

Abstracts

1. LECHAT, M., MELARTIN PREHN, L., BLUMBERG, B. S. & MORIS, R. **Australia Antigen in Zaire. Studies in Leprosy.** *Ann. Soc. belge Méd. trop.*, 1973, v. 53, 173-178.(trs).

The authors studied the prevalence of Australia antigen in 936 patients in Zaire: 98 were pygmoid and the rest Bantu. Standard Ouchterlony double-diffusion methods were used.

The percentage of sera positive for Au antigen was 2.6. No differences were found between 286 patients with lepromatous leprosy, 361 with tuberculoid leprosy, and 191 healthy people.

S. G. Browne

2. BECHELLI, L. M., *ET AL.* **Some epidemiological data on leprosy collected in a mass survey in Burma.** *Bull. Wld Hlth Org.*, 1973, v. 48(3), 335-344.(trs).

This paper should be studied in detail. It sets out objectively the most significant findings in the WHO survey in an area of Burma where prevalence rates of leprosy are high or very high.

The high lepromatous rates recorded were found in districts where the total prevalence rate and the annual incidence rate were both high. About 3% of such a population is prone to develop lepromatous leprosy if sufficiently exposed to infection.

The highest prevalence rates (48.11 per 1000) were found in the 30-39 years age group, in which the lepromatous rate was 12.5 per 1000. No child under 10 was found suffering from lepromatous leprosy. This observation was interpreted as an expression of the long silent period and the length of time generally noted before overt signs of lepromatous leprosy appear. Indeterminate leprosy was commonest in all age groups below 14, reaching its peak in the 10-14 group.

There was a true and significant male predominance: 40.4 cases per 1000 among males, and 24.0 among females. Under 10 years, the sex prevalence was approximately equal.

On the figures presented, multibacillary leprosy (that is the lepromatous and borderline forms combined) is only 3 times as contagious as tuberculoid leprosy, but it may be that contacts of patients with tuberculoid had also been exposed to persons suffering from the multibacillary forms.

It is noteworthy that on subsequent surveys, only indeterminate and tuberculoid leprosy was seen in the new cases. Initial lesions were found on thighs and buttocks; less frequently, on arms, forearms and legs.

Bacilli were demonstrated in skin smears of patients with tuberculoid leprosy, particularly if recourse was had to histopathological examination. Bacilli were also occasionally found in the nasal mucosa in such patients, and even in ear lobes of patients with clinically inactive tuberculoid leprosy or in the preclinical state.

It is considered that higher prevalence rates of tuberculoid leprosy are indicative of the spread of leprosy rather than of a higher level of resistance among the population. Leprosy can show itself at any age: the most important factor is exposure to infection. Given infectious index-cases, high prevalence rates may occur in any ethnic group, provided that the socio-economic and environmental factors are propitious. The early diagnosis and adequate treatment of patients suffering from indeterminate leprosy is probably a Utopian ideal, but one worth striving for.

S. G. Browne

3. NOORDEEN, S. K. **Epidemiology of (poly)neuritic type of leprosy.** *Leprosy in India*, 1972, v. 44, 90-96.

Accepting as criteria for the diagnosis of the neuritic type of leprosy, the presence of an area of cutaneous hypoesthesia and an enlargement of the corresponding nerve trunk, the author suggests that this type may account for about one-sixth of all cases of leprosy diagnosed in a rural area in South India. Clinical examinations of the population of about 8000 were made every year for 5 years. Among the 800-odd new cases of leprosy discovered, 106 were classed as neuritic.

In the majority of cases (56 out of 63) in one series, the lesion was confined to one limb, usually the lower. The lateral popliteal (44 cases) and ulnar (16 cases) were the nerves most commonly affected by far.

Males were affected more commonly than females in the proportion of 3:1, and the incidence increased definitely with age.

Spontaneous remission was the rule, though complete return of sensation did not usually occur. The 7 patients who had taken treatment were the only ones (out of 44 studied and followed up) in whom the nerve enlargement had not regressed.

The prognosis of the neuritic type of leprosy is considered to be similar to that of tuberculoid leprosy.

S. G. Browne

4. DELVILLE, J. P. **The differential diagnosis of *Mycobacterium leprae* based on its behaviour *in vitro* in human macrophages.** *Ann. Soc. belge Med. trop.*, 1973, v. 53, 195-199.

