

Abstracts

The following 16 abstracts are reprinted, with permission from *Trop. Dis. Bull.*, 1968, **65**, 3:

1. **Health education in leprosy—Kerala's efforts in the field**, by T. N. N. BHATTATHIRIPAD. *Lepr. India*, 1967, **39**, 3, 110-17.

This paper gives a factual account of the success achieved in overcoming prejudice, inertia and fear in relation to leprosy in the state of Kerala, South India. Thanks to a leadership that combined imagination and enthusiasm, knowledge and a practical outlook, and thanks also to a wise use of all possible methods of mass education, long-standing prejudice against the leprosy patient was broken down and much misunderstanding about leprosy was removed. Doctors and paramedical workers were given special courses of instruction in leprosy. Leprosy figured in school textbooks, in dramatic performances, in cinema films, in newspaper articles and radio talks; special pamphlets written in the vernacular were distributed widely; camps for social workers were organized, and essay competitions for schoolchildren arranged.

Much of the success of the campaign is attributed to the work of local Leprosy Welfare Committees, which ensured the informed co-operation of people of goodwill in even the most outlying districts.

By means of educating the patient and his family and the general public, the attendance rate of patients under treatment for leprosy has shown a gratifying increase and a high degree of confidence has been gained.

S. G. Browne.

2. **Análisis epidemiológico de la lepra en Costa Rica** (The epidemiology of leprosy in Costa Rica), by R. JIMÉNEZ MÓNGE and E. RAMÍREZ CASTRO. *Acta Méd. Costarric.*, 1967, **10**, 1, 59-70. English summary.

The authors have made an epidemiological analysis of leprosy in Costa Rica and found that the disease is prevalent in all parts of the country. The incidence and prevalence rates remained constant during the quinquennium under survey—1961-1965—and the provinces of Limón and Puntarenas had the highest incidence while Heredia had the lowest. 38 new cases were notified in Costa Rica in 1965, an incidence of 2.6 per 100,000. The disease predominates in males and most of the patients are aged over 50. In all the Latin

American countries the control of leprosy contacts is inadequate but in Costa Rica it is better than in the other Central American countries as general practitioners are sufficiently interested to report suspected cases. However, more opportunities for training in the early diagnosis of leprosy are necessary.

There are 6 tables of figures, 5 of them relating to Costa Rica. The first table gives a useful summary of the cases, by age and clinical type, and the number of contacts, in 18 countries in Central and South America, and in the West Indies in 1963.

J. R. Innes.

- Studies on *Mycobacterium leprae* in media enriched by mycobacterial extracts**, by A. L. OLITZKI and D. GODINGER. *Int. J. Lepr.*, 1967, **35**, 2, Pt. 1, 154-65.

Mycobacterium leprae was subcultured *in vitro* 8 times on a modified Eagle's medium enriched by extracts obtained from saprophytic mycobacteria and from human foreskin. It was not proved that multiplication took place, but since the sub-culturing techniques involved the making of 8 successive 10-fold dilutions, and there were still large masses of organisms in the final culture, it is thought that the result cannot be otherwise explained, unless conceivably it was due to an agglutinating factor in the medium. The growth or maintenance of the organisms depended not on a single factor but on a multiplicity of factors of bacterial and human origin.

D. S. Ridley.

4. **Microscopic, cultural and serologic studies on *Mycobacterium leprae* and other mycobacteria isolated from leprosy patients**, by A. L. OLITZKI, D. GODINGER, Z. OLITZKI and M. L. DORFMAN. *Int. J. Lepr.*, 1967, **35**, 2, Pt. 1, 166-74.

Cultures or prolonged maintenance on enriched Eagle's medium of organisms thought to be *Mycobacterium leprae* (see above) were successful in 13 out of 17 cases, when the material from ear lobes was used, and in 7 of material from nasal mucosa. The patients from whom these organisms were derived came from Asia, Africa and South America, 11 countries in all. Antigens were prepared from the second and third subcultures and used for complement-fixation tests with the sera of the patients, but the results did not definitely indicate

whether the various strains were antigenically identical. It is postulated that some of the atypical mycobacteria isolated from leprosy lesions may act as growth promoters for bacteria-dependent leprosy bacilli.

