CURRENT LITERATURE

It is intended that the current literature of leprosy shall be dealt with in this department. It is a function of the Contributing Editors to provide abstracts of all articles published in their territories, but when necessary such material from other sources is used when procurable.

BOSCH MILLARES, J. La lepra y su cura por la lagartija. [Leprosy and its cure with little lizards.] Medicamenta (Madrid) **10** (1952 121-122.

In the section, "Art, History, Philosophy and Literature in Relation to Medicine" is a description of the conditions that existed in the Canary Islands shortly after they were brought under the Crown of Castille by the Catholic kings. At that time the most varied and fantastic remedies were prescribed in therapy. In 1783, the doctor Don Francisco Pano, who had under his care the patients admitted to the hospitals San Martín and San Lázaro, got hold of the formula of a remedy which, according to reports, had been used in Guatemala and Mexico for various diseases, including elephantiasis, with marvelous results. This remedy, called *de la lagartija* (of the little lizards) consisted in capturing one of these reptiles alive and quickly severing its head, feet and tail. The rest of the body, after having been skinned, was made into pills, to be taken on an empty stomach for 4, 8, or more days. Mention is made of several cases treated by this method, with what for that time was considered great success. The author published this historical note solely as an example of what might happen to patients with this calamitous disease when there did not exist effective means such as we have now. —FELIX CONTRERAS

BAILEY, W. International Leprosy Conference of the Mission to Lepers and American Leprosy Missions. Lep. India **26** (1954) 56-62.

This article describes briefly the proceedings of the Conference held at Lucknow, November 7-16, 1953. Seventy delegates were present from all countries in which the missions work, among them some leading leprologists and social workers. Between social and religious functions, which were a special feature of the conference, papers of a very high standard were read and discussed. These touched on all aspects of leprosy work—medical, spiritual, social, and organizational. The findings of the various committees set up were presented to the conference, and extracts from the report of the Medical Committee are given in this article. It dealt with the subjects of epidemiology, control, isolation, classification, treatment, and research. The conclusions are based mainly on the findings of the Madrid Congress and the WHO Expert Committee on Leprosy. —DHARMENDRA

AMRIT KAUR. International Leprosy Conference of the Mission to Lepers and American Leprosy Missions, Lucknow, 1953.

In her address before the plenary session of this conference [see preceding abstract] the Minister of Health, Government of India, eulogized the humanitarian work of the missions. Remarking that leprosy had attained both national and international recognition, she stressed the importance of social and economic rehabilitation of leprosy patients and referred briefly to the various agencies, besides the missions, that are engaged in antileprosy work in India, viz., the central and state governments, voluntary organizations like the Hind Kusht Nivaran Sangh, the Leprosy Foundation of the Gandhi Memorial Trust, etc. She then gave a short outline of the future plans for antileprosy work by the government, viz., establishment of a Central Leprosy Research Institute, and opening of pilot centers in some of the highly endemic areas for survey, education, and mass treatment with sulfones. —DHARMENDRA

ARNOLD, H. L., Jr. A dermatological tour of Japan, Okinawa and Korea. Straub Clin. Proc. (Honolulu) **20** (1954) 75-89.

This is a succinct and entertaining day-by-day account of a tour made by the author with several army officers as a consultant to the surgeon general. His interest in leprosy is reflected in some of the visits made. The first of these was to Aisei-en on Nagashima Island, where he was impressed by Mitsuda's activity (at 79) and with the leprous alopecia he was shown. Of the 1,600 patients there, 700 were receiving (Japanese-made) promin by daily intravenous injection—because "they like it." The same is true of patients in Hawaii, the writer interjects. The annual mortality has decreased from 5% to 0.5% since the introduction of the sulfones. Leprosy has evidently decreased in Japan generally, because 50 years ago the rate in draft examinations was 1.5 per 1,000, now down to 0.1. In Korea visits were made to two leprosaria. One was a village-type place near Pusan, visited periodically by a Dr. Burgess from a mission hospital in Pusan. The other was a dormitory type near Taegu with 1,100 patients, under the over-all supervision of Dr. Kenneth M. Scott, a missionary surgeon, with a resident Korean physician. On Okinawa a visit was made to the Airaku-en leprosarium, where there are now 930 cases in the charge of an Okinawan physician, Dr. Kojun Oyadamari. Promin and diasone have been used mostly (DDS is to be substituted, for economy), and their discharge rate is about 130 per year, with only 70 admissions. —H. W. W.

DE SOUZA-ARAUJO, H. C. O problema da lepra no Brasil. [The problem of leprosy in Brazil.] Arq. mineiros Leprol. **14** (1954) 79-89.

This paper, read at the Congress of Tropical Medicine and Malaria at Istambul in 1953, is full of collected data of which only a few samples can be taken. In the 5-year period 1946-1950 in Brazil, 22,245 new cases were registered (detailed table), of which 56.5% were open or infectious. The proportion of open cases varies in different regions from over 70% (Minas Gerais, etc.) to less than 50% (Espirito Santos and São Paulo). Not until 1935 did the federal government begin to deal with leprosy as a national problem. Many figures are given with respect to the period since 1941, when the national service was created. One table lists the 38 leprosaria, which had a total of 23,421 patients in 1952, and another one lists 29 preventoria in operation and 2 under construction, with a total of over 4,000 children (varying from 22 to 389 per place). Of antileprosy dispensaries, the "*célula mater*" of the antileprosy campaign, there were only 93 in the country whereas at least 200 (fixed and itinerant) are needed. —H. W. W.

ZACCARIA, R. Epidemiologia e profilassi della lebbra in Tripolitania. [Epidemiology and prophylaxis of leprosy in Tripolitania.] Boll. San. Tripolitania **11** (1953) 15-24.

A list of the cases found in Tripolitania each year from 1923 to 1953 includes 175 Libyans, 6 Italians, 8 Jews and 1 Eritrean. A survey carried out in 1937, when compulsory isolation was introduced, produced a total of 35 cases; certain portions of the old hospital were then set aside to provide separate accommodation for the two sexes. The number of new cases diagnosed each year has increased, and the hospital space has become inadequate. Since 1947, 78 patients have been admitted. Eighteen of them have been discharged, as required by law, after 6 successive negative examinations. These patients are supposed to be kept under observation after discharge, but they are usually lost trace of. Sixteen others have escaped and most of these, too, have been lost sight of. Thirteen have died. The author's views about the mode of spread does not exclude the possibility of indirect transmission through insects and rat bites. He stresses the importance of a low standard of living and lack of sanitary conditions. He pleads for extensive improvement in the "sanatorium" (which term he proposes in place of the term "leprosarium"), with among other

things separation of cases with tuberculosis and sufficient land for cultivation. A generous subsidy to dependents would reduce the tendency to conceal cases.—[From abstract in *Trop. Dis. Bull.* **51** (1954) 1167.]

PREMANANDA, INDIA. Premananda Leper Dispensaries. Annual report for 1952. Lep. India **26** (1954) 38-39 (condensation).

These two outpatient clinics are located in Calcutta and are run by the Oxford Mission with grants from other agencies. The total number of leprosy cases attending them during the year was 5,626, of which 2,004 were new cases. Of the total, 4,788 were males and 838 females; 2,020 were infectious and 3,606 noninfectious; 4,227 came from inside the city and 1,399 from outside. —DHARMENDRA

LARA, C. B. Neglected problems in leprosy control. J. Philippine Med. Assoc. **28** (1952) 82-84.

Almost a half-century of government effort has not reduced the prevalence of leprosy in the Philippines. It is possible to say in retrospect that this has been due to the control measures employed, which were based on principles applicable to acute infectious diseases, and because of a very imperfect understanding of leprosy itself. There is urgent need for a new orientation, and the following points are discussed on the basis of epidemiological facts. (*a*) In regions of highest prevalence, in spite of inadequate or no control measures, not more than 10-15% of the population is affected; so most of the population is immune or highly resistant to leprosy. (*b*) Young children are the most susceptible of all age groups, and in the majority of frankly recognizable cases the first manifestation observed by the patient can be traced back to childhood or adolescence. (*c*) The disease is probably transmitted through skin contact with fresh material containing the infectious agent, usually by direct skin-to-skin contact. (*d*) Adults are immune or almost completely immune to the infection, as proved by healthy spouses of leprous patients, by workers living in more or less intimate and prolonged contact with patients, and by the consistent failure of numerous experimental inoculations. (*e*) Early leprosy has a marked tendency to subside spontaneously in from two-thirds to four-fifths of the cases, a process of self-healing which is apparently complete and permanent in most of them. (*f*) No complete and permanent cure has yet been found, nor has there yet been developed any effective prophylactic vaccine. To demonstrate childhood susceptibility and to plan for a more direct approach to effective leprosy control, the author offers the following proposals for children born of leprous parents in leprosaria, their removal immediately at birth from leprous parents being a prerequisite: (1) To raise a number of such children to adolescence or early adult life in a known nonleprous environment, eliminating all direct and indirect contact, including vectors, but not heredity and intrauterine transmission. (2) To keep a similar number of children in a nonleprous environment until the age of 3 or 4 years, then return them to the parents and unlimited contact. (3) A third group of children would be dealt with like the second one, but as early as possible their ability to react strongly to injected lepromin would be built up before returning them to their parents, mostly before the age of 3 years, with periodic retesting with lepromin afterward to explore further the possibility of active immunization. —J. O. NOLASCO

LITTANN, K. E. Medical cartography of leprosy distribution; purpose and methods. Mem. VI Congr. Internac. Leprol., 1953, Madrid, 1954, pp. 910-921; also, Die medizinsche Kartographie der Lepraverbreitung, ihre Aufgaben und Methodik. Ztschr. Tropenmed. u. Parasitol. **5** (1954) 115-130.