The author suggests that since the mouse footpad inoculation technique sometimes fails to differentiate between *Myco. leprae* and certain other mycobacterium (such as *Myco. abscessus*), his method of inoculating macrophage cultures with suspected *Myco. leprae* should serve as a differentiating procedure. He finds that the behaviour of *Myco. leprae* is different from that of other mycobacteria in certain objectively observable respects. *Myco. leprae* appears to be relatively non-toxic for the macrophages: whereas, ordinarily, most inoculated macrophages die within a few days, those that ingest *Myco. leprae* regularly survive for 3 to 4 weeks or even longer.

Again, formations resembling globi are sometimes seen in macrophages containing *Myco. leprae*. Whereas other mycobacteria may multiply outside the macrophages, *Myco. leprae* does not.

The number of macrophages taking up *Myco. leprae* in the inoculum is small, but the organisms disappear rapidly from the inoculum. The author interprets this finding as due to digestion of the organisms by the macrophages. He concludes that a mycobacterium that multiplies slowly in macrophages produces globi and does not cause the rapid destruction of the cell in which it is growing, has characteristics corresponding uniquely to *Myco. leprae*.

S. G. Browne

5. PRICE, E. W. & PITWELL, L. R. **The mineral content of inguinal nodes in barefoot people with and without elephantiasis of the legs.** *J. Trop. Med. Hyg.* 1973 v. 76, 236-238.

The study of oedema of the legs in patients suffering from long-standing lepromatous leprosy has led the senior author by a long and devious route to an investigation of the presence of trace elements (metals and silicon) in the inguinal lymph nodes of Ethiopian subjects.

Since in lymphatic tissues these elements may act as non-living physical irritants producing a sarcoid-like granulomatous response, with eventual disturbance of lymph flow and consequential blockage, the demonstration of the presence of silicon and aluminium in all cases and of beryllium in all but two, is worthy of note. No differences in metal content were discernible between subjects with elephantiasis of the legs and those without.

S. G. Browne

6. BROWNE, S. G. **Comment reconnaitre la lèpre en Suisse. (How to recognize leprosy in Switzerland).** *Med. et Hyg.* 1973, v. 31, 1203-1204.

This practical article is intended primarily for general practitioners and dermatologists in Switzerland, and for any Swiss doctor who has medical dealings with people who have spent some time in countries where leprosy is endemic. With about 700,000 "guest workers" in Switzerland (not counting dependants), most of them from Southern Europe, the chance of leprosy being missed, or misdiagnosed, is quite considerable.

The author alerts doctors to the commoner modes of presentation of leprosy in the Western World, and discusses briefly the diagnostic criteria.

Author's Summary

7. GEIGER, J. **Behind the Bamboo Curtain.** *World Med.*, 1973, v. 9 (22), 15-23.

Although leprosy does not figure in this illuminating inquiry into the kind of medicine now being brought to the millions in mainland China, the reference to the use of barefoot doctors—their training, competence, deployment and activities—will be read with interest and profit by leprosy workers engaged in the preparation of medical auxiliaries for the leprosy programmes in different countries. The point is well made that for purposes of primary health care and the control of transmissible disease, such auxiliaries can be rapidly trained and widely (and wisely) deployed—at a small fraction of the cost of fully fledged Western style doctors, and the value of their work is apparent to all.

The curious admixture of traditional remedies and modern synthetic drugs, of "spot diagnosis" and the ready availability of facilities for major surgery, the rather naïve credulity and the sophisticated and pragmatic organization, should stimulate much radical thinking in countries where conventional medical services have made little impression on the leprosy problem.

S. G. Browne

8. VAUGHAN, J. P., MENU, J. P., LINDQUIST, K. J. & VENNEMA, A. **A trial with mixed BCG/Smallpox vaccine given intradermally.** *J. Trop. Med.* 1973, v. 76, 10.

Leprosy workers engaged in BCG vaccination programmes for tuberculosis/leprosy prophylaxis investigations will be interested to learn that the simultaneous administration of BCG vaccine and smallpox vaccine at the same site has no adverse effect on the efficacy of either vaccine. Whether the vaccines are delivered by a transcutaneous route (using the bifurcated needle) or intradermally, and whether the vaccines are actually mixed or not, apparently leads to interference, no loss of potency, and no increase in the rate of complications. As judged by the criteria of post-BCG allergy and reactions to vaccinia virus, the simultaneous administration of the two vaccines seemed, if anything, to have a mutually enhancing effect.