D. S. Ridley.

5. **La lépre borderline et la lépre tuberculoïde réactionnelle. Leur réunion dans un groupe intermédiaire** (Borderline and reactional tuberculoïd leprosy: their juxtaposition in the inter-polar group), by J. LANGUILLON. *Méd. Trop.*, 1967, 27, 2, 183-92, 8 figs. on 2 pls.

After a brief historical résumé of borderline leprosy, the author advances the thesis that reactional tuberculoïd leprosy has more affinities—clinical, immunological and bacteriological—with borderline leprosy than with tuberculoïd leprosy, and should therefore be considered as falling into the broad intermediate or inter-polar group. While this suggestion is unexceptionable rather than novel, the article provides a useful summary of the clinical and pathological features of this unstable form of leprosy, which is characterized by a variable immunological pattern and an unpredictable prognosis.

S. G. Browne.

6. **Inoculación accidental de la lepra por transfusión sanguínea en gemelos univitelinos** (Accidental inoculation of leprosy by blood transfusion in identical twins), by J. TERENCIO DE LAS AGUAS. *Revta Leprol. Fontilles*, 1967, 6, 7, 603-11, 3 pls.

The author gives a list of references to instances of accidental inoculation with the leprosy bacillus. He then reports the history of a pair of twins who developed leprosy as a result of blood transfusions.

A pair of identical twins with no family history of leprosy or contact with the disease were given blood transfusions at the age of 20 months because of gastro-enteritis with dehydration. The blood donor was later diagnosed as suffering from lepromatous leprosy. When aged 2 years both children developed cutaneous lesions simultaneously and infantile nodular tuberculoïd leprosy was diagnosed in the first and tuberculoïd leprosy in the second. The case notes in this interesting report show the temporary lowering of resistance at the time of transfusion, the factor of infancy in favouring the development of the disease and the genetic factor, in that the children were identical twins.

J. R. Innes.

7. **Estudios de immuno-precipitación en la lepra** (An immuno-precipitation test in leprosy), by M. SALAZAR MALLÉN, E. AMEZCUA CHAVARRÍA and A. ESCOBAR GUTIÉRREZ. *Revta Invest. Salud. Publ.*, 1967, 27, 1, 3-14. English summary.

The authors used an immunologically active polysaccharide named Poly I Nb which occurs in *Nocardia brasiliensis*, *Mycobacterium tuberculosis*, *Myco. leprae-murium* and *Myco. leprae*. Their present sample was prepared from *N. brasiliensis* (*Trop. Dis. Bull.*, 1967, 64, 375). This was tested by Ouchterlony plates and by paper chromatography against sera of patients with

leprosy and other infections. Of 71 sera from patients with lepromatous leprosy, 6 were positive by the agar method, 35 by paper; of 13 patients with tuberculoïd leprosy, 6 were positive by paper; 1 patient with dimorphic leprosy was positive; of 9 patients with the indeterminate form, 3 were positive by paper; with the exception of 6 of the patients with lepromatous leprosy, all were negative by agar plates. 69 healthy control subjects were negative by both tests. The amount of antibody in the lepromatous sera was higher than that in tuberculoïd sera (not statistically significant). In 2 cured patients the reaction was negative. 6 positive sera were treated with 2-mercaptoethanol, and the titre of precipitation was much diminished; from this it is concluded that the antibody in the serum belongs to the IgM class. With sera from patients with pulmonary tuberculosis, 4 out of 18 were positive by paper chromatography, and so were 3 out of 6 from persons with *N. brasiliensis* infection.

F. Hawking.

8. **Patterns of radial paralysis in leprosy in Papua-New Guinea**, by J. K. A. CLEZY. *Int. J. Lepr.*, 1967, 35, 3, 345-7.

'A high incidence of radial paralysis has been encountered in leprosy patients in Papua-New Guinea. The commonest single pattern involving this nerve is radial/ulnar paralysis, sparing the median nerve. The surgical management of hands suffering from radial paralysis due to leprosy is outlined.'

9. **Acute exudative arthritis in leprosy—rheumatoid-arthritis-like syndrome in association with erythema nodosum leprosum**, by A. B. A. KARAT, S. KARAT, C. K. JOB and M. A. FURNESS. *Br. Med. J.*, 1967, Sept. 23, 770-72.