Far too little use has been made of the possibilities of the carefully planned application of modern medical cartography for the study and control of leprosy. With its help, surveys and other epidemiological investigations will be considerably simplified and made more accurate, and the control of endemic diseases will be facilitated

and rationalized. (1) In the first part of the present work an investigation is made regarding the special tasks to be fulfilled by geomedical cartography in regard to leprosy. Most significant is the presentation of the distribution of the disease or its prevalence among the population. By means of chronological comparisons of maps—in particular of incidence maps—it is possible to pursue and to control the course of an endemic. This provides important information on the prognosis and references to areas in which the control of leprosy is urgent. [Similar data are obtainable from maps about immunity conditions (lepromin reaction).] The possibility of showing, by means of cartographs, the correlations between disease and surroundings, and evaluating these for the study of epidemiology and etiology, merits special attention. (2) The second part deals with particularities of the method of geomedical maps, and for this purpose certain requirements are mentioned and explained by maps. Case maps register all infected communities or the number of cases in absolute numbers. Distribution maps give a summary of the distribution of an endemic. Expansion maps are only suitable for a representation of the historical expansion of leprosy or of routes of importation. On statistical maps can be demonstrated all characteristics of leprosy that are expressible in numbers and scales. Combined maps can help in cases in which one method is not sufficient to reach the desired aim. Mention is made of certain difficulties in cartographic representation of diseases and in the preparation of maps, at the same time showing how such difficulties can be avoided. The above-mentioned possibilities of making use of leprosy maps open up new ways for the control and research of this wide-spread endemic. The basic features of geomedical cartography should therefore become the common property of every research worker and physician working in the field of epidemiology and control. —AUTHOR'S ABSTRACT

YOKOTA, T. The observation of the healthy (untainted) children isolated from their leprosy parents. La Lepro **23** (1954) 147-157 (In Japanese; English abstract p. 147).

The children who have no one to take care of them after infected parents have been admitted to the leprosaria are sent to children's homes near the leprosaria and are observed by doctors of the institution. Almost all of 232 children at Aisei-en lived with their parents for different periods of time, from 1 month to 13 years. The findings indicate that these children should be kept under observation in the children's home for at least 5-6 years in order not to overlook the beginning of leprosy; after that period the disease seems not to develop. Twelve of these children (5.1%) have developed the disease, all of them contacts of lepromatous cases. The initial lesion was usually a tuberculoid macule (8 cases), but 1 showed lepromatous infiltration at the time of onset. Of the 12 cases, 9 are of the neural type and 3 lepromatous. In general the prognosis is favorable, because of early diagnosis and treatment.—[From abstract.]

MANCA, F. E possibile una profilassi antileprosa endouterina del feto con vaccino BCG? [Possibility of antileprosy prophylaxis by endo-uterine BCG vaccination of the fetus.] Minerva Ginecol. **6** (1954) 74-75.

The author summarizes the literature on prophylaxis of leprosy by means of the antituberculosis vaccine BCG, particularly in the youngest children. Since the Hansen bacillus has been demonstrated in the placenta and in the funiculum, the author suggests the possibility of direct, transplacental transmission of leprosy to the embryo [a possibility often discussed and generally considered improbable], and suggests BCG vaccination of the fetus, trans-uterine, endo-amniotic, or subcutaneous. He is considering the possibility of beginning this prophylaxis. —M. TERNI

MONTESTRUC, E. Vaste léprome bacillifère chez un enfant de trois mois né de parents sains. (Coexistence d'une tache mongolique.) [Large bacillus-containing

lepromas in a 3-month baby born of healthy parents. (Coexistence of a Mongolian spot.)] Bull. Soc. Path. exot. **46** (1953) 877-880.

Large (*vastes*) skin lesions which appeared at the age of two months were observed in a 3-month-old baby. They were achromic, covered one-fifth of the total skin surface, and contained very numerous Hansen bacilli. The parents were apparently free from leprosy, but another member of the household was a lepromatous case. The importance of this observation lies in the fact that this child was infected between the time of birth and the age of two months, and that at 3 months he presented lepromatous leprosy. In addition, there was noted in the baby a Mongolian spot situated in a macular leprous area. [The results of the histological examination and the Mitsuda test are not indicated.] —M. VIETTE

DREISBACH, J. A. A case of leprosy in a seven months old child. Leprosy Rev. **25** (1954) 81-82.

In a family of four the father, who had far advanced lepromatous leprosy, had to look after the three children (boys of 5 and 3 years, and 7 months) while the mother worked on the farm. All three sons developed flat, hypopigmented leprosy macules, and the family presented themselves at the Kano Leprosy Settlement of the Sudan Interior Mission. The baby had three such macules, one on the face, one on the left buttock and thigh, and the third on the front of the right thigh. Only in the last were a few bacilli found in smears. Treatment consisted of 50% aqueous sulphetrone, 0.5 gm. twice weekly. The baby responded well. Two lesions cleared up in 5 months, but the one in which bacilli had been found persisted for over a year. No clinical signs of leprosy remained after 28 months, and no bacilli could be found. —G. O. TEICHMANN

GHERARDI, G. J. Lepromin reaction. Brooklyn Hosp. **11** (1953) 44-45.

In 1951 a 55-year-old man, who had lived in Colombia, South America, for ten years, presented himself at the King's County Hospital, Brooklyn, with nodules on his face and ears and anesthetic macules over the greater part of his body; he is being treated for leprosy on an ambulatory basis. He was Mitsuda positive in 1950. Two photomicrographs of a specimen taken from the Mitsuda test site show that histologically they are indistinguishable from leprosy. [This article is confusing because the case is obviously one of lepromatous leprosy, and yet the Mitsuda reaction is said to have been positive. "Sections are *said to have been* taken from test site on forearm." The photomicrographs show clearly that the specimen is of a lepromatous lesion and not a positive Mitsuda reaction lesion as indicated.]

—SR. HILARY ROSS

BORDA, J. M. Leuconiquia en franjas con neuritis leprosa. [Striated leukonychia with leprous neuritis.] Arch. argentinos Dermat. **4** (1954) 72-73.

Striated leukonychia involving the entire nails, resembling the arsenical onychopathy of Mées, was seen in a patient with tuberculoid leprous neuritis of the ulnar. A peculiar observation was that the nails corresponding to the sector innervated by the affected ulnar (the left small and the ring fingers) were unaffected.

—G. BASOMBRIO

ROLLIER, R. and WEISBERGER, J. P. Quelques aspects des associations pathologiques de la lèpre au Maroc. [Some aspects of the pathological associations of leprosy in Morocco.] Maroc Méd. **32** (1953) Spec. No. pp. 755-757.

The different affections which frequently accompany leprosy give an unusual aspect to the disease in certain cases. Lepromatous syphilitics sometime present ulcerated lepromas which heal in from 2 to 6 weeks after treatment with penicillin. Regarding the frequency of positive serologic tests for syphilis in leprosy cases, the authors agree that many are false positives. They have seen 4 cases with negative

sera that became positive during lepra reactions, then returned to negative again afterward. In 350 patients there were 2% with pulmonary tuberculosis, and several cases of tuberculosis of other locations. The bacillary adenitis that is frequent in Morocco was seen in only a limited number of leprosy cases. The appearance of a benign form of leprosy in a case which had been followed previously for tuberculosis confirms the idea of leprosy-tuberculosis antagonism. Amebiasis is frequent, as in the rest of the population, but rarely needs active treatment. Trachoma is frequent, in association with the ocular lesions of leprosy, but the latter are rarely observed in the pure state. Malaria is on the way to disappearance. Interdigital and plantar epidermomycoses, eczema and impetigo aggravating the trophic lesions of leprosy have been seen. Avitaminoses, especially A and B, are frequent. —M. VIETTE

MONTESTRUC, E. A propos de la classification de la lèpre de R. Chaussinand. (La réaction d'hémagglutination dans les différents formes de la lèpre.) [On Chaussinand's classification of leprosy. (The hemagglutination reaction in the different forms of leprosy.)] Bull. Soc. Path. exot. **46** (1953) 985-991; *also*, Arch. Inst. Pasteur Martinique **6** (1953) 31-36.

The author approves the classification of leprosy proposed by Chaussinand [see THE JOURNAL **21** (1953) 1-10]. He agrees particularly with the principle of classifying a patient according to his aspect at the time of examination. In his opinion, indeterminate leprosy is a relatively benign form. He thinks, also, that the result of the Mitsuda reaction is useful in the classification of certain patients. He submits, however, that the results of the Middlebrook-Dubos hemagglutination reaction and conditioned hemolysis test should be added to Chaussinand's simplified formula. The titers obtained in these reactions are very different according to whether the case is of the benign or the malign form. Furthermore, the titers decrease very clearly when there is improvement of the clinical condition of the patient as a result of treatment. —M. VIETTE

GOUGEROT, H. Les quatre grandes formes de la lèpre. [The four principal forms of leprosy.] Arch. Inst. Pasteur Guyane Française. Publ. No. 313, 1954 (Jan.).

The four forms or groups recognized by the author are: (1) lepromatous, the old nodular leprosy; (2) the maculoanesthetic forms, corresponding to all the cutaneous and nerve lesions that are poor in cells and bacilli, subdivided into macular and trophoanesthetic; (3) tuberculoid; and (4) invisible forms. He concludes: "Thus the reactions to the infection oscillate between three main poles: (1) nonspecific lympho-connective tissue infiltration (U or I); (2) reaction of defense and immunology—tuberculoid reaction, epithelioid and giant cells (T); and (3) imperfect reactions of defense and immunology—foreign-body reactions with phagocytosis of the globi in the macrophages and lympho-connective tissue cells (L). One then conceives the possibility of transitional forms and of the coexistence or association of these 3 series of forms (mixed forms in the true sense of the word) and their evolution; for example, the disease beginning by an I form and finishing spontaneously or by treatment under the same I form." —H. FLOCH

MCLEAN, L. D. Early diagnosis in leprosy. Louisiana State Med. J. **106** (1954) 405-411.

SWAN, L. L. The laboratory diagnosis of leprosy. *Ibid.* 411-413.

MEYER, W. H., SR. Modern approach to the public health aspects of leprosy. *Ibid.* 413-419.

1. McLean emphasizes that the physician in Louisiana should be better informed about leprosy, since it is endemic in the state and the National Leprosarium is located there. A resumé of the types is given, with a table showing the characteristics of each type as to lesions, pathology, serology and host resistance. Other topics dicussed are: early diagnosis, differential diagnosis, laboratory tests and therapy.