S. G. Browne

9. TOYOHO MUROHASHI & KONOSUKE YOSHIDA. **Stimulating effect of pyruvate on the growth of *Mycobacterium leprae* in cell-free, semisynthetic, soft agar medium.** *Bull. Wld Hlth Org.* 1973, v. 48, 571-579.

The authors report the growth of an organism resembling *Myc. leprae* in their semi-liquid, cell-free, soft agar medium, incubated at 37°C. The addition of pyruvate as a carbohydrate source seemed to stimulate multiplication to such a degree that after 50 weeks' incubation micro-colonies appeared in the primary culture. A bacterial suspension prepared from the first subculture of this strain elicited the same skin reactions in patients with lepromatous and

tuberculoid leprosy as did the standard Mitsuda antigen. On these grounds, the authors conclude that the organism isolated was indeed *Myc. leprae*.

S. G. Browne

10. **Third International Colloquium on the mycobacteria—"The Genus Mycobacterium"** *Ann. Soc. belge Méd. trop.*, 1973, v. 53, No. 4, 210-425.

This entire number of the Belgian *Annales* is devoted to papers presented at the Colloquium (held in Antwerp from 1 to 3 December 1972) and expertly edited and presented by S. R. Pattyn, who writes both the Foreword and the concluding chapter.

The papers (in English, French and German) give an excellent indication of the growing points of mycobacterial research, excluding *Myc. leprae* and *Myc. lepraemurium* (because of the imminence of the International Congresses in 1973).

Workers in microbiology will find in this volume a fascinating wealth of material, and research leprologists will appreciate the stimulating investigations now proceeding in many European laboratories. The identification of various mycobacteria has now reached a stage when Reference Laboratories can function. Many newly-identified organisms are being discovered in the environment—especially in the tropics.

The direct and indirect bearing of these studies on the problems posed by leprosy will become increasingly apparent with the passing years.

S. G. Browne

The following abstracts are reprinted, with permission, from *Trop. Dis. Bull.* 1973, v. 70 and 1974, v. 71.

11. MOHYSEN, A. M. & ALEMAYEHU, W. **Application of Nyka's method for the staining of mycobacteria in leprosy skin sections.** *Acta Path. Microbiol. Scand., Sect. A*, 1973, v. 81, No. 1, 71-4.

At the Armauer Hansen Research Institute in Addis Ababa a modification of Nyka's method was used to stain sections; this consisted firstly of removal of paraffin and rehydration, then the section was left in a trough of 5% periodic acid for 4 hours, then it was washed, and stained with carbolfuchsin—prepared from basic fuchsin, absolute alcohol, phenol and distilled water—for 30 min at 70°C. The section was decolorized with 2% lactic acid in 70% alcohol, and counterstained with haematoxylin, and "blued" in lithium carbonate. Adjacent sections from biopsy specimens from 10 patients with lepromatous, 8 with tuberculoid, and 2 with indeterminate leprosy were stained by the Ziehl-Neelsen (ZN) method and by the modified Nyka's method. In the lepromatous tissue Nyka's method "showed significantly greater number, of bacilli and a higher proportion tended to stain solidly" (the latter statement may seem surprising). Two photomicrographs support this statement. A table with the details of the other 10 biopsies shows that Nyka's method revealed from 3 to 5 times as many leprosy bacilli per section as the ZN method. Three sections from patients with "tuberculoid" leprosy showed by the ZN method 48 to 69 bacilli per section (!). It would seem that this modification of Nyka's method should replace the ZN method, but the authors advise against this because of the "relatively poor contrast" obtained (the illustrations do not support this statement).

C. S. Goodwin

12. GOTTLIEB, L. S. & SOUTHGATE, M. T. **Acute adenopathy in a young man.** *J. Am. Med. Ass.*, 1973, v. 224, No. 13, 1737-46.

