

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.

[TROPICAL DISEASES BULLETIN] Summary of recent abstracts. IX. Leprosy. Trop. Dis. Bull. 52 (1955) 1033-1043.

This ten-page round-up, by Charles Wilcocks, covers summarily the abstracts published in that periodical during the previous year. The whole is divided into 10 sections: general, classification, geographic distribution, etc. It is mentioned that similar articles have been published in the November issue each year since 1939. Because of the extreme brevity with which the various contributions are mentioned, if for no other reason, one could not depend on these summaries alone for current information—they are obviously not intended for that—but they are most useful for purposes of orientation and constitute a real service. —H. W. W.

[LA LEPRO] Selected Articles. Vol. 24, October 1955 (59 numbered pages).

In a prefatory statement of this publication, put out in a colored cover, it is said that this English appendix is to be published once a year and that the studies contained in it are selected for introduction abroad by the editorial staff of *La Lepro* from reports presented at the meetings of the Japanese Leprosy Association Conference. Publication Office: Tofu Kyokai (Japanese Leprosy Foundation), 5 Uchisaiwaicho, 2 chome, Chiyodaku, Tokyo (no price indicated).

It is obviously a special issue supplementary to the regular ones; it is not numbered, does not interrupt the sequence of the regular white-covered issues, and its pagination is independent. It contains six carefully translated articles, three of them a series of reports of a study of the lepromin test. Abstracts of all will be found among those that follow, in the usual topical arrangement, identified by the reference data.

Association meeting number.—Note is made here that English is now being used to some extent in the number of *La Lepro* which, each year, is devoted to the annual meeting of the Japanese Leprosy Association, containing the text of special addresses and abstracts of all the papers read. In the four years beginning 1948, when the first postwar transactions number appeared, there was nothing whatever in English. In 1952 there was one brief English abstract of a special presentation at the 25th meeting, and in 1953 there were two of them, but none in 1954. Beginning that year, however, the titles of all papers, special and ordinary, have been listed in English, so that the foreigner can at least get an idea of the problems with which leprologists in Japan are concerning themselves. At the 1955 meeting there were two "special discourses," and condensations of the lengthy abstracts appear in these pages; also a "special report" on the extensive lepromin studies that have been made. Unique is a paper on classification by Cochrane, in both Japanese and English. —H. W. W.

[KENYA] Annual Report, 1954, Medical Department, Colony and Protectorate Kenya, Nairobi, 1955.

Except for some figures on patients treated (687 outpatients and 227 inpatients), only the development of the Itesio leprosarium, near the Uganda border, started in 1950, is mentioned. There were then accommodations for 280 inpatients, those who were fit to do so working on the institution's farm. Outpatient attendances had dropped from 2,000 to 750 a month because of the opening of a clinic on the Uganda

side. Mention is made of the leprosy research station to be developed at this institution [see *THE JOURNAL* 23 (1955) 336]. When the sulfones were introduced, all medical officers were encouraged to set up special leprosy clinics in their districts, and the results had been encouraging although there was difficulty of maintaining contact with the patients long enough to ensure cure. Most unusual for such a report are the remarks about the effects of the Mau Mau emergency, which deprived the department of a material number of its trained African assistants, supporters or participants. After a clean-up operation the operating room staff of the African hospital was reduced from 24 to 8. Credit is given to those who remained faithful, and there is an account of a volunteer resistance group among the people which developed into an important screening unit.

—H. W. W.

[TANGANYIKA] Annual report of the Medical Department, 1954, Vol. II (Statistics). Dar es Salaam, Government Printer, 1955.

This part of the report, received after the first part [see *THE JOURNAL* 23 (1955) 338], has a table on the leprosaria of the country, the following being the principal data:

Region & province	Leprosaria	Admissions	Inmates Nov. '54	Sulfone treated
Central Region				
Central Province	2	305	683	670
Southern Highlands	1	392	614	606
Eastern Region				
Eastern Province	2	216	432	388
Southern Province	4	623	2,085	1,674
Northern Region				
Northern Province	1	4	24	24
Tanga Province	3	58	196	191
Western Region				
Lake Province	2	412	924	924
Western Province	2	51	268	259
Dar es Salaam	1	12	41	38
Totals	18	2,073	5,267	4,774

(At the time of the report for 1953—which was not abstracted—there were 17 leprosaria, 5 administered by the government and 12 mission institutions. The two principal ones of the former group were Makete (Southern Highlands Province) and Chazi (Eastern Province). One, Mtindiro (Tanga Province) had previously been a "derelict colony for burnt-out cases," a "leprosy 'dump'" for destitutes, maintained by the local Native Administration. The largest leprosaria were those run by the Benedictine Mission at Peramiho and Ndanda (Southern Province), by the Augustana Lutheran Mission at Mkalama (Central Province), and by the Africa Inland Mission at Kolandoto (Lake Province). The total number of inmates at that time was 4,768, so there had been no real change in that respect.