The authors report that, in the past 2 years at Schieffelin Leprosy Research Sanatorium, Karigiri, South India, they have seen 10 patients with lepromatous leprosy who developed painful exudative polyarthritis simulating acute rheumatoid arthritis during the course of erythema nodosum leprosum (ENL). They give the history and results of treatment for 2 of the patients and they suggest that these two conditions occurring in conjunction may be aetiological determined by an immunological phenomenon. Histological study of synovial membranes showed that the acute inflammatory reaction was similar to that seen in the ENL lesions elsewhere in the body and differed from the lesions characteristic of rheumatoid arthritis. The joint manifestations cleared after the subsidence of ENL which responded to the usual measures.

J. R. Innes.

10. **Chemotherapeutic trials in leprosy. 4. Dapsone (DDS) in low dosage in the treatment of lepromatous leprosy. A demonstration pilot study**, by J. H. S. PETTIT and R. J. W. REES. *Int. J. Lepr.*, 1967, 35, 2, Pt. 1, 140-48.

There is much experimental evidence that leprosy bacilli which stain solidly are alive and those which stain irregularly are dead. Accordingly the present

authors suggest that the percentage of solidly staining bacilli (the Morphological Index, MI) can be used to assess the value of a treatment in selected patients with lepromatous leprosy in a period of 6 months. They illustrate this test by a trial on 6 previously untreated patients in Malaya, with lepromatous leprosy, each of whom was given 50 mgm. dapsone twice weekly by mouth. Full case histories are given. Briefly the average Morphological Index (in biopsies) at the start was 34 (25-42) and after four and a half months it was only 0.75 (0-1). The conventional Bacterial Index was not much changed (3.9 became 4.2). Clinically, there was only slight to moderate improvement in these patients as might have been expected in this short period. The mean blood concentration of dapsone was 0.09 μ gm./ml. before each dose and 0.75 μ gm./ml. 6 hours after a dose. There was no progressive build-up in blood concentration. It is concluded that this method affords a relatively quick way of testing new treatments and that 50 mgm. of dapsone twice weekly is probably as effective therapeutically as the conventional 600 mgm. per week, while being less toxic.

F. Hawking.

11. **Attempt at treating leprosy with a sulfone in conjunction with iodine**, by R. N. MIRANDA, L. C. PERERA, A. SAO MARCUS and S. F. TARLÉ. *Publicações Cent. Estud. Leprol.*, 1966, 6, 1/2, 18-19. (Also in Portuguese and French.)

The authors, who are from the Federal University of Parana, Brazil, tested the value of a combination of dapsone and potassium iodide (KI) in 11 patients with leprosy. The drugs were used in the following dosage: tablets of dapsone 100 mgm.; KI 50% solution, each drop of the solution containing 0.03 gm. KI. The drugs were given orally in doses of 0.025 gm. dapsone and 0.03 gm. KI per week; the dose was increased slowly to 300 mgm. dapsone and 1.2 gm. KI by the 15th week. 11 patients who had never received any anti-leprosy treatment were selected; 8 had the lepromatous form of leprosy, 2 the tuberculoid and 1 the indeterminate form. All tolerated the treatment well and showed definite clinical improvement during the first 5 months. Later 4 of the patients with lepromatous leprosy showed reactivation and acute manifestations of symptoms. The condition of one patient with lepromatous leprosy deteriorated and that of another showed no improvement. The remainder of the patients showed clinical, bacteriological and histological improvement.

The authors state that although only a few patients were treated the scheme seemed to be effective when the doses were small, i.e., not more than 200 mgm. dapsone and 300 mgm. KI per week.

W. K. Dunscombe.

12. **Sulforthomidine (Ro 4-4393) in the treatment of lepromatous leprosy**, by K. RAMANUJAM. *Lepr. India*, 1967, 39, 3, 95-9.

After reviewing the literature on long-acting sulphonamides in the treatment of leprosy, the author describes his experience with Sulforthomidine—better known as sulphormethoxine or Fanasil—given in a

single oral dose once a week to 17 patients, and concludes that it is not as effective as standard DDS (dapsone) treatment. Two-thirds of the patients underwent reactional episodes.