This is the verbatim record of a case presentation and discussion. The patient, a young Portuguese man, had lived in Angola for 6 years until he entered the United States 9 months

before the onset of his illness. He was admitted to the Boston City Hospital 2 weeks after the sudden appearance of a tender mass in his groin for which he received penicillin treatment as an out-patient. On admission he was febrile and delirious, with enlargement and tenderness of the lymph glands, especially those in the inguinal and femoral regions. Out of a large number of investigations, only the tuberculin test was positive, with an induration of 20 mm, and treatment for tuberculosis was started, but without beneficial effect. It was noted at this time that lymph node aspiration produced abundant acid-fast material, but this was thought "possibly to be artifactual".

The discussion was led by Dr F. A. Neva who dealt with the many possibilities in the differential diagnosis and concluded that the patient was suffering from *erythema nodosum leprosum*—the diagnosis of acute lepromatous leprosy was subsequently confirmed, and "retrospective examination did indeed reveal the typical cutaneous and neurological lesions of lepromatous leprosy". This discussion, in which a number of experts in tropical medicine and pathology took part, makes interesting reading in the original, and provides details of further clinical and pathological investigations. There are 10 photomicrographs in colour which show the histology of the lymph glands and of skin and sural nerve preparations. A section of a gland showed "massive numbers" of acid-fast bacilli.

Twelve cases of leprosy have been seen in Boston "in the past year".

F. I. C. Apted

13. RAMANUJAM, K., RAMU, G., BALAKRISHNAN, S. & DESIKAN, K. V. **Nephrotic syndrome complicating lepromatous leprosy.** *Indian J. Med. Res.*, 1973, v. 61, No. 4, 548-56.

"The clinico-biochemical features of nephrotic syndrome developing as a terminal event in five cases of lepromatous leprosy who were subjects of recurrent lepra reaction along with the post-mortem findings in two of them are presented. The various aetiological factors that might have played a part in the causation of this condition in this group of cases are discussed. It is suggested that the recurrent episodes of lepra reaction, which in the acute phases were associated with abnormal urinary findings indicative of a focal glomerulo nephritis, could be due to the occurrence of lesions in the kidneys structurally similar to *erythema nodosum leprosum* or precipitation of antigen-antibody complexes in the glomeruli. Amyloidosis may be a more frequent accompaniment of recurrent lepra reaction than hitherto known. Properly designed studies for the assessment of renal functions supported by renal biopsies will serve to gauge the type of renal involvement."

14. FRIEDMANN, P. S. **Dapsone-resistant leprosy.** *Proc. R. Soc. Med.*, 1973, v. 66, No. 7, 623-4.

The patient, a woman aged 48 from Guyana, had been living in the U.K. for 15 years. Painless papules had developed on her face, arms and legs over the past 4-5 months. At first she denied having had any previous illness, but later admitted that she had been treated for leprosy in Guyana at the age of 13 and had been taking dapsone (sent from Guyana), 50 mg twice weekly for at least 20 years. Acid-fast bacilli were present in "vast numbers" in the skin lesions.

In comment on this case presentation, Dr Stanley Browne said that the long history of self-medication with dapsone, perhaps irregular, and the recent subacute clinical exacerbation with a high proportion of morphologically normal leprosy occurring as the result of the emergence of drug-resistant organisms. The small fleshy papules, of no special distribution, were typical of clinical relapse. He also mentioned the value of the mouse footpad inoculation in confirming drug resistance (see *Trop. Dis. Bull.* 1968, v. 65, abstr. 2828; 1971, v. 68, abstr. 1013). All patients hitherto found with dapsone-resistant bacilli have responded to either clofazimine or rifampicin.

F. I. C. Apted

15. RUSSELL, S. L. & RUSSELL, D. W. **Isoniazid acetylase phenotyping of Amharas in Ethiopia.** *Afr. J. Med. Sci.*, 1973, v. 4, No. 1, 1-15.

Eighty-seven male Amharas in Gondar, Ethiopia, 19 Tigreans, and 14 Gallas were given 100 mg isoniazid at 07.00, 12.00 and 17.00 hr. On the next day at 07.00 hr urine was collected, and "acetylisoniazid: isoniazid ratios" (A:I) were determined. The "antimode" was at A:I 40 in the Gallas, A:I 10 in the Tigreans, and A:I 20 in the Amharas. Rapid acetylation was found in 5 Gallas, 9 Tigreans, but in only 15-17% of the Amharas. "The relevance of these findings to intermittent dapsone therapy of leprosy merits further study."