2. Swan points out that the pathologist plays a major role in the diagnosis and classification of leprosy. In order to diagnose leprosy successfully he must develop a high degree of suspicion, and he must be sure that the acid-fast staining technique used in the laboratory will stain the leprosy bacilli. Several granulomas of the skin may be indistinguishable histologically from tuberculoid leprosy, and every patient with such a histologic picture should be studied clinically for leprosy. The importance of tissue diagnosis is illustrated by two case histories.

3. Meyer gives some of the salient points about leprosy as regards history, epidemiology, and the modern approach to the public health aspects. Figures show the history of its spread in the New World, its geographic distribution throughout the world, throughout the United States, and in the various states in which it is endemic. In local practice active lepromatous cases are referred to Carville, while others obtain treatment at biweekly clinics held at the United States Public Health Hospital in New Orleans.

[These three articles are dealt with together because they were presented as a series at an annual meeting of the Louisiana State Medical Society in 1954.]

—Sr. Hilary Ross

Mariano, J. Considerações sobre os aspectos clínicos e localização da nevrite leprosa. [Considerations of the clinical aspects and the localization of leprous neuritis.] Arq. mineiros Leprol. **13** (1953) 136-139.

Leprous neuritis is unique in being the only neuritis caused by an ascending [*sic*] bacillary infection. In 300 cases examined the ulnar nerve was the most commonly affected, 223 showing abnormality. The external popliteal was next in frequency, 96 cases. Only in leprous neuritis are the volume and consistency of both the nerve trunks and the slender nerve filaments modified by the infection.—[From abstract in *Trop. Dis. Bull.* **51** (1954) 941.]

Duarte, L. G. and De Mello, P. H. O 4:4′-diamino-difenil-sulfona no tratamento da lepra lepromatosa. [DDS in the treatment of lepromatous leprosy.] Rev. brasileira Leprol. **21** (1953) 207-220.

The literature of the sulfones is first reviewed, and then an account is given of 90 cases of leprosy treated with DDS. The daily dose given orally was 100 to 200 mgm., the latter being tolerated when 42 days of treatment was followed by 15 days' rest. Having formerly used promin, diasone and other sulfone derivatives, the author considers that because of its efficiency, ease of administration and moderate price, DDS is the treatment of choice for leprosy.—[From abstract in *Trop. Dis. Bull.* **51** (1954) 698.]

Biswas, H. B. A note on the preparation of 2:2′-dihydroxyl 4:4′-diaminodiphenyl-sulphone. Science & Culture **19** (1953) 214-216.

The author describes a method of preparation of this compound, less complicated than that of Linnel and Stenlake (1950), with notable modifications in two of the stages, namely in the preparation of the organic sulphide compound and the reduction of the intro-compound to the final product. —Dharmendra

Dharmendra and Chatterjee, K. R. Preliminary tests with a new sulphone drug. Bull. Calcutta Sch. Trop. Med., April 1954.

The authors investigated the toxicity and bactericidal effect of the hydroxy compound of DDS prepared by Biswas [see preceding abstract]. For the former test guinea-pigs were employed, and for the latter one Kedrowsky's bacillus. It was found that guinea-pigs could tolerate the drug in a dose of 20 mgm/kgm, and that a 1:100,000 concentration of it in glycerine agar could inhibit the growth of the Kedrowsky's bacillus. —Authors' Abstract

TZANCK, A., BASSET, A. and SALOMON, L. Un cas de lèpre traité par l'association, à pois égal, de deux nouvelles sulfones di-substituées: la diphényl sulfone 4,4'bis (azo-para-isopropyl-métacrésol) et son dérivé diargentique. [A case of leprosy treated by an equal-parts mixture of two disubstituted sulfones: diphenyl sulfone 4,4'bis (azo-para-isopropyl-metacresol) and its bis-silver derivative.] Bull. et Mém. Soc. Méd. Hôp. Paris **68** (1952) 749-752.

———, ——— & ———. Action prolongée d'un nouvel antibiotique atoxic dans le traitement de la lèpre. [Prolonged action of new nontoxic antibiotic in treatment of leprosy.] Presse Méd. **61** (1953) 249-250.

———, ——— & ———. Résultats d'une nouvelle sulfone dans le traitement de la lèpre. [Results obtained with a new sulfone in the treatment of leprosy.] Bull. et Mém. Soc. Méd. Hôp. Paris **69** (1953) 715-719.

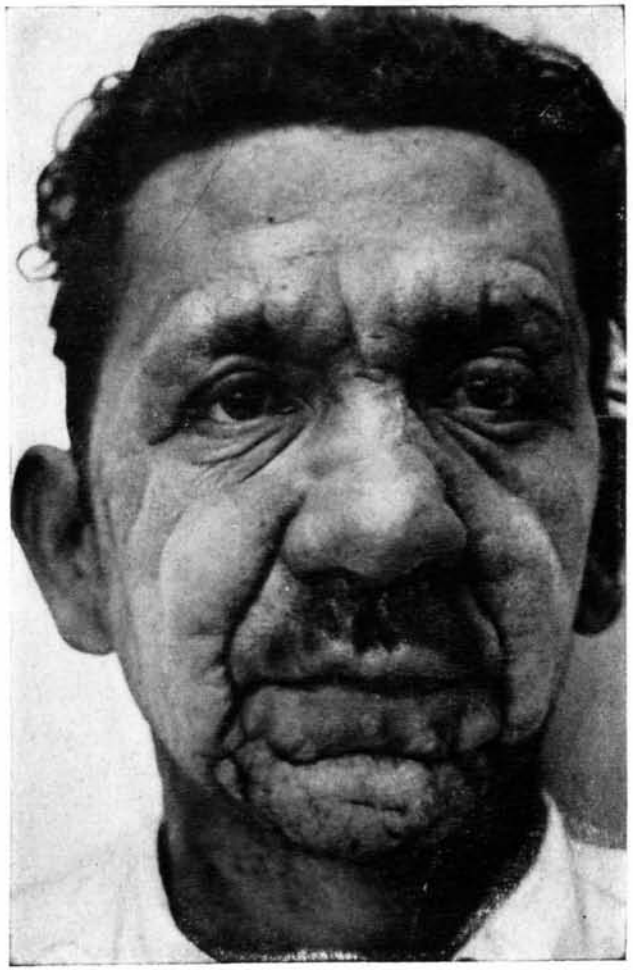
A patient who contracted leprosy in Indo-China was treated with these sulfone derivatives (called J-51), 200 mgm. daily, and within 6 months he made great clinical improvement, with no toxic effects. At the beginning, smears from the nasal mucosa and the buttock showed numerous bacilli; after 22 months smears from the mucosa were negative. The authors conclude that J-51 is certainly 40 times less toxic than DDS. [The abstractor pointed out that it is rather rash to base such a conclusion on the treatment of only one patient; that the type of case is not mentioned; and that nothing is said of the blood concentration for the amount absorbed or the rate of excretion, points that are essential in comparing the toxicity with that of DDS.]—[From abstract in *Trop. Dis. Bull.* **49** (1952) 1129.]

Tests made during the past 4 years with a new diazotized silver sulfone (Di-Atox argentique-Jeanson) in 15 patients with leprosy proved its lack of toxicity or of cumulative effect. It does not produce drug resistance; its efficacy is not reduced after administration for prolonged periods. In preliminary tests it was administered to guinea-pigs 1 gm./kgm. (400 times the effective dose for man) for 60 days; the animals continued to gain weight, and showed no pathological changes when sacrificed. Details are given of 3 of the 15 patients treated. The therapeutic effect was rapid on most of the lesions, although some which were poorly vascularized and sclerotic did not begin to regress until the end of the second year. Continued treatment finally resulted in their complete disappearance. Adults may be given a dose of 0.20 gm. a day (taken orally) to begin with; as the disease regresses, the dose may be reduced. Relapses were prevented by continuance of the treatment for two or three years after clinical cure.—[In part from abstract in *J. American Med. Assoc.* **152** (1953) 978.]

[From an abstract seen this would seem to be another report of the treatment with "Di-Atox argentique" containing the histories of 3 patients. The abstractor remarks that no description of the chemical formula is given, and that no mention is made of the blood concentration, the degree of absorption or the rate of excretion, and that no evidence is given that this drug differs from DDS in these two qualities.]

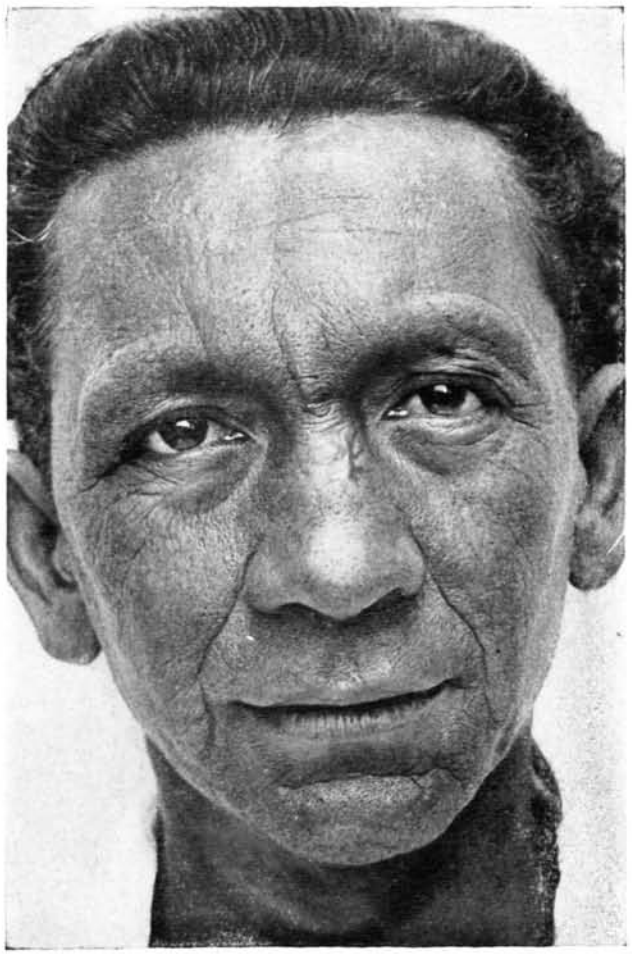
A Foreign Letter in the *J. American Med. Assoc.* **154** (1954) 163-164 tells of a presentation by these authors, before the Medical Society of the Paris Hospitals on June 26, 1953, of the first 3 patients treated with this drug without interruption. All of them had leonine facies, but all had returned to normal life in the community. There had been no instance of relapse. [With 3 cases—presumably the same ones—repeatedly reported, the silence regarding the other 12 arouses curiosity.]