W. H. Jopping.

13. **Evaluation of B663 in human leprosy**, by A. J. ATKINSON, JR., J. N. SHEAGREN, J. BARBA RUBIO and V. KNIGHT. *Int. J. Lepr.*, 1967, 35, 2, Pt. 1, 119-27.

Although this paper is based on the case-history of only a single patient treated with B.663, it records useful details of clinical observations and laboratory investigations, and confirms earlier work on this interesting phenazine derivative. (*Trop. Dis. Bull.*, 1965, 62, 422; 1966, 63, 1344.)

From previous experience and from the results in this patient, the following conclusions are drawn: B663 is therapeutically effective in lepromatous leprosy, causing a progressive reduction in both the Bacterial and the Morphological Indexes and a corresponding clinical improvement; when given in adequate doses, B663 is able to control even severe erythema nodosum leprosum; in high doses (600 mgm. daily), it may provoke gastro-intestinal disturbance and consequent loss of weight, symptoms which, in the present patient, ceased when the drug was stopped. Radiographic evidence of small bowel irritation was accompanied by the deposit of crystals of B663 in the lamina propria of the intestinal wall. Apart from these signs of drug intolerance, and the pigmentary changes in the skin already reported (*ibid.*, 1965, 62, 422 *bis*), no evidence of toxicity (renal, hepatic, or haematological) was obtained in this patient after almost 2 years of treatment with high doses of B663.

S. G. Browne.

- (Long-term observation on the development of experimental mouse leprosy), by Y. KAWAGUCHI and Y. TAKAHASHI. *Lepro*, 1967, 36, 1, 13-18. (In Japanese.) English summary.

- (Effects of BCG on the development of visceral lesions in CF 1 mice with subcutaneous murine leprosy infection), by Y. KAWAGUCHI and Y. TAKAHASHI. *Ibid.*, 19-24. (In Japanese.) English summary.

(i) Mice of 4 strains were infected with murine leprosy bacilli and observed for periods of up to 80 weeks.

Mice of the C3H strain died within 50 weeks with extensive disease of the visceral organs. In the C57BL and ddY strains the infection was of a more benign type. In CF 1 mice the lepromata at the inoculation sites were of the benign type, but the visceral lesions were severe, comparable with those of C3H mice.

(ii) The second paper reports the effect of vaccination on the course of a subsequent infection with murine leprosy in mice of the CF 1 strain. BCG and a killed murine leprosy bacillus vaccine both gave partial protection, but the former was the more effective.

D. S. Ridley.

15. **Activity of repository sulfones against *Mycobacterium leprae* in mice**, by C. C. SHEPARD. *Proc. Soc. Exp. Biol. Med.*, 1967, **124**, 2, 430-33.

The finding that minute doses of DDS (dapson) were sufficient to suppress the growth of *Mycobacterium leprae* in mice (*Trop. Dis. Bull.*, 1967, **64**, 53) suggested the possibility that repository sulphones might be effective in leprosy. A number of repository sulphones were therefore tested against footpad infections in mice in the same manner as before, and all were found to suppress completely the growth of *Myco. leprae* when injected at intervals of 2 months. Dapsone by contrast had to be given every 2 weeks to achieve comparable suppression. In the case of 4,4-diacetyldiaminodiphenylsulphone (DADDS) the lowest dose which gave nearly complete suppression was 6 mgm. per kgm. at intervals of 2 months.

D. S. Ridley.

16. **Histobacteriología de la almohadilla plantar del raton inoculado con *M. leprae*** (Histological and bacteriological study of the footpads of mice inoculated with *M. leprae*), by M. BERGEL. *Publicações Cent. Estud. Leprol.*, 1966, **6**, 1 2, 5-12, 7 figs. on 4 pls. English summary.