C. S. Goodwin

16. ROA, P. S. S., KARAT, A. B. A., KALIAPERUMAL, V. G. KARAT, S. **Prevalence of leprosy in Gudiyatham Taluk, South India. Part I. Specific rates with reference to age, sex, and type.** *Int. J. Lepr.*, 1972, v. 40, No. 2, 157-63. **Part II. Geographical variations.** *Ibid.*, 164-70.

In Gudiyatham Taluk in South India 276 568 people, 91% of the "rural population", were examined for leprosy. (The unexamined 9% may have contained many people with leprosy.) 7142 patients with leprosy were discovered. There were "only 731 female patients" for every 1000 male patients. The prevalence increased with age from 1.8% in children aged 5 to 9 years to 4.2% in adults aged 30 to 34 years. Geographically, the prevalence of leprosy per thousand population ranged from 12 to 126, with a mean of 26. The prevalence was higher in the hill areas. 16 tables and figures give the detailed results.

C. S. Goodwin

17. QUAGLIATO, R. **Relatório sobre a Hanseníase no Alto Juruá (Estado do Acre). (Leprosy in the Upper Juruá, Acre State, Brazil).** *Anais Bras. Derm.*, 1972, v. 47, No. 377-97.

This is a report on the incidence of leprosy in the Upper Juruá river area of Acre, Brazil's newest and most remote state; one of the two main towns, Cruzeiro do Sul, is situated 1400 km west of Manaus and only 180 km from the borders of Peru, and the capital, Rio Branco, is 600 km to the east of Cruzeiro do Sul. Communications are very bad and as yet almost entirely dependent on the river (although the trans-Amazon highway is being built); information on the incidence of the disease is scanty but the author states that it is very high as, in 1970, of the total population of the state of 112,000, there were thought to be at least 1200 cases; this incidence is at least 16 times higher than that which WHO regards as high endemicity, and the upper Juruá river area seems to be particularly affected. The state has 2 leprosaria situated in the 2 main towns; there are also 2 dispensaries and 2 preventoria, also in the 2 main towns; the preventoria are now being renamed "Educatória", and are where children living with an infective patient can be re-housed and given some education. According to the author, in 1970 not more than half the patients had had treatment in the past year and, as for ascertainment and prevention, since trained staff are almost non-existent, he suggests the use of 5th or 6th year students who, after some special instruction in the disease, could be sent to the area to carry out investigations and treatment; the provision of a fully equipped launch would also be of the greatest possible value.

(Although the author mentions both main towns it seems that the figures he gives relate almost entirely to the area under the aegis of Cruzeiro do Sul, but the distance of 600 km from there to the capital gives the reader some idea of the immense problems to be solved.)

W. K. Dunscombe

18. DRUTZ, D. J. & GUTMAN, R. A. Renal manifestations of leprosy: glomerulonephritis, a complication of *erythema nodosum leprosum*. *Am. J. Trop. Med. Hyg.*, 1973, v. 22, No. 4, 496-502.

In a study of 636 in-patients at Taiwan's national leprosarium, where the majority suffered from lepromatous leprosy, 11 were found to have urinary abnormalities consistent with glomerulonephritis, and there was a strong correlation with a history of *erythema nodosum leprosum* (ENL). In another (more detailed) study of 41 out-patients referred to the U.S. Naval Medical Research Unit No. 2, 21 of whom had lepromatous leprosy, 8 had active ENL and 7 of these reacting patients had urinary findings suggestive of glomerulonephritis, but such changes were absent in all the others. A total of 7 renal biopsies were carried out on patients with ENL (from both study groups) and 2 were found abnormal; these showed proliferative glomerulonephritis.

As ENL is considered to be an immune complex syndrome the authors suggest that immune complexes may be deposited in renal vasculature in some cases of ENL and give rise to glomerulonephritis.

W. H. Jopling

19. JOSHI, P. B., SHAH, A. H., AGASHE, P. K., BAFNA, R. G. & JOSHI, P. V. Ocular manifestations of leprosy. *Indian J. Med. Res.*, 1973, v. 61, No. 3, 435-41.