—H. W. W.

[AUSTRALIA, WESTERN] Report of the Commissioner of Public Health, Western Australia, 1953. Perth, 1955. [More recent data supplied.]

The number of patients in the Derby leprosarium, in the Kimberly region of the far northern part of the state, all aboriginals, was reduced in 1953 from 303 to 262. There were only 25 new admissions whereas 66 patients were discharged, because of the satisfactory results of treatment. The greatly improved prospects for cure has made it no longer difficult to persuade the natives to enter for treatment. The changed conditions have led to more thought being given the crippling effects of nerve involvement. [See abstract of an article on the subject by E. Aberdeen, which appeared in this report.]

[The commissioner of public health has supplied the following more recent information. In 1954, there were 48 admissions (36 new and 12 readmitted), while the discharges totalled 64 (48 as cured), leaving 246. One of the patients was a European; the others were full-blood Aborigines (231) or half-castes (14). In 1955 the admissions

dropped sharply back to 24 (14 new, 10 readmitted), while the discharges totalled 60 (49 as cured), about the same as before, so the number remaining had further decreased to 211. These now included 190 full-blood Aborigines, the half-caste increased to 20.] —H. W. W.

MONTESTRUC, E. L'Institut Pasteur de la Martinique en 1954. (Deuxième mémoire.) Arch. Inst. Pasteur de la Martinique 8 (1955) No. 3-4.

Under the heading "the alarming progress of leprosy" it is reported that 196 new cases had been diagnosed in 1954, 23% lepromatous (including 22 cases of "polyneuritic lepromatous"), 15% tuberculoid (including 5 "polyneuritic tuberculoid"), and 62% indeterminate (44 of them "polyneuritic indeterminate"). It is mentioned that the Havana system of classification is used, eliminating the borderline (*frontière*) group; but perhaps two cases that were classed as lepromatous might have been put in that group. At the Emile Marchoux (antileprosy) dispensary 284 cases were under treatment, 231 adults and 53 children; 166 were lepromatous, 80 tuberculoid, and 38 indeterminate. Sulfones are used mostly, especially DDS, usually by mouth; *retard* intramuscular injections are given only to patients from distant communities.

—H. W. W.

[HIND KUSHT NIVARAN SANGH] Annual Report for 1955, Hind Kusht Nivaran Sangh (Indian Leprosy Association). New Delhi, 67 pp.

Rajkumari Amrit Kaur, the minister of health for India, the chairman of this organization (which took over from the Indian Auxilliary of BELRA), gives an account of the government's plans for leprosy control, with statements about the Central Leprosy Teaching and Research Institute, the contributions of WHO, and the work of the Mission to Lepers, of the Gandhi Memorial Leprosy Foundation, and of the School of Tropical Medicine research unit in Calcutta. A government committee appointed in 1954 has reported that there are probably about 1,500,000 cases in the country, with some 152 inpatient institutions taking care of 19,600 patients, and about 1,200 clinics where about 120,000 patients are treated. In the control scheme 40 treatment centers had been sanctioned in 16 states; 100 more are contemplated, perhaps with collaboration of WHO and UNICEF. It was proposed to train 500 doctors and 2,000 paramedical personnel. To aid in coverage, it was recommended, leprosy treatment should be given at all government hospitals and dispensaries and at the primary health centers. To coordinate this work a director of leprosy control (Dharmendra) has been appointed. For the Central Institute in Madras, the Lady Willingdon Sanitarium (Chingleput) and the Silver Jubilee Children's Clinic (Saidapet) had been taken over from the state and were being expanded, to come into full operation by the end of 1956. The Belgian Leprosy Foundation had set up a special field unit in Chingleput, under Dr. Hemerijcks, with 42 treatment centers. At the research unit in Calcutta, N. Mukerjee was now in charge, vice Dharmendra. A summary is given of the studies made there, some of which have already been published. The document ends with reports of 11 state branches, plus one other (Madras) printed separately.

—H. W. W.

[Hong Kong Auxiliary, Mission to Lepers.] Hay Ling Chau, Annual Report, 1955, 40 pp.

Expansion of the institution, now with 400 patients, has continued, bringing the total capacity to 550, which the government hopes can be further increased to 1,000. New groups are received weekly from the government's two outpatient clinics in Hong Kong, where 20 [elsewhere said to be about 50] new patients are added each month to the more than 1,000 already registered there for treatment. A summary is given of the work of the newly-opened medical center (named after the late James L. Maxwell), under Drs. N. D. Fraser and H. J. Smyly (the former serving as superintendent and surgeon), with occasional visits of specialists from the city. An important

development is that fifth year medical students are now sent there, two at a time, for one-week courses, resulting for one thing in changes of their attitude toward the disease. Dr. Smyly, having stayed on much longer than the period for which he had volunteered, was leaving, to be replaced by Dr. D. J. Harman, seconded from the London Missionary Society. [Hay Ling Chau, which is not a converted asylum of the old type but was started from scratch to be a model institution with emphasis on modern treatment and study of leprosy, is perhaps unique in the support that has been given it by volunteers in Hong Kong. It has been spoken of as a place that has made "business men out of missionaries, and missionaries out of business men."] —H. W. W.