The following is a free translation of the author's summary:—

The author made a histological and bacteriological study of the footpads of mice which had been inoculated with 0.03 to 0.05 cc. of recent leproma suspension taken from patients with untreated lepromatous or borderline leprosy. The animals were divided into 2 groups, one of which had normal food and the other a pro-oxidant diet; it was found that the experimental leprosy developed much better in the footpads of the animals who had been fed on the pro-oxidant diet. Two types of granulomata were found. In one type the granuloma was large and found in a deep part of the skin with damage to vascular and nerve elements and even muscular tissue. The bacilli in these granulomata were either 'globi' or isolated and were large and acid-fast, which indicated a state of great vitality. In the other type, the granuloma was found in the dermis and was small and contained only isolated bacilli. This confirms the findings of PALMER *et al.* (*Trop. Dis. Bull.*, 1965, **62**, 879) concerning the presence of bacillary groups in striated muscular tissue in the footpads of mice with the bacilli showing characteristics which indicated a great degree of vitality.

J. R. Innes.

The following 9 abstracts are reprinted, with permission, *Trop. Dis. Bull.*, 1968, **65**, 4:

17. **Leprosy rehabilitation in Japan**, by S. TAKASHIMA. *Lepro*, 1967, **36**, 2, 63-7.

For nearly 60 years, patients with leprosy in Japan were subject to legally enforced segregation, and the old attitudes and superstitions of patients, public and the profession towards leprosy persist despite recent enlightened legislation.

In this study, the author analyses the factors that underlie the reluctance of these patients to leave the national leprosarium in Aiseien, Japan, and return to life outside.

In Aiseien, the 1,489 patients were examined and assessed according to their degree of physical disability. Most of the 41% who had no deformities, and who were bacteriologically negative, worked in the sanatorium at jobs of various kinds (as medical orderlies, or in stock-raising, farming, shop-keeping, light industries and so forth). The 37% with slight or moderate degrees of disability were candidates for the recently-introduced facilities for reconstructive surgery (orthopaedic and plastic), physical therapy and education in the use and protection of their anaesthetic and deformed extremities. The 16% with severe deformities (blindness, serious physical defect, psychosis, etc.) would continue to need institutional care. Determined efforts are made to rehabilitate all patients, whatever their degree of disability. (It is gratifying to note the informed enthusiasm of this paper, typifying the new outlook that augurs well for the future.)

S. G. Browne.

18. **La lèpre en Polynésie française. Esquisse épidémiologique** (Leprosy in French Polynesia: epidemiological sketch), by G. SCHOLLHAMMER and P. AUBRY. *Bull. Soc. Path. Exot.*, 1966, **59**, 6, 939-43.

Introduced apparently by Chinese immigrants round about 1870, leprosy has not assumed epidemic proportions in the islands of French Polynesia (mainly Tahiti, Tuamutu and the Marquesas). The known number of patients at present under treatment is under 400, giving a prevalence rate of under 4 per 1,000. The proportion of patients with lepromatous leprosy is 40%, and the male/female ratio is about 2/1.

The authors consider that in view principally of the recent (slight) fall in the lepromatous rate and in the total prevalence rate of leprosy, the present time is opportune for the successful application of standard measures of control and eradication.

S. G. Browne.

19. **Human macrophage culture. The leprosy prognostic test (LPT)**, by T. A. BARBIERI and W. M. CORREA. *Int. J. Lepro.*, 1967, **35**, 3, 377-81

The authors have attempted to establish a new and reliable test for determining the resistance of man to leprosy based on observations of the ability of cultured human blood macrophages to lyse heat-killed *Mycobacterium leprae*.

The blood macrophages were cultured by the method of G. CAMERON (Tissue culture technique, 2nd edition, 1950, New York: Academic Press) in Leighton tubes. The medium, which was replaced every 3rd day, was composed of Hanks's balanced salt solution plus antibiotics and 10% human serum. The bacilli, from lepromin, were added to the culture on the 6th day and, although in the early investigations the cells were observed daily, the day of examination was finally fixed as the 10th day of infection. Examination was made on Ziehl-Neelsen stained preparations and lysis and non-

lysis of the ingested bacilli was scored as LPT-positive and LPT-negative, respectively. Cultures were studied from 35 patients with tuberculoid leprosy, 40 with lepromatous leprosy and 50 healthy persons.

The sequence of events after infection was as follows: after 24 hours, the cytoplasm of the macrophages enveloped the bacilli; after 48 hours, almost all the bacilli were ingested; from the 3rd to the 10th day, in the non-losing macrophages the bacilli were present as intact rods or globi, but in the lysing cells were thinner, broken or completely hyalinized; and on the 16th day, the bacilli were still intact in the non-lysing cells but were completely lysed in the lysing cells.