In Poona, India, the eyes and eyebrows of 654 patients with leprosy were examined, 84% of the patients were non-lepromatous. Posterior synechiae were found in 13 non-lepromatous and 3 lepromatous patients, and iritis in 9 of the former and 3 of the latter. Five tables give details of the lesions, but true ophthalmic lesions did not seem to have been frequent.

C. S. Goodwin

20. VERMA, K. C., SINGH, K. & CHOWDHARY, S. D. Dapsone toxicity. *J. Indian Med. Ass.*, 1973, v. 60, No. 7, 255.

This is a report of psychosis occurring in an Indian female aged 30 years after 1½ years of dapsone therapy for lepromatous leprosy. She had been treated as an out-patient and at no time received more than 300 mg a week. Dapsone was stopped and she was admitted to a psychiatric ward where she made a rapid recovery, but an attempt to re-introduce dapsone therapy, 50 mg daily, had to be abandoned when her mental symptoms recurred.

W. H. Jopling

21. KIRCHHIEMER, W. F., STORRS, E. E. & BINFORD, C. H., Attempts to establish the armadillo (*Dasypus novemcinctus* Linn.) as a model for the study of leprosy. II. Histopathologic and bacteriologic post-mortem findings in lepromatoid leprosy in the armadillo. *Int. J. Lepr.*, 1972, v. 40, No. 3, 229-42.

This paper presents an autopsy report on the first nine-banded armadillo to be infected with lepromatoid leprosy (see *Trop. Dis. Bull.* 1972, v. 69, abstr. 1692) which died of the infection 520 days after inoculation. As the histology is described in some detail and finely illustrated, interested workers are advised to consult the paper in the original. In general, the findings are those of an intense lepromatous (LL) infection with more widespread systemic dissemination than occurs in man. Some of the differences from the corresponding human infection may be due to the lower body temperature of the armadillo, but they are attributed also to a greater immunological susceptibility of this animal. The numbers of bacilli in the lesions were enormous and, in the ear lobe, were calculated to exceed by 200 times the numbers per gram of heavily infected human skin.

In the skin, tissue response was mainly in the deep lesions, although it did also extend up to the epidermis without any clear zone at the inoculation site. Nerves in the skin (and also the left peroneal nerve) showed invasion of bacilli in appreciable numbers, and the perineural tissue was similarly involved, but less so than in human lepromatous leprosy. Heavy lepromatoid lesions were found in the liver, spleen, lymph node, bone marrow (but not the muscle attached to the bone), lung, meninges and oesophagus. There was less severe involvement of testes, kidney, and some other viscera. Multiplication in the mouse footpad was obtained with *Mycobacterium leprae* from the armadillo's skin, liver and inguinal lymph node. (The armadillo is obviously an interesting model from many points of view, and also a promising source of supply of *Mycobacterium leprae*.)

D. S. Ridley

22. DI MARTINO, M., GUALDI, G. & MARRACINO, F. Attualtà sulla lebbra: aspetti epidemiologici e preventivi. (The present position of leprosy: epidemiological and preventive aspects.) *Nuovi Ann. Ig. Microbiol.*, 1972, v. 23, No. 5, 361-91. English summary (4 lines).

This is an extremely interesting report on the recent incidence of leprosy throughout the world. The authors point out that the true incidence is not known but give figures (Table 2) of registered and estimated cases by continents and countries; in 1965 these were 2.8 million and 10.8 m, and by 1970 it was not thought that they had altered greatly. However, the chronicity of the disease, the difficulty in the diagnosis of early cases and the costs of treatment and prevention multiply the problems. The authors discuss the diagnosis of stained films by the light microscope and the presumed difference in pathogenicity of fully stained, presumably live, bacilli and partly stained, possibly dead, bacilli; they feel that this subject is still obscure and are uncertain whether any prophylactic significance can be ascribed to this difference. The immunological state will have repercussions on the type of the disease and there may even be persons who are relatively resistant (see also *abstr.* 83 below). For treatment, thalidomide and B 663 (Lamprene, clofazimine) for leprotic reactions are mentioned, and also the various and numerous anti-leprosy drugs in current use, particularly rifampicin, although dapsone still seems the general maid-of-all-work. For prevention, the infectivity of the leprotic forms makes it especially important that children should be removed from such patients (but what of the indeterminate forms?) and the value of BCG vaccination of children is extensively discussed. Here the three great BCG campaigns in Uganda, New Guinea and Burma are mentioned, the success of the first being balanced by the failure in Burma, while the results in New Guinea are equivocal to say the least; so here also the position is still by no means clear.