It is also stated that these workers "have also used this sulfone in treating the various forms of cutaneous tuberculosis with promising results. The investigations of Gernez-Rieux and his associates with tuberculostatic drugs have already shown that the most rapid and definite action is obtained with a combination of isoniazid and sulfone. He confirmed the remarkable tolerance for this sulfone, as well as its absolute innocuousness, in contrast with the earlier sulfones, which were detrimental to the blood. He thinks that it is too early to estimate the absolute therapeutic value of this sulfone in tuberculosis, as he always uses it in association with other antibiotics."



November 24, 1949.

Massive infiltration of the face producing the leonine facies.



June 24, 1950.

The same patient after a treatment by SULFONE J. 51 (DI-ATOX) - 6 tablets a day.

Non improved photography published with the authorization of the person concerned.

LAVIRON, P. and LAURET, L. Résultats d'ensemble, après cinq ans, du traitement de la lèpre par le 3668 R.P. (Cimédone). [Overall results of 5 years of treatment of leprosy with 3668 R.P. (Cimedone).] Méd. Trop. **14** (1954) 65-68.

Cimedone was used in the treatment of 85 patients for periods varying from several months to 5 years. The daily dose was 1 gm., increased to 3 gm. within 5 weeks. Sometimes anemia occurred, but this was overcome by rest periods. In 2 cases treatment had to be suspended, in one because of vesicular dermatitis, and in the other because of repeated lepra reactions. Clinical improvement was particularly evident in the lepromatous cases, 90% of which were very much improved after 4 to 5 years. The nasal mucosa was bacteriologically negative in 18 patients treated for over 4 years. Improvement is slower in the benign forms. The authors believe that Cimedone is more rapidly effective than DDS, but the amount of the drug needed prevents it from being used for mass treatment. —M. VIETTE

VEDAMATHU, I. Therapeutic uses of sulphetrone. Lep. India **26** (1954) 13-15.

The author reports on the successful use of sulphetrone, particularly in some of the complications of leprosy. Injections of 2 cc. of a 10% aqueous solution along the nerve was beneficial in some cases of nerve abscess, neuritis, and wrist drop. Subcutaneous injection around chronic trophic ulcers was also found beneficial. Subconjunctival injection of 0.2 to 0.4 cc. of a 5% solution was useful for conjunctival nodules, keratitis, and leucoma. —DHARMENDRA

FLOCH, H. and SUREAU, P. Essai de traitement de la lèpre par la β-pyridine aldéhyde thiosemicarbazone. [Trial treatment with β-pyridine aldehyde thiosemicarbazone in leprosy.] Thérapie **7** (1952) 392-399.

Recognizing the activity of thiosemicarbazone in the treatment of leprosy, the authors have tried the β-pyridine aldehyde derivative. This compound is active in leprosy in daily doses of from 500-600 mgm., and the results are comparable with those obtained with TB-1. The β-pyridine aldehyde thiosemicarbazone may be, in general, less well tolerated than TB-1, but daily doses below 500 mgm. (200 mgm., for example) are still definitely effective. The importance of investigating less toxic allied compounds is pointed out. —AUTHORS' ABSTRACT

LAVIRON, P., LAURET, L. and SCHNEIDER, J. Etude de l'activité antilépreuse des thiosemicarbazones. [Study of the antileprosy effect of the thiosemicarbazones.] Bull. Soc. Path. exot. **46** (1953) 880-885; Mem. VI Congr. Internac. Leprol., 1953, Madrid, 1954, pp. 300-304.

TB-1 was compared with three other thiosemicarbazones in groups of leprosy cases totaling 81 patients. Each drug was given alone for from several months to 3 years. The doses were 200 mgm. daily for TB-1, 4544 R.P., and 4546 R.P., and 50-100 mgm. for 4545 R.P. One day out of seven was a rest day, and one week after 4 weeks of treatment. The 4544 R.P. variety seemed effective, but rather less so than TB-1. The other two were definitely less active, and in addition 4545 R.P. seemed more toxic. There were two deaths, one during treatment with TB-1 (acute necrosing hepatitis and nephritic lesions), the other under 4545 R.P. (toxic jaundice with ocular and psychic disturbances). The authors conclude that only TB-1 can be retained an as antileprosy medicament. Its activity, however, seems less marked, from the bacteriological point of view, than that of the sulfones, of which it can be considered as a complementary drug or a substitute. —M. VIETTE

HERRERA, G. El contebén en el tratamiento de la lepra. [Conteben in the treatment of leprosy.] Rev. Med. dominicana **8** (1953) 121-135.

Conteben (4-acetylaminobenzaldehyde-thiosemicarbazone) was administered to 12 leprosy patients for periods of 9 to 12 months. Of the 12 patients, 7 were lepromatous and 5 were reacting tuberculoids. The drug was given orally beginning with

12.5 mgm. and increasing to an average of 250 mgm., daily except for interruptions indicated by the condition of the patients; the maximum was 400 mgm. Blood disturbance (hemolysis chiefly) was countered adequately with sulfate of iron. In nearly one-half (41%) of the patients who had 12 months' treatment the clinical signs cleared up entirely, and of those who had had only 9 months' treatment one-third made notable improvement and one-quarter progressed satisfactorily.—[From abstract in *Trop. Dis. Bull.* **51** (1954) 1069.]

MORRIS, C. W. J. The treatment of leprosy with thiosemicarbazone. Leprosy Rev. **25** (1954) 73-77.

Thirty-eight patients, 20 with lepromatous leprosy, were treated for 9-12 months with Neustab; 18 of them had had previous treatment with hydnocarpus oil and DDS. Very few complications occurred during treatment. All patients showed evidence of clinical improvement, and one lepromatous case became bacteriologically negative. —G. O. TEICHMANN

ROY, A. T. Thiosemicarbazone in leprosy. Lep. India **26** (1954) 9-13.

This is a short note on the treatment of 9 cases of leprosy of the lepromatous type with Conteben. The drug was given orally every day beginning with 25 mgm., gradually increased to a maximum of 150 mgm. The treatment was continued for an average of 23 months. There was bacteriological and clinical improvement in 8 of the cases; the other case stopped treatment after 10 months without any improvement. Lepra reaction and other toxic symptoms were mild, and the patients did not suffer from bone-pains which the author finds common under DDS treatment.—DHARMENDRA

SECRET, E. Soixante-deux cas de lèpre traités par l'isoniazide. [Sixty-two cases of leprosy treated with isoniazid.] Maroc. Méd. **32** (1953) Spec. No. pp. 758-762.

Sixty-two cases have been treated with INH, for up to 15 months in some cases with a dosage of 250 mgm. for a 60-kgm. person. [Details of dosage, etc.] The treatment was generally well tolerated. One patient had reactions that necessitated suspension of the drug, streptomycin and PAS being given for a while. The general condition improved, with increases of weight from 0.5 to 1 kgm. per week. The leprous skin lesions regressed and the ulcerations and plantar ulcers healed; rhinitis, laryngitis, glossitis, and conjunctivitis and other eye conditions, including iridocyclitis, readily improved; pains diminished; the hemagglutination rate (Middlebrook-Dubos) dropped, and the sedimentation rate decreased. The improvement was more clear in lepromatous cases than in the tuberculoid and indeterminate ones. Bacteriologically, the nasal mucosa became negative in 8 out of 21 lepromatous cases treated for more than 3 months; in the other patients decrease of the bacillus count was noted. The author concludes that INH is efficacious in leprosy. —M. VIETTE

GUSSENHOVEN, G. A. Behandeling van lepra met isonicotinezuurhydrazide. (Treatment of leprosy patients with isonicotinic acid hydrazide.] Nederlandsche Tijdschr. v. Geneesk. **98** (1954) 2481-2487.

The English summary appended to the paper is as follows: "Eleven leprosy patients in South Sumatra (Indonesia) were treated with INH. In one patient a serious leprosy reaction was interrupted; a second showed repeatedly serious reactions by the drug. Of the other nine none showed any improvement, neither clinically, bacterioscopically or histopathologically. A daily dose of 6 to 8 mg. per kgm. body weight caused in the majority of patients serious toxic reactions."—[Abstract from *Trop. Dis. Bull.* **51** (1954) 1257.]

DHARMENDRA and CHATTERJEE, K. R. Isonicotinic acid hydrazide in the treatment of leprosy. Lep. India **26** (1954) 49-54.

Isoniazid from two sources were used for the treatment of 31 cases, 24 lepromatous and 7 nonlepromatous. Numerous examinations and tests were made before

and during the treatment period. The drug was found to be rapidly absorbed from the gut, maximum concentration in the blood being reached after 2 to 6 hours (0.5 mgm.% with an oral dose of 100 mg.). It was quickly excreted, mostly through urine; it disappeared from the blood within 16 to 24 hours. In most of the cases treatment was commenced with 50 mgm. per day orally, gradually increasing to 200 mgm. The average duration of treatment was 35 weeks in the lepromatous cases, 48 weeks in the others. No signs of liver damage or marked depressive effect on the hemopoietic system were noticed. In the first two or three months there was clinical and bacteriological improvement in the majority of cases, but later on there was a setback in most cases in spite of continued treatment with increasing doses.

—AUTHORS' ABSTRACT

FLOCH, H. Intérêt du benzal-isonicotyl-hydrazone-méta-sulfonique en thérapeutique antilépreuse. [The importance of benzal isonicotyl acid hydrazone metasulfone in the treatment of leprosy.] Bull. Soc. Path. exot. **47** (1954) 21-25.