The results showed complete agreement between the lepromin status of the donors and their macrophage test, the cells from lepromin-positive persons being invariably LPT positive and those from lepromin-negative persons being invariably LPT negative. The authors consider that this test is an advance over the lepromin test because it is carried out at the cellular level of resistance and not at the level of complex organism reaction.

S. R. M. Bushby.

20. **Contribución al estudio de las formas de transición de la lepra** (Study of the transition forms of leprosy, by G. HERRERA. *Revta Dominicana Derm.*, 1967, 1, 2, 111-14. English summary.

The author, from the Dominican Republic, reports a case of combined lepromatous, tuberculoid and indeterminate forms of leprosy. The patient was a man aged 37 years who was seen at the Dermatological Clinic in Santo Domingo. He had had a lesion in the skin of the left buttock for 5 years; 1 year later leprotic foci in the eyebrows, gluteal and lumbar regions appeared, and subsequently nodules on the lobe of the left ear and on the left cheek. Large numbers of *Mycobacterium leprae* were seen in histological sections which showed appearances characteristic of all 3 forms of leprosy.

W. K. Dunscombe.

21. **The lepra reaction with necrotizing skin lesions. A report of six cases**, by S. L. MOSCHELLA. *Arch. Derm.*, 1967, 95, 6, 565-75.

The author gives the case histories of 6 patients with lepra reaction and necrotizing skin lesions and discusses their clinical features. He was disturbed by the slow response of these patients with the Lucio phenomenon to sulphone therapy and the necessity of using systemic corticosteroids for long periods to control this reaction.

He concludes that: 'The primary diffuse (the pure and primitive) lepromatous leprosy has sufficient clinical characteristics to be classified as a subtype of lepromatous leprosy.'

'The cutaneous expression of the lepra reaction depends upon the subtype of lepromatous leprosy, the location and degree of the involvement of the cutaneous vessels, the duration of the reaction, and the degree to which the reaction has been modified by therapy.'

'Patients with the grossly infiltrative and nodose lepromatous leprosy usually react with erythema nodosum leprosum. The Lucio phenomenon which

occurs in patients with diffuse lepromatous leprosy is seen most frequently in Mexico and Costa Rica.'

'Necrotizing skin lesions which are the typical lesions of the Lucio phenomenon are seen infrequently in erythema nodosum leprosum and in an eruption which resembles the cutaneous allergic vasculitis of Ruiter and rarely appears as part of the lepra reaction. The erythema nodosum leprosum with necrosis and the lepra eruption resembling the cutaneous allergic vasculitis of Ruiter can be loosely described as expressions of the Lucio phenomenon. It is preferred (by the author) to limit the use of the Lucio phenomenon to describe the distinctive lepra reaction which occurs in diffuse lepromatous leprosy and is characterized by the presence of only erythema necroticans. All the other lepra reactions with reactive necrotic skin lesions can be classified clinically as variants of erythema nodosum leprosum.'

J. R. Innes.

- Poststeroid nodular panniculitis and the erythema nodosum of leprosy**, by S. G. BROWNE. *Derm. Int.*, 1965, 4, 2, 215-18.

Precipitate reduction in the dose of corticosteroid drugs being given to patients with rheumatism may cause a form of panniculitis which resolves on increasing the dose of the steroid. The author sees close parallels between poststeroid nodular panniculitis and the erythema nodosum of leprosy, e.g., the typical symptomatology, especially polymorphism, the typical histological picture and the recurrence of symptoms on the over-rapid reduction of the dose of steroids. (This would, of course, be true of other forms of erythema nodosum which, as the author is aware, is a reaction due to a wide variety of infections and drugs, sometimes associated with a demonstrable change in immunity, e.g., the development of tuberculin sensitivity in primary tuberculosis. Presumably poststeroid panniculitis is due to the abrupt withdrawal of the cushioning effect of steroids in cases of continued antigenic stimulation.)

P. J. Hare.

23. **Chemotherapeutic trials in leprosy. 5. A study of methods used in clinical trials in lepromatous leprosy**, by M. F. R. WATERS, R. J. W. REES and I. SUTHERLAND. *Inter. J. Lepr.*, 1967, 35, 3, 311-35.