The authors conclude that, in spite of all the efforts of those interested throughout the world, leprosy still retains some as yet undiscovered secrets.

(This paper is very well worth reading in the original for its extremely well balanced views).

W. K. Dunscombe

23. FIELDSTEEL, A. H. & McINTOSH, A. H. Attempts to cultivate and determine the maximum period of viability of *Mycobacterium leprae* in tissue culture. *Int. J. Lepr.*, 1973, v. 40, No. 3, 271-7.

"Repeated long-term attempts have been made to cultivate *Mycobacterium leprae* *in vitro* in cultures derived from tissues of man, mouse and rat. These attempts were uniformly unsuccessful. However, it was possible to demonstrate that most of these tissues could be maintained from 110 to 413 days in a single passage with only minimal changes of nutrient fluids. When these tissues were infected with *Mycobacterium leprae* and maintained at either 31°C or 34°C, phagocytosis was highly variable, ranging between 23% and 100%. In these experiments, cultures of murine origin appeared to be more favourable milieu than cultures of human tissue for maintaining viability of *Mycobacterium leprae* over extended periods of time. Seven of the eight experiments in which *Mycobacterium leprae* survived from 28 to 118 days were in murine tissue cultures."

24. MYRVANG, B., GODAL, T., FEEK, C. M., RIDLEY, D. S. & SAMUEL, D. R. **Immune response to *Mycobacterium leprae* in indeterminate leprosy patients.** *Acta Path. Microbiol. Scand., Sect. B*, 1973, v. 81, No. 5, 615-20.

"Immune responsiveness to *Mycobacterium leprae* was examined in 31 histologically classified indeterminate leprosy patients. Fourteen of the patients were also classified as indeterminate clinically (strictly indeterminate group), while the other seventeen patients were clinically classified as tuberculoid or borderline leprosy. The strictly indeterminate group appeared to be quite homogenous in their immune reactivity to *Myco. leprae*. All patients revealed a lymphocyte transformation of less than 3% (mean 0.57 ± 0.88) and only 1 out of 7 patients tested by the leucocyte migration technique revealed a migration index of less than 0.80 (mean 0.91 ± 0.16). Only one patient gave a positive early lepromin reaction. None of the patients revealed a positive reaction in gel precipitation to mycobacterial antigens. These findings are in agreement with the view that the immune response to *Myco. leprae* has not been triggered off in strictly indeterminate leprosy. On the other hand, the clinically tuberculoid and borderline patients with an indeterminate histological picture responded on average more strongly to *Myco. leprae*, and by and large according to their clinical diagnosis. It is concluded that in classifying patients as indeterminate leprosy, the clinical picture may give more information than histopathology."

25. LOAIZA, W. O. **Leprosy in Ecuador.** (**Leprosy in Ecuador.**) *Medna Cutánea*, 1972, v. 6, No. 6, 447-50. English summary (6 lines).

The author mentions that the Andean Cordillera divides the country into 3 zones: (a) a coastal zone which has a hot and humid climate and where most of the cases of leprosy occur; (b) the sierra which is cold and dry; (c) the lower eastern zone consisting of tropical forest.

Historically, leprosy is thought to have arrived in the country with the Conquistadores but there are certain curious features as in the lower eastern zone and in the Galapagos islands where no autochthonous cases have been detected. The national anti-leprosy campaign began in 1963 although there had been no attempts at leprosanaria before then. Between 1963 and June 1971 over 770,000 persons had been examined out of a total population of just over 6 million, and 1894 new cases detected. Of 1862 cases classified, the numbers were: lepromatous 765, tuberculoid 436, indeterminate 618 and dimorphic 43 (no details are given of the missing 32). Of the new cases 152 were in children under the age of 15 years, most of whom had the indeterminate form. In general, more males were affected than females and this was particularly the case in those over the age of 15 years. Over the 17 provinces of the country the incidence ranged from 0.02 to 1.21 per mille. The author stresses that there are important foci of the disease in 6 provinces, two of which border Peru, and he regards the degree of infection as of moderate intensity.

W. K. Dunscombe