After having treated 18 patients for periods of 5-10 months with G.605 (sodium salt of the benzal isonicotyl acid hydrazone metasulfone), the author concludes that this substance has given unquestionably better results than previously obtained with INH. Of the 8 patients with the malignant forms of leprosy (lepromatous and borderline) only one had not improved bacteriologically and histologically, in that case after 5 months of treatment. The difference of activity between INH and G.605 indicates that the latter compound is, at least partially, active because of its molecule, although that is still to be proved. Bacteriological improvement is generally rapid and closely parallels the clinical improvement, an effect not usually observed with the sulfones. The beginning lepromatous case may in some months undergo bacteriological clearing, at least apparent. Histological amelioration is later, but practically always manifest. The average tolerated dose was 3 gm. daily (maximum 5, minimum 2) taken in 3 doses during meals; there was one day of rest each week. The author believes there is the same risk of resistance with G.605 as with INH, and now that the activity of the former has in his opinion been demonstrated it is advisable to use it in combination with a sulfone. —AUTHORS' ABSTRACT

DAVIDSON, W. S. Isoniazid alone and in combination with other drugs in the treatment of leprosy. Leprosy Rev. **25** (1954) 69-73.

A small series of cases (10) treated with isoniazid alone showed considerable improvement after 9 months. Then intramuscular injections of sulphetrone were added, whereupon improvement ceased and several cases began to show deterioration. It was thought that this was due to biological incompatibility between the two drugs. One-half of the patients were then given INH alone and the other half sulphetrone alone. Both groups made satisfactory improvement, as before. This incompatibility was not noted when INH was combined with Neustab (TB-1), in a group of 6 patients that had become resistant to sulphetrone and other drugs. The writer believes that INH alone is not inferior to sulphetrone alone. No details are given of the types or severity of the cases treated. —G. O. TEICHMANN

HAYATA, H. Treatment of leprosy with $P_{54}L$ (Morinaga). La Lepro **23** (1954) 93-108 (in Japanese; English abstract p. 93).

In 1950, P_{54} was administered for the first time orally to 9 cases of lepra tuberosa and as a result there was obvious degeneration of the bacilli of the nodule. However, in about 4 months some started complaining of anorexia with occasional heart-tap, and the treatment was discontinued. In an effort to remedy these by-effects, 30 mgm. of P_{54} was suspended in 1 cc. refined chaulmoogra oil, and 1 cc. of this was injected into 4 rabbits, each weighing approximately 3,000 gm., six times weekly for 4 consecutive weeks. There was no change in appetite; one rabbit showed decrease of

weight; there was no local induration, indicating that absorption was good. Therefore, in April 1951 it was decided to adopt this injection for the treatment of leprosy patients. The formula for P_{54} is $C_7H_7SO_2 \leftrightarrows CH{:}N\text{-}NH\text{-}C\begin{matrix}NH_2\\ \\ S\end{matrix}$. It is a brilliant white crystaline substance, melting point 132°C, does not dissolve readily in water but is soluble in acetone, propyl glycocol, chloroform, ether and alcohol. It is liquefied at 23°C, and when injected intramuscularly is painless and does not cause induration. The dosage starts with 0.5 cc. 3 times weekly, increasing gradually up to 3 cc. Simultaneous administration of 2.5 to 5 cc. of promin by intravenous injection every other day is excellent, and its usual by-effects (anemia and general weakness) do not occur. Fifty-nine patients were treated (3 cases of lepra maculosa, 15 of lepra nervosa and 40 of lepra tuberosa), with this drug alone or together with promin, for 2 to 34 months. (*a*) In general, the lepra maculosa [tuberculoid] cases showed resolution of the lesions in about one year, and in 2 years restoration of sensation of the affected area; histopathological examination proved the condition cured. The thickening of the ulnar nerves, however, was not completely resorbed. (*b*) No remarkable results were obtained in the cases of lepra nervosa, except for restoration of sensation, increase of the area of perspiration, cure of molum perforans pedis, and restoration of motor paralysis where hyaluronidase was given simultaneously. (*c*) In the lepra tuberosa cases, in approximately 6 months there was evidence of absorption of nodules together with degeneration of the bacilli, and in about 2 years they were bacteriologically negative. The Mitsuda reaction turns positive about 6 months before the bacilli are gone. In such cases no erythema nodosum leprosa was observed; on the whole, there was considerably less ENL than with other antileprotic drugs. Two cases developed jaundice, but whether or not that was caused by the drug is not known. There was no case of albuminuria, anemia or leucopenia. $P_{54}L$ is one of the drugs to be used for the treatment of leprosy.—[From abstract.]

MERKLEN, F. P. and RIOU, M. Résultats favorable d'un an d'esai de dérivés vitaminiques K dans la lèpre. [Beneficial results of one year trial of vitamin K derivatives in leprosy.] Bull. Soc. Path. exot. **46** (1953) 741-748.

————. Epuisement relatif de l'action favorable de substances vitaminiques K et de l'A.C.T.H. au cours de réactions lépreuses répétées. [Relative exhaustion of the favorable action of vitamin K substances and ACTH during repeated lepra reactions.] Bull. Soc. française Derm. et Syph. **60** (1953) 274-275.

Twenty-eight leprosy patients were treated for one year with daily intravenous injections of vitamin K in series of 20-30 days, with 10-15 days of rest between series. Other patients were given similar treatment by mouth. This treatment, which was well tolerated, resulted in better tolerance of sulfones in 6 cases, and caused improvement of ocular lesions in 2 cases, of a leprous orchitis in 1 case, and of neuritic pains in many cases. Lepra reactions in 2 lepromatous and 2 indeterminate cases were stopped in a few days. In one case the reaction reappeared many times; vitamin K, then ACTH, were at first effective but lost their activity; when the vitamin was employed again, however, it definitively arrested the reactions. This intensive vitamin K treatment, either during or outside of the periods of lepra reaction, seems to have caused regression of the infiltrations and skin lesions in some of the patients and, to a certain extent, the polyneuritic lesions. Three indeterminate cases treated with sulfones for 1-4 years showed positive Mitsuda reactions after the vitamin K treatment. No definite bacteriological improvement was noted. The authors think that the good results obtained were due essentially to the action of the vitamin on the phenomena of vascular congestion and inflammatory infiltration. —M. VIETTE

IGLESIA, M. H. Tratamiento de la reacción leprosa con cortisona. (Comunicación previa.) [Treatment of lepra reaction with cortisone; preliminary note.] Rev. Asoc. med. argentina **68** (1954) 55-57.

Treatment with cortone acetate (Merck) was given to 4 lepromatous patients and 1 prelepromatous one suffering from severe lepra reaction, beginning with 200 mgm. orally in divided doses on the first day and gradually diminishing to 100 or 75 mgm. In one very severe case, 400 mgm. was given; that patient was given a total of 8 gm. The reaction subsided in all cases, the pain disappeared, the patients had a feeling of well-being, appetite returned, nodules and eruptions flattened out and disappeared, and the eye symptoms cleared up. Bacteriological examination did not show any diminution of bacilli, however. The author stresses the importance of early administration of the drug in adequate doses. In 3 patients there was slight return of reaction, but in a much less severe form.—[From abstract in *Trop. Dis. Bull.* **51** (1954) 1068.]

FLOCH, H. Sur la thérapeutique des réactions lépreuses. Intérêt du Colchicoside. [Treatment of lepra reactions. The importance of colchicoside.] Arch. Inst. Pasteur Guyane Française, Publ. No. 324, 1954.

The treatment of lepra reactions is a problem unfortunately far from being solved. (The author uses mostly vitamin P.P.) Because reactions, at least in part, are allergic, some have recommended the use of cortisone or ACTH; the author has used pregnenolone, one of the many steroids the chemical structure of which is related to that of cortisone. Mugler observed, in 1948, the efficacy of colchicine in allergic accidents. Colchicoside in mice is 50 to 100 times less toxic than colchicine, but still possesses a remarkable "ACTH-like" effect. The author has used it in 5 cases with lepra reactions, and 4 of them improved rapidly, 3 in a striking manner. Of these improved cases one was borderline and 3 lepromatous. One patient did not show improvement for a curious reason: he showed a reaction of intolerance (similar to the edema of Quincke) that made it necessary to interrupt the treatment. This happened despite the fact that this ACTH-like substance, like ACTH itself and cortisone, is remarkedly antiallergic. However, analogous observations have been made with cortisone itself. In general, the author believes, a series of 10 daily injections of 10 mgm. of colchicoside (starting with 2 injections of 5 mgm.) is sufficient to obtain noteworthy results in lepra reactions. No effects detrimental to the course of the disease itself have been seen, once the reaction was controlled.

—AUTHORS' ABSTRACT

PENNEK, J. Essai de traitement de la réaction lépreuse par l'acétate de delta-5-prégnénolone. [Treatment of lepra reaction with delta-5-pregnenolone acetate.] Bull. Soc. Path. exot. **46** (1953) 889-896.

Two lepromatous patients, one treated with a sulfone and the other with INH, were given delta-5-pregnenolone acetate during the course of lepra reaction in doses of from 800 to 1000 mgm. daily for from 12 to 14 days. In one of the cases the temperature fell from 40.5° to 38°C. on the 5th day and became normal on the 12th day. In the other patient a definite improvement was seen on the 4th day but he relapsed thereafter. This condition was arrested by continued treatment with the pregnenolone together with synthetic antihistamin, while the INH was withdrawn. Without having an action as spectacular as ACTH and cortisone, pregnenolone seems to have had a certain efficacy in these two reactions. —M. VIETTE

KANAKARAJ, J. D. Plastic surgery in the rehabilitation of the leprosy patient. Leprosy Rev. **25** (1954) 87-101.