RICHTER, R. and ERKABAN, N. Die Lepra en der Türkei. [Leprosy in Turkey.] *Hautarzt* 7 (1956) 102-105.

Using the reports received by the Home Secretary between 1950 and 1955, an attempt is made to ascertain the prevalence of leprosy in Turkey. The cases reported in that period total 510 (2.10 per 100,000 population). The disease is most frequently met with in the southern and eastern provinces, especially Anatolia. Here the population is particularly poor, generally living in very small and primitive dwellings, and there is a very high incidence of hypo- and avitaminoses, especially pellagra. The insufficient number of physicians and the fear of compulsory isolation make an assessment of the leprosy situation extremely difficult. The authors believe that the total number of cases may be 10,000-13,000. Of the 510 reported cases 56% were lepromatous and only 2% tuberculoid; 26% were classified as "indeterminate"; the rest were uncertain. The sex ratio was 335 men to 175 women, ascribed to the fact that women are more reluctant than men to consult doctors. For hospitalization there are leprosaria in Stanboul and Elazig. It is recommended that a commission of three motorized, specially-trained physicians should, following preparatory propaganda, search the country for unknown cases. These physicians should, perhaps, also carry out large-scale examinations for tuberculosis. The fear of compulsory isolation should be dispelled, social welfare for the families should be provided, and the leprosaria should be attached to the university dermatological clinics of the country.

—ERNST KEIL

OBERMAYER, M. E. Mexico; a study of its contribution to dermatology. *Arch. Dermat.* 73 (1956) 533-552.

This paper, the presidential address at a meeting of the Pacific Dermatological Association held in Mexico City, is a historical study of dermatology and medicine prior to and following the Spanish conquest of Mexico, including dermatology as practiced at the present time. Deification identified with various activities of daily life was a feature of Mexican culture prior to the conquest. The loathsome Nanahautl was supposed to be the god of leprosy and elephantiasis, but historians believe this to be wrong since leprosy did not exist in Mexico prior to the conquest. The natives who had what the Spaniards thought to be leprosy, and those with other contagious diseases, had been sacrificed for the sake of public hygiene to Izaccitl and other gods. Approximately two pages are devoted to leprosy, including the historical aspects, early publications, and antileprosy efforts. This is a most interesting article, and a very valuable contribution to dermatology.

—SR. HILARY ROSS

LOIOLA PEREIRA. Campanha contra a lepra na India Portuguesa, no pasado, no presente e no futuro. [The battle against leprosy in Portuguese India in the past, present and future.] *O Médico* 180 (1955) 98.

This paper is a speech made by the author in the Dr. Froilano de Melo Leprosarium (Salcete, Portuguese India), in which the battle against leprosy in Portuguese India is described and the value of the modern drugs and the possibilities of the modern buildings of the leprosarium are emphasized.

—A. SALAZAR LEITE

BROWN, J. A. K. Uganda leprosy control scheme. *East African Med. J.* **33** (1956) 259-270.

The specialist leprologist to the Government of Uganda here gives an account of the leprosy control scheme he has worked out on the basis of his surveys and is now putting into force. Compulsory segregation is effective only in the degree to which it can be enforced, but it is impracticable in undeveloped countries like East Africa. Previous work in Uganda was based on leprosaria run by missions and subsidized by the government, admissions being voluntary. There have been 4 leprosaria in existence for the last 20-25 years, Nyenga, Buluba, Kumi-Ongino and Lake Bunyoni, and a new one was opened at Kuluva in 1951. Between them they dealt with more than 2,000 patients and probably the same number of outpatients. To provide leprosarium treatment for every case in the country would require a European staff of 700 and an annual expenditure of £750,000. Therefore the Uganda plan has turned to reaching as many patients as possible in village settlements, on the lines of the system of treatment villages which the author introduced in Southern Nigeria in 1936, which since then has greatly changed the leprosy situation in that country. First, 80 careful leprosy surveys were carried out, as a result of which it is estimated that there are 67,800 cases in a population of 5,540,000. Lepromatous leprosy varies in proportion, the Western Province being highest with 19% and the Eastern Province lowest with 5%. Children under fifteen constitute only 19% of all cases; leprosy in Uganda is not primarily a children's disease. Furthermore, the infecting case is