The authors write with the authority of experience and give a detailed description of the controlled chemotherapeutic trial in leprosy. They stress the importance of ensuring that patients in the trial belong to one carefully defined, homogeneous group, and recommend untreated patients suffering from pure lepromatous leprosy who are temperamentally suitable and who have a predominance of solid-staining bacilli in skin smears. The various methods of assessing progress—clinical, bacteriological and histological—are described. Only drugs which have shown promise in pilot trials should be considered for the much more elaborate controlled trials. The design of pilot trials is next considered, and it is suggested that evidence of therapeutic activity may be gained within 4½-6 months by

studying the effect of the trial drug on the morphological characteristics of the bacilli as seen in skin smears. Finally, the question of erythema nodosum leprosum (lepra reaction) is discussed with reference to the effect of drugs on its initiation and treatment.

W. H. Jopling.

24. Effect of X-irradiation and thymectomy on the development of *Mycobacterium leprae* infection in mice, by J. M. GAUGAS. *Br. J. Exp. Path.*, 1967, **48**, 4, 417-22.

This report confirms the recent findings of REES (*Trop. Dis. Bull.*, 1966, 63, 1346) that the multiplication of *Mycobacterium leprae* in mouse footpads is enhanced by previous thymectomy and irradiation of the mouse. 3 experiments, with albino mice, were undertaken to determine the effects of irradiation and thymectomy both separately and in combination. The technical details are fully described.

The increase of organisms in either irradiated or thymectomized animals was little greater than in control animals, the enhancement being about two-fold. By far the greatest increase was obtained in mice that had been thymectomized and also irradiated with a single dose of 900r, the multiplication of bacilli then being 16,800 times, which was 29 times greater than in control mice. 900r is a lethal dose, and injection of homologous marrow cells is necessary for survival. But sub-lethal doses of 420r, though they were repeated several times, were less successful in conjunction with thymectomy in enhancing multiplication. Although the footpad infections were enhanced they were not progressive beyond a certain point. Cellular infiltration at the site of infection was diminished.

D. S. Ridley.

25. Effect of immunosuppressive drugs on infection in mice by *M. marinum* (balnei), *M. tuberculosis* and *M. leprae*, by C. C. SHEPARD and M. A. REDUS. *Int. J. Lepr.*, 1967, **35**, 3, 348-54.

The authors have studied the effect of immuno-

suppressive drugs on infections in mice produced by *Mycobacterium marinum* (balnei), *Myco. tuberculosis* and *Myco. leprae*, and, although the ultimate aim of increasing growth of *Myco. leprae* in footpads was not achieved, some useful information was gathered.

The drugs were administered subcutaneously at their highest sub-lethal doses; amethopterin at 6 mgm./kgm. thrice weekly, 6-mercaptapurine at 75-150 mgm./kgm. thrice weekly and cyclophosphamide at 300, 200 or 150 mgm./kgm. at various intervals.

The infection with *Myco. marinum* was in the footpad and the drug was injected 2 days before inoculation. Direct visual inspection of the feet and viable counts of the bacteria present at the 13th and 35th day showed that the chief effect of the treatments was a marked persistence in the viability of the bacteria during the plateau phase of the infection, and because cyclophosphamide had the most pronounced effect, it was the only drug used in the other infections.

The tubercle bacilli were injected intravenously in doses that caused death between the 20th and 90th day and the effect of treatment with the phosphamide was assessed by changes in mortality and the number of viable bacilli in the tissues. In the first experiment, in which the drug was given in doses of 300 gm./kgm. 5 days before and 2 and 9 days after infection, no effects were observed on the number of bacilli, although the mice died earlier. Similarly, results were obtained in 2 other experiments in which the doses of the drug and the bacteria were varied.

The effect of the phosphamide on the rate of multiplication of *Myco. leprae* was examined in 4 experiments. The bacilli were injected into the footpads. In the first 3 experiments, treatment was delayed until multiplication had reached countable levels; in the fourth experiment it was started 3 days before infection and given at approximately 2-week intervals in doses of 150 mgm./kgm. Little, if any, effect was observed on the rate of multiplication.

S. R. M. Bushby.