The writer points out that the public horror of leprosy is due not so much to the disease as to the resultant deformities, and because of these deformities patients in whom the disease is arrested find it difficult to return to their villages. For this

reason he devised operations to correct gynomastia, enlarged lobes of the ears, and deformed noses, operating on a number of cases in the Lady Willingdon Sanatorium, at Chingleput in Madras, where only lepromatous cases are admitted. Full details are given of the operations performed. —G. O. TEICHMANN

GIANINI, J. T. Surgical treatment of plantar warts, callosities and ulcers. Plast. & Reconst. Surg. **13** (1954) 130-136.

A brief review of the treatment of plantar warts, calluses and ulcers is presented, including surgical procedures to correct these conditions. The author used in 11 cases a combination of a plantar pedicle and a partial digital bone resection which provided a satisfactory skin coverage from an area distal to the lesions. The second digit was usually the one selected for resection. The operation is performed under general or spinal anesthesia and with a tourniquet ischemia. The article is well illustrated. —SR. HILARY ROSS

FOWLKS, E. W. Plastic splints for neurological conditions. J. American Med. Assoc. **156** (1954) 1154-1159.

This article is about splints made of Plexiglass, which are light in weight and easy to make and adjust. Illustrations show: plastic abduction shoulder splint, with hinged forearm open to allow use of the hand; plastic opponens cuff splint; wrist extensor splint of plastic and leather; and two types of finger extensor splints, also of plastic and leather. —SR. HILARY ROSS

DHAR, S. K. Choline esterase of blood in leprosy. Indian J. Physiol. **6** (1952) 130-136.

The author studied the choline esterase activity of the blood corpuscles by the pharmacological method, using Dale's apparatus and utilizing the contraction of the frog's rectus abdominis muscle to acetyl choline. Determinations were made on 40 healthy male subjects between 20 and 40 years of age, and on 50 leprosy patients, lepromatous and neural, of the same sex and age group. The mean value for the normal group was found to be 0.241 mgm. ± 0.024, and that for the leprosy patients 0.137 mgm. + 0.042. Thus the choline esterase activity of the blood of leprosy patients was found to be lower than in normals. There was no appreciable difference between the neural and lepromatous type. [The number of cases of each type is not indicated.] —DHARMENDRA

BALASUBRAHMANYAN, M., JAYARAJ, A. P. and GASS, H. H. An improved histological method for examination of cutaneous nerves in leprosy. Leprosy Rev. **25** (1954) 83-86.

Full details are given of a modification of Bielchowsky's technique for the staining of nerve fibers in healthy and leprotic skin and counterstaining for the demonstration of *M. leprae*. For a fuller report of the findings see THE JOURNAL **22** (1954) 31-34. —G. O. TEICHMANN

LOWY, L. and RIDLEY, D. S. The acid-fast staining properties of *Mycobacterium leprae*. Trans. Roy. Soc. Trop. Med. & Hyg. **48** (1654) 406-410.

The multitude of lepra bacilli in smears contrasts with the few seen in paraffin sections, in which only a small fraction present can be stained by the Ziehl-Neelsen method. Experiments were undertaken to determine, first, the relation of soluble lipids in the bacillus to acid-fastness, and, second, the use of substitutes for the bacterial lipids. The material was obtained from nodules from patients, many of whom were under treatment with sulfones or isoniazid, or both. Zenker-fixed sections in paraffin wax and water-soluble wax (polyethylene glycol) and heat-fixed smears were prepared in all cases, to study the effects of fat solvents on acid-fastness and to compare staining procedures; carbol-fuchsin at room temperature and weak acid-alcohol were used for differentiation. It is concluded that the difficulty of staining *M. leprae* in paraffin sections is due to, (1) a capacity of the bacillus to adsorb paraffin

wax, and (2) destruction of its acid-fastness as a result of extraction with fat solvents. In both these respects this bacillus differs from the tubercle bacillus. The insoluble core of the lepra bacillus takes up carbol-fuchsin; it partially regains its acid-fastness if some substance that wets lipids but is immiscible with acid is applied immediately before the acid. Certain terpenes are particularly effective in this respect. The acid-fast staining mechanism is discussed, and a stain technique based on these observations is described.—[From abstract in *J. American Med. Assoc.* **157** (1955) 299.]

[A mimeographed sheet sent out with reprints of this article gives an "ideal" fixation technique: (1) Zenker's fluid, not more than 1 hour; (2) wash in water 5 minutes (or several changes); (3) transfer to a mixture of 2 parts 10% formol-saline, 1 part 95% ethyl alcohol, and 3 parts water, overnight or longer if desired. It is advantageous, it is stated, to counteract the oxidation due to the Zenker's by washing sections in sodium metabisulfite 10% for 10 minutes.—EDITOR.]

ISHIHARA, S. and HAGIHARA, S. Study on the procedure for demonstrating lepra bacilli in paraffin sections. La Lepro **23** (1954) 143-146 (in Japanese; English abstract p. 143).

The staining of lepra bacilli in paraffin sections is difficult, due to the use of chloroform and xylol during the embedding of the tissues and staining of the sections. It is better to use toluol instead of chloroform in the embedding, using xylol to remove the paraffin from the sections. Amyl acetate is useful as well as toluol, but for practical use the latter is better.—[From abstract.]

TAKAHASHI, T. Studies on the blood sedimentation rate in leprosy patients. Part 1. The type of leprosy and B. S. R. Part 2. The correlation of B. S. R. and tuberculin test. La Lepro **23** (1954) 109-113 (in Japanese; English abstract p. 109).

Acceleration of blood sedimentation is generally recognized to occur in advanced leprosy, although the reason is not yet thoroughly clarified. Part 1 of this paper deals with the correlation between leprosy types and the BSR. The test was applied in 209 cases without any complication, 133 lepromatous, 64 neural, and 12 tuberculoid. The ages ranged from 5 to 52 years, and the duration of the disease from 1 to 33 years. Measurements were made by Westergren's method three times at three-months interval, and a fourth time after five years. (1) The BSR of leprosy patients is generally higher than that of healthy people. (2) Tuberculoid, neural and lepromatous types take turns in the acceleration [sic]. It is most marked in the lepromatous cases, especially due to the aggravation of the disease. (3) The ratio of acceleration is in direct proportion to the severity of the disease. Part 2 deals with the correlation of the BSR and the results of the tuberculin test in 209 patients (L 133, N 64 and T 12), from whom tuberculous disease could be strictly excluded. (1) The negativity and positivity show no significant difference in any type of leprosy. (2) Comparing tuberculin positivity (1+, 2+ or 3+) and negativity with the BSR, the latter is not in accordance with tuberculin positivity.—[From abstract.]

TAKAHASHI, T. Studies on the blood sedimentation rate in leprosy patients. Part 3. The influence of treatment upon B. S. R. La Lepro **23** (1954) 114-117 (in Japanese; English abstract p. 114).

The influence of the drugs used in treatment—koha in 180 cases, cepharanthin in 28, and promin in 120—on the BSR was investigated. Neither koha in large or small doses, nor cepharanthin administered by injection or by mouth, had any influence in any type of leprosy, except that the BSR is accelerated when the disease is aggravated by the latter drug. The BSR of the patient is quickened by injections of promin, a side effect of this sulfone. As the disease improves under promin treat-

ment, however, the BSR of every type of leprosy changes toward the normal.—[From abstract.]

KASS, I., JACKSON, A. and SLAVIN, M. Sarcoidosis: A hypersensitivity disease; discussion of three cases. J. Allergy **25** (1954) 453-463.

Evidence in favor of considering sarcoidosis as a hypersensitivity disease includes the similarity of its lesions to beryllium granuloma, the clinical response to cortisone, and the allergic history frequently present in patients with sarcoidosis. Although 25% of cases of sarcoidosis are associated with tuberculosis, it is felt that the association is a hypersensitivity reaction to the tuberculous toxin rather than to the tubercle bacillus per se. Of the three cases presented in this paper, two patients had symptoms of a hypersensitivity reaction prior to the onset of sarcoidosis. In the first case, the earliest hypersensitivity symptoms noted were those of erythema nodosum and hilar adenopathy, and the second patient showed a marked antecedent sensitivity to dust, milk, and milk products. This should not imply that sarcoidosis occurs only in persons with allergic backgrounds. Rather, the nature of the morphological reaction in response to a plurality of stimuli, including malignant disease (as in the third case reported), is such that it seems entirely possible that the proper antigen or antigens in a sensitized or predisposed person may produce erythema nodosum or food allergies on one occasion and the protean manifestations of sarcoidosis on another. In the third patient, the sarcoid lesion found in a lymph node of the neck secondary to squamous cell carcinoma of the larynx appeared to be purely localized. It may have been a hypersensitivity reaction resulting from the presence in the tissues of irritant products of a lipoidal or lipoprotein nature, such as stearin or palmitin. The term "sarcoid lesion" should be used to define this localized granulomatous reaction, since "sarcoidosis" indicates a systemic disease entity.—[Abstract from *J. American Med. Assoc.* **156** (1954) 1535.]

BUENO DE MESQUITA, J. Die Lepromin-Reaktion bei 80 Marine-Infanteristen aus Holland. [The lepromin reaction in 80 marines from Holland.] Ztschr. Tropenmed. u. Parasitol. (Stuttgart) **5** (1954) 376-379.

Of 80 healthy Dutch marines, 73 of whom had never before left Holland, 38% were lepromin positive—one-half of them strongly so—after a 5-weeks stay in Surinam where leprosy is endemic. The Fernandez test was positive in 12.5%. Most of them (57) received 0.05 cc. of lepromin, the rest (23) 0.1 cc., intradermally into the front of the forearm. The reactions were read after 48 hours and 3-5 weeks. Similar results were seen with both of the doses used. These figures seem to be well below those reported by other examiners in normal persons living in nonendemic countries. No definite conclusions are drawn in view of the small number of cases.
—E. KEIL

GEHR, E. and MUNDER, H. H. Die Lepromin-Reaktion bei verschiedenen Volksgruppen in Suriname. [The lepromin reaction in various population groups in Surinam.] Ztschr. Tropenmed. u. Parasitol. (Stuttgart) **5** (1954) 379-387.

