hyperplastic bone marrow; a severe hypochromic microcytic anaemia was present in several cases. " The so-called ' burned out ' cases may reveal few or no organisms—one of the oldest patients in this series became blind from leprous changes in 1898, 8 years after the clinical onset of leprosy. He refused virtually all specific treatment except for sporadic doses of chaulmoogra oil approximately 1,000 cc. Several years prior to death, over 60 years after the onset of his leprosy, skin scrapings were positive only occasionally. No organisms were demonstrable at necropsy."

As seen by the average duration of life of 20 years after the recorded onset of obvious signs and symptoms, leprosy is not a fatal disease, and the average age at death is 59, less than 10 years below that of the population as a whole.

*** Trop. Dis. Bull., Vol. 53, No. 6, June 1956**

Findings in Leprosy and Tuberculosis with the Wassermann, Meinicke and VRDL Tests, by **H. Ruge.** Bull. World Health Organisation, Geneva, 1955, Vol. 13, No. 5, 861-86.

H. Ruge, writing on Serological Findings in Leprosy and Tuberculosis with the Wassermann, Meinicke and VDRL Tests, examined serologically in the course of a venereal disease survey in Egypt, 820 cases of leprosy and 720 cases of tuberculosis with the Wassermann, Meinicke (MKR II), and VDRL tests.

On serological and anamnestic evidence, 31 cases of syphilis were discovered among the leprosy cases and 37 among the tuberculosis cases. Apparently false positive reactions were seen in 203 cases of leprosy (25 per cent) and in 38 cases of tuberculosis (5 per cent). The author discusses the probability that a fairly high proportion of these reactions were in fact caused by otherwise undetected syphilis or were non-specific.

The Meinicke test proved the most specific of the three, followed, in that order, by the Wassermann and the VDRL tests.

It was found that syphilis was more frequent among males with tuberculosis than among those with leprosy; this is attributed to the fact that leprosy patients are kept in greater isolation. Less easily explicable is the fact that more females than males with leprosy were found to have syphilis, whereas in tuberculous persons the difference in syphilis incidence between male and female patients was not very great.

Treatment of Ulcerating Fissures and Leprous Perforating Ulcers with a Combination of Trichloracetic Acid and Salicylic Acid, by **L. Lauret** and **P. Kerbastard.** Méd. Trop. Marseilles, 1956, Jan.-Feb., Vol. 16, No. 1, 83-92.

Twenty per cent of patients at the Marchoux Institute for Leprosy suffer from trophic troubles of the extremities. There are deep fissures of the heel, toes and between the digits, occurring in both the dry and the wet weather. Perforating ulcers are the most frequent and intractable trophic lesions. Under good food and

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sulphone treatment patients make remarkable improvement, but the ulcers do not show equally favourable results.

The remedy tried was either a glycerine solution or a pomade of trichloracetic acid and salicylic acid (ATS), 3 per cent of the former and 0.5 per cent of the latter. Seventy leprosy patients with fissures of the feet were treated morning and evening for 10 minutes in baths containing the glycerine solution. Within 15 to 45 days all the fissures closed and the hyperkeratosis diminished, although the patients continued to cultivate their fields during treatment.

A second group of 39, with 8 who had fissures, 23 with perforating ulcers and 8 with other ulcers, were treated with poultices of ATS for 8 days, followed by the ATS pomade. Of the 42 perforating ulcers affecting the above 23 patients, 14 healed up, 10 improved and 4 improved slightly. Of 17 perforating ulcers treated by a combination of this method and daily intravenous injections of dycholium (dihydrocholate of sodium) 7 healed up, 5 were improved and 2 were slightly improved. The superior results from this combined treatment are attributed to the antiseptic and epithelium softening actions of the acids, and the vasodilatation of the bile salts.

Investigation of Tuberculosis in those suffering from Leprosy, by **J. J. Baldo.** Rev. Sanidad y Asistancia Social, Caracas, 1954, Sept.-Dec., Vol. 19, 5/6, 361-71.

The investigation was made in the patients of the Cabo Blanco Leprosarium, Venezuela. The patients had been examined for tuberculosis 12 years previously and were now re-examined. The tuberculin alergy showed in 709 leprous patients a high positivity, with an early incidence in the younger groups comparable with that found in those with poor economic and social standards outside the leprosarium. The positive percentage was rather lower in the second than in the former enquiry, but this could be accounted for by a difference in the Mantoux technique. Chest photography in 827 leprous patients, using first microfilms, and then 30 x 40 cm. films in those with abnormal appearances, followed by examining the sputum of those suspected of suffering from pulmonary tuberculosis, gave 10.7 per cent of pathological findings, compared with 21.2 per cent in the former examination. Those with early active tuberculosis were only 0.6 per cent compared with 3.2 per cent formerly; and those with more advanced disease only 2.0 per cent compared with 6.7 formerly. There is thus a marked decline in

the incidence of tuberculosis. This may be due partly to better hospital conditions, but the chief reason for the improvement is probably the effects of sulphone therapy, which improves the general health of the patients. The atypical trabecular and reticular shadows due to leprosy of the respiratory passages are also much less.

The Motor Unit in Leprous Neuritis. A Clinico-Pathological Study, **D. K. Dastur.** Neurology, Bombay, 1956, Jan.-March, Vol. 4, No. 1, 1-27.