The incidence of leprosy varies considerably in the various population groups of Surinam. Creoles constitute 37.2% of the population, and they contribute not less than 71% of the leprosy cases. (The other *Einheimischer*, the *Buschneger*, 9.6% of the population, have relatively little leprosy.) The Indonesians, 17.2% of the population, provide 11% of the cases. The authors applied the lepromin test to various social groups to determine those with the lowest resistance so that they might be inoculated with BCG. The lepromin was made according to Dharmendra's process, and usually 0.05 cc. was used. The reaction was equally positive with 0.05 and with 0.1 cc. Group A consisted of 114 healthy family contacts, 92 of them contacts of lepromatous cases (21), 14 of intermediate cases (3), and 8 of tuberculoid cases (3). The number of positive reactions was significantly less than expected [78% of

45 adults, 54% of 61 children]. Group B consisted of 102 members of the leprosarium staff having daily contact with lepromatous cases, almost all adults. In this group the reaction was most frequently positive [93%], and there was a definite correlation with the tuberculin reaction. Group C consisted of 109 adult inhabitants of a mental home, principally town-dwellers without known contacts. The number of positive reactions in this group was low [74%], considering the high incidence in the city. Group D consisted of 129 native Negroes without known contacts. The positves were extraordinarily many [82% of 97 adults, 62% of 50 children; 75% of the whole]. This was equated with a high degree of resistance traceable to a presumed old general leprosy. Group E consisted of 29 Indians, mostly children and mostly not of pure Indian descent, without known contacts. The positives here were very few [22%]. Of all the children tested 50% were positive, even including those 1-4 years old. —E. KEIL

[NOTE: The figures in brackets, added to the original abstract, refer to the results of the late or Mitsuda reaction in the individuals in whom that reaction was read, as shown in the tables of the original article.—EDITOR.]

BLUM GUTIERREZ, E. Lepromina preparada a partir de ganglio linfático formolizado. [Lepromin prepared from formolized lymph nodes.] Rev. ecuatoriana Hig. y Med. Trop. **11** (1954) 106-110.

As the grosser forms of lepromatous leprosy have become more uncommon, the author has found it increasingly difficult to obtain fresh lepromas from which to prepare lepromin, a difficulty which has also been experienced in other South American countries. In the pathological department of the Hygiene Institute in Guayaquil there were available bacillus-rich lymph nodes which had been excised from a child with lepromatous leprosy. Because these nodes had been preserved for two years in formalin, it was expected that their antigenic value would have been destroyed, but on trying out a Mitsuda suspension on leprous patients of all types he obtained results comparable with those expected with an antigen from fresh lepromas. The advantage of using formolized lepromas is that small pieces of tissues can be collected as occasion permits, suitable quantities of antigen being prepared as required.—[From abstract in *Trop. Dis. Bull.* **52** (1955) 274.]

PLISSIER, M. and SECRET, E. La réaction d'hemagglutination de Middlebrook et Dubos chez 37 lépreux. [The reaction of Middlebrook and Dubos in 37 leprosy patients.] Maroc Méd. **32** (1953) Spec. No. pp. 779-783.

The Middlebrook-Dubos hemagglutination test was applied to 37 leprosy patients, the antigen being the St polyoside of the IP 48 tuberculin. No patient showed any clinical or radiological sign of tuberculosis. The hemagglutination titer was higher than 1/8 in 23 out of the 24 lepromatous cases(95.8%), and in 9 out of the 13 tuberculoid or indeterminate cases (69.2%). With this test one can determine the diagnosis when the clinical examination is not conclusive. A second hemagglutination test done 1-3 months after the first one in 29 cases treated with INH, alone or in alternation with DDS, showed a decrease of titer in 15 cases, no change in 10 cases, and a slight increase in 4 cases (when the second examination was performed shortly after the first one). In one case the titer decreased under the influence of treatment but rose when that was interrupted. The authors think that this reaction is of interest for the serologic diagnosis of leprosy and for checking the treatment. —M. VIETTE

VIETTE, M. Réactions d'hemagglutination et d'hémolyse conditionée dans la lèpre. [Hemagglutination and conditioned hemolytic reactions in leprosy.] Ann. Inst. Pasteur **86** (1954) 76-83.

These reactions were carried out in 100 cases, 56 lepromatous, 13 indeterminate and 31 tuberculoid. The antigen used was the St fraction of the IP 48 tuberculin, in a 0.5% suspension of sheep cells. [Technique is given in some detail.] The maximum

titer for the hemagglutination was 1/4096 in the lepromatous cases (average 1/227), 1/128 in the indeterminate cases (average 1/39), and 1/32 in the tuberculoid cases (average 1/15). For the conditioned hemolysis the corresponding figures are, respectively, 1/512 (average 1/49), 1/28 (average 1/16), and 1/64 (average 1/14). In each type of the disease the results of both reactions are highest when the disease is not active. On the contrary, the figures obtained are as much the lower, regardless of the form of the disease, as the Mitsuda reaction is the stronger. The tests repeated after 6-10 months in 20 patients showed a decrease in the rates in 9 of them, corresponding to clinical improvement. The reactions do not seem to be of importance in diagnosis of the disease or classification of the patients; their interest lies in the possibility of controlling the evolution of a case by periodically repeated tests.

—AUTHOR'S ABSTRACT

MONTESTRUC, E. La communauté antigénique du bacille de Koch et du bacille de Hansen traduite par la réaction d'hémagglutination de Middlebrook-Dubos et la réaction d'hémolyse conditionée. [The antigenic relationships of the Koch and Hansen bacilli deduced from the hemagglutination reaction of Middlebrook and Dubos and the conditioned hemolysis reaction.] Rev. Coloniale Méd. et Chir. **25** (1953) 172-174.

These reactions have been used by the same author as a basis of classification in leprosy. He now uses them as evidence of the affinity of the tubercle (human and bovine) and leprosy bacilli, and particularly to support the practical advantages of the use of BCG in producing relative immunity to leprosy. Using tuberculin IP 48 and also a fraction of the same as antigens, he obtained hemagglutination in 98.9% and conditioned hemolysis in 79.5% of lepromatous cases, and similarly in 61.6% and 46.2% of tuberculoid cases.—[From abstract in *Trop. Dis. Bull.* **51** (1954) 391.]

ROLLIER, R. and PELBOIS, F. Le test de Nelson dans la lèpre. Premiers résultats portant sur 41 malades. [The Nelson test in leprosy. Early results based on 41 patients.] Maroc Méd **32** (1953) Spec. No. pp. 777-778.

In 41 leprosy patients the Nelson test was compared with the classical serological reactions for syphilis (Kolmer, Kahn standard, Meinicke, and VDRL). The findings are summarized as follows:

Standard test	Nelson test		
	Positive	Doubtful	Negative
Postive, 7 cases	3	1	3
Disagreement, 12 cases	2	..	10
Negative, 22 cases	1	..	10

Thus the Nelson test was positive in 14.6% of the cases, and the classical serologic tests were positive in 17%. The usual percentage of syphilis in the nonleprous population being from 15 to 20%, the authors think their results are in favor of the specificity of the Nelson test, which is therefore of importance in leprosy. Among the classical reactions, that of Kolmer seemed to be the most specific. —M. VIETTE

FLOCH, H. Lèpre et vaccination par le B. C. G. [Leprosy and BCG vaccination.] Arch. Inst. Pasteur Guyane Française, Publ. No. 318, 1954.

This report is of the overall results obtained in several hundreds of babies vaccinated with BCG, using the desiccated BCG from the Institut Pasteur of Paris applied by scarification or by intradermal injection. Out of the 909 babies vaccinated, 467 (51%) were tested, and most of these (82%) were reexamined several months after the vaccination. The following reactions were obtained: Von Pirquet: positive, 75%; doubtful, 8%; negative, 17%. BCG intradermal: clearly positive, 87%; doubtful, 6%; negative, 7%. With lepromin, Fernandez reaction: positive, 73%; negative, 27%. Mitsuda reaction: positive, 73%; negative, 27%. It is concluded that, although transformation of the Mitsuda reaction from negative to positive can

undoubtedly be obtained by various methods, BCG vaccination is still the method of choice, and this vaccination should be performed systematically in tuberculin-negative individuals in countries where leprosy is endemic. In order to evaluate the results of vaccination it is important to use comparable antigens of the leprosy and tuberculosis bacilli, as for example the microbial antigens used in this work. Although intradermal vaccination gives better results than vaccination by scarification, the latter may be used when, for whatever reason, the former is not desired. In French Guiana the author has tried vaccinating, without previous tuberculin testing where they do not live in contact with tuberculosis, as many babies as possible before 2 months of age. It is important, from the point of view of leprosy, to vaccinate babies as quickly as possible in this country because they may very early and very easily come in contact with contagious leprosy cases. —AUTHOR'S ABSTRACT

ARGUELLO PITT, L., CONSIGLI, C. A., DEGOY, A. and PEÑA, J. M. Experiencia acerca de las relaciones inmunobiológicas entre lepra y tuberculosis. [Experience regarding immunobiological relationship between leprosy and tuberculosis.] Arch. argentinos Dermat. **4** (1954) 21-34.

After analyzing the investigations tending to demonstrate immunobiological relations between leprosy and tuberculosis, the authors relate experiments carried out by them in Córdoba, where both diseases are found coexistant. In the first part of their paper they confirm the admitted fact that the Mantoux and Mitsuda reactions seldom follow parallel curves. The second part records the changes provoked in lepromin nonreactors through the administration of BCG, either orally, intradermally, or both successively—the last-named technique having shown the best results.—[From authors' summary, supplied by G. Basombrio.]

FORNEY, J. E. The sensitization of guinea pigs to *Micrococcus pyogenes* var. *aureus* in the presence of the "wax" of acid-fast bacilli. American Rev. Tuberc. **69** (1954) 241-246.

Furthering previous work done by Raffel and associates [THE JOURNAL **20** (1952) 167-171], of whom the present author was one, crude "wax" of the tubercle-bacillus wax, and a similar extract from *Mycobacterium smegmatis*, were used with whole cells of a staphylococcus (*Micrococcus pyogenes* var. *aureus*) to produce sensitivity of the tuberculin type in guinea-pigs. The *smegmatis* wax was used because in previous work only wax from tubercle bacilli had been used, and it was desired to know whether or not the biological activity which it had displayed was a property of only a virulent acid-fast bacterium. Neither the bacterial cells alone, nor either of the waxes alone, gave rise to significant skin or cornea reactivity, but the combination of the bacterial cells with either of the waxes caused marked reactivity. This study increases the number of antigens used in this wax sensitization, and also shows that the effect is not confined solely to tubercle-bacillus wax. —H. W. W.

YAMAOKA, A. On electron micrographs of *Mycobacterium leprae* from the human leprosy nodule. La. Lepro **23** (1954) 56-63 (In Japanese; English abstract p. 56).

The author examined with the electron microscope specimens of homogenates of aseptically removed lepromas. The findings with respect to the bacilli were: (1) Their size and shape under electron microscope observation are approximately the same as with the optical microscope after strong staining. (2) Although the specimen-making process differs from that used in work with the optical microscope, identical images were obtained as regards the arrangement of bacilli: they occurred singly, or gathered irregularly, or placed side by side like cigar bundles, or in round masses. (3) Two morphological types were found, one granular and the other homogeneous. In the granular type the predominant bacilli have dense masses that appear like large polar bodies. (4) Some bacilli have a belt-like structure covering almost the entire

width; the nature of this structure is unknown. (5) In some bacilli there were small round bodies, 150-200 mμ in diameter, like chrysanthemum flowers, inside or outside the bacilli; these small bodies are being studied.—[From abstract.]

HAN, G. K. [An investigation of the usefulness of the concentration method of Khanolkar for acid-fast bacilli in skin biopsy of leprosy patients and healthy contact persons.] Madjalah Kedokteran Indonesia (1954) 68-72 (Mar.-May).

The results of this investigation indicates that the concentration method of Khanolkar is better for the bacteriological diagnosis of tuberculoid and indeterminate cases than is a single bacteriological examination of a preparation from the nasal mucous membrane or the skin. In 20 clinically healthy contacts no acid-fast bacilli were found. It is not possible to say that the Khanolkar method yields better results than the direct microscopic examination of the biopsy tissue suspension. A definite concentration of the number of acid-fast bacilli could not be demonstrated in those cases. —R. BOENJAMIN

VON HAEBLER, T. and MURRAY, J. F. Fluorescence microscopy as a routine method for the detection of *M. tuberculosis* and *M. leprae*. South African Med. J. **28** (1954) 45-48.

The authors report that the main advantages claimed for fluorescence microscopy (F. M.) over Ziehl-Neelsen staining (Z. N.) are increased percentages of positives, greater speed of examination, and lessening of eye strain. They attempted to establish these claims. The technique is described. With tuberculosis material they found slightly more positives were obtained with F. M., and 3 times as many positives were missed in the Z. N. smears. As regards leprosy slides they report, "Examination of leprosy smears by F. M., although it appears to give equally good results as the Z. N. technique, has been abandoned, mainly because routine smears submitted for this examination are often unsuitable for this method and have to be restained and re-examined by Z. N. to reach a diagnosis of reasonable certainty." —A. R. DAVISON

FLOCH, H. Le *Mycobacterium marianum* est-il ou non un bacille lépreux? [Is the *Mycobacterium marianum* a leprosy bacillus or not?] Bull. Acad. Nat. Méd. **138** (1954) 410-415; *also* Arch. Inst. Pasteur Guyane, Publ. No. 341, 1954 (Oct.).

A strain of mycobacterium which was first called the "Chauviré" bacillus and later *M. marianum* was cultivated from a human leproma in Lyon, France, by Sr. Marie-Suzanne. The first question always asked in such case is whether the culture is of "the" Hansen bacillus, or of "a" Hansen bacillus. Sr. Marie-Suzanne, Noel and Sohier have reported that this mycobacterium and the Hansen bacillus produced histologically similar lesions in white rats. Chaussinand, at the Madrid congress, said that the two bacilli can be differentiated by certain staining characteristics, and that on that basis *M. marianum* undoubtedly resembles the "paratuberculosis" bacilli. The author has studied the reactions provoked in leprosy patients by intradermal injections of killed *M. marianum* suspension in comparison with the Mitsuda test. Almost all of the 18 lepromatous cases (16, or 89%) were, as is usual, lepromin negative, only 2 being slightly positive. On the other hand, with the marianum antigen 16 of the 18 (89%) were positive and only 2 were negative, which would be an absolutely abnormal result with a true leprosy antigen. It is concluded that *M. marianum* is unquestionably neither "the" Hansen bacillus nor "a" Hansen bacillus. That it induces positive Mitsuda reactions in negative reactors in a certain proportion of cases is not, in his opinion, valid evidence that it is a leprosy bacillus; that sort of argument would have led one to conclude that the Hansen bacillus is a tuberculosis bacillus, because BCG vaccination usually converts negative Mitsuda reactors to positive! Conversion of the Mitsuda reaction to positive by means of the marianum

antigen is nevertheless interesting to investigate. It can be said, however, that among the paratuberculosis bacilli there are other species capable of bringing about the same transformation. —AUTHOR'S ABSTRACT

TODA, T. and MIFUCHI, I. Studies on the culture of *Mycobacterium leprae*. Report I. On the growth of *M. leprae murium* in lecithin-contained medium. La Lepro **23** (1954) 52-56 (in Japanese; English abstract p. 52).

The media used for the cultivation of *M. leprae murium* were based on a modified Kirchner's medium and contained polytannin, and glycerin, dextrose, soluble starch or glycogen was added to it as a source of carbon. Chemically pure lecithin and blood albumin were added for supplementation purposes. It seemed that *M. leprae murium* could be grown on the lecithin-albumin medium with starch or glycogen in the initial culture and the first subculture, but not in further subcultures. Growth was poorer with dextrose, and worst with glycogen.—[From abstract.]

KAWAGUCHI, Y. Hemagglutination test in rat leprosy. La Lepro **23** (1954) 64-68 (in Japanese; English abstract p. 64).

This paper gives the results of the hemagglutination test with tuberculin-sensitized red cells and the sera of white rats inoculated with the rat leprosy bacillus. Fifteen of 16 infected animals gave positive reactions, the hemagglutination titers being from 1:4 to 1:128. In the early stages of the infection, however, all the sera of inoculated animals were negative; only two animals became positive within 6 months after inoculation. The titers seemed not to correlate with the weight of the superficial leproma, but with the grade of leprous changes of visceral organs.—[From abstract.]

KAWAGUCHI, Y. Hemagglutination test in rat leprosy (Report 2). La Lepro **23** (1954) 135-141 (in Japanese; English abstract p. 135).

The present study was undertaken to ascertain the reliability of the hemagglutination test with tuberculin antigen in the diagnosis of rat leprosy in experimentally inoculated white rats. The test appears to have some diagnostic value in rat leprosy except in the early stages of the infection. The results seem to be closely related to the leprous changes in the visceral organs. The sera of animals infected intraperitoneally or intravenously showed much higher titers than those of animals infected subcutaneously.—[From abstract.]

YOSHINAGA, T. and KAKU, T. The studies on the chemotherapy of murine leprosy. Report I. On the synthesis of PAS-hydrazide and its influence on murine leprosy. La. Lepro **23** (1954) 68-71 (in Japanese; English abstract p. 68.)

PAS-hydrazide was synthesized for the treatment of leprosy. It prevents tolerably [sic] the development of murine leprosy. Its effect on murine leprosy is almost the same as that of PAS or INH.—[From abstract.]

TAKAYAMA, Y. The inhibitory and the therapeutic effects of INH on rat leprosy. Studies on rat leprosy (25). La Lepro **23** (1954) 71-74 (in Japanese; English abstract p. 71).

Evaluating the influence of INH on rat leprosy, based on the degree of enlargement of lepromas and dissemination of the bacilli into tissues, it seems to be more or less effective for inhibiting the development of the infection in the hamster, and for therapeutic effect.—[From abstract.]

NAKASHIMA, H. The therapeutic effects of proethyl on the rat leprosy. La Lepro **23** (1954) 81-84 (in Japanese; English abstract p. 81).

A study of the therapeutic effects of proethyl in relation to the development of rat leprosy has been made. The lethal dose of proethyl is DL 50-93.64mgm/10gm

by internal dosage. Its density in the blood was highest after the internal dosage during 2 hours, and half as high after 5 hours. It could be detected after 24 hours. Based on the degree of enlargement of the leproma and the dissemination of the bacilli into the tissue, this drug appeared to have little therapeutic effect on rat leprosy.—[From abstract.]

NISHIMURA, S. and MASUDA, T. The effects of combined administration of various chemical agents upon murine leprosy. La Lepro **23** (1954) 123-133 (in Japanese; English abstract p. 123).

To investigate *therapeutic* effects, animals with manifest disease were divided into four groups, three of which were given the following combinations: INH + SM, INH + PAS, and SM + PAS; the fourth group was kept as the untreated control. To investigate *inhibitory* effects, there were six groups of 10 rats each, one-half of which had been inoculated with 0.5 cc. of a 1:10,000 suspension of the Kumamoto strain of rat leproma and the other half with 0.5 cc. of a 1:200 dilution. Five of the groups received, from the day after inoculation, combined drugs: SM + PAS, INH + SM, INH + PAS, INH + TB-1, and INH + promin; the sixth group was the control. [Details of dosage are given.] (1) The combination INH + SM proved excellent in both treatment and inhibition, although the effect is not very different from that of INH alone. From the results of the successive inoculation with the remaining granular tissue, it is known that the combined administration inhibited the infectiousness of the bacillus. (2) The combination INH + PAS produced no effect in treatment, but gave nearly half inhibition of disease compared with the control group. PAS seems to decrease the efficacy of INH administered with it. (3) The combinations INH + TB-1 and INH + promin prevented strongly the onset of the disease, but the effects were somewhat weaker than when only INH is used. (4) The combination of SM + PAS produced some effect in both treatment and prevention, but showed no great difference from that of SM alone. The added PAS does not appear to attenuate the effect of SM.—[From abstract.]