Study of the literature leads the author to the conclusion that leprous neuritis is an ill-studied problem, though perhaps the commonest cause of muscle disorder in India. He studies: (1) the clinical features of sensory and motor loss, (2) terminal innervation of muscle by intravital staining, (3) changes in voluntary muscles, and (4) various "neuropathies." From 69 leprous patients 75 muscle biopsies were obtained, the *flexor carpi ulnaris* being chiefly used. A portion of an ulnar nerve was obtained at necropsy. Clinical study showed that "the zone of sensory loss was generally well defined and roughly corresponded to the anaesthetic areas resulting from peripheral nerve injuries."

The pathological changes found in the muscles were: reduction of the over-all density or even loss of innervation, beading or fragmentation of the nerve fibres, shrinkage of end-plates, prominence of Schwann nuclei, and proliferation of endoneurium and perineurium. Along with these signs of degeneration there were regenerative signs such as collateral branching and formation of growth cones and end-plates. In some cases there were signs of inflammatory myositis. Rarely acid-fast bacilli were found in intramuscular nerve twigs or connective tissue. There was evidence that muscular atrophy and degeneration of end-plates preceded changes in motor nerve fibres, and the neuritic process was slow, giving time for diagnosis and treatment. The role of anatomical and mechanical forces in determining the degree of disease in infected nerves is discussed, as are also the effects of pressure and ischaemia in first causing blocking and then progressing to necrosis.

[There is much valuable information in this paper, which should be read in the original.]

Preliminary Note on the Preparation of a Standardised Lepromin, by **R. Chaussinand, M. Viette** and **R. O. Prudhomme.** Bull. Soc. Path. Exot. 1955, Vol. 48, No. 6, 784-8.

The objections to the lepromin antigen prepared according to Wade's method by filtration through nylon are that an amount of tissue debris remains, and that the bacilli are gathered together in masses or globi. This massing of bacilli is an even greater disadvantage when it is sought to dilute the antigen, both as a measure of economy and with a view to testing the degree of sensitivity to the antigen. Grinding up with glass powder is not suitable, as this does not dissociate the masses sufficiently and fine particles of glass are left in the suspension. Two methods have been found to give promising results. (1) Treatment of Wade's antigen with 1 per cent papain, raising the temperature to 70° during 5 minutes, keeping it at 70° for 5 minutes, and boiling for 5 minutes. It was found that when this was filtered through nylon about a third of the tissue debris had been eliminated. (2) Ultra-sonic action was used to dissociate the bacilli in a suspension of Stefansky's bacillus. With a freqency of 960 kilohertz and 90 watts applied for 15 minutes there was a diminution in the number and size of the masses. In 3½ hours the majority of the masses were dispersed, but a few small ones persisted, but the number of the bacilli seemed to have diminished. Using a lepra bacillary suspension with a similar method applied for 4 hours, and examining a drop of the suspension every 15 minutes, it was found that after 30 minutes the number of the globi had diminished, but the number of single bacilli was the same. By 45 minutes the bacilli had diminished by half. By 4 hours there were very few masses and globi, and very few isolated bacilli. There was thus much less resistance of Hansen's bacilli to supra-sonic vibrations than of Stefanski's bacilli. Using this 4-hour treated suspension of lepra bacilli to test patients, the early reaction was slightly stronger than with the ordinary antigen, and the delayed reaction practically identical with it. However, in lepromatous cases a slight local reaction was noted which lasted for a few weeks. Attempts were made to find out if this latter was due to the partly broken up tissue debris or to the supra-sonic treatment of the bacilli. It was observed that the injection of the supernatant fluid, after centrifuging the treated antigen for half an hour, produced no local reaction in allergic patients.

It was found that the papain-treated antigen does not give any false positive reactions, but is rich in bacilli. It is hoped by combining the two methods to produce a reasonably homogeneous antigen suitable for dilution.

Treatment of Lepra Reaction with Phenylbutazone, by **Drs. P. Destomes** and **L. Chambon.** Bull Soc. Path. Exot. 1955, Vol. 48, No. 4, 454-8.

Following the work of Ravina and Pastel in acute inflammatory conditions in tuberculosis, the authors tried derivatives of pyrazolidine. Five patients suffering from lepra reaction were given six intramuscular injections of 5 cc. of 20 per cent solution of phenylbutazone, one every three days for three patients, and two courses of three daily doses with an interval of two days between the two courses for two of them. Five other patients were given orally in tablet form 300 to 400 mgm. daily for seven to nine days.

The results were found to be at least as good as those obtained with ACTH and more lasting. First of all, pain disappeared generally within 24 hours, and this was followed by the fever subsiding and the reduction of inflammation of skin and nerve lesions. One of the patients was of the tuberculoid type, though the histological picture was at first obscured by the reaction, and appeared to be lepromatous. However, 12 days after the fourth injection the histological picture had changed to be typically tuberculoid. Swelling of the prominent swollen nerves was quickly reduced. Slight traces of albumen were found in the urine, but these were transient and not considered as contraindications. There was also aqueous rentention and oedema occasionally, but this quickly passed off. In only one case was there a return of reaction after treatment was finished, and this quickly subsided when the treatment was renewed. Phenylbutazone has another advantage over ACTH in that it is much less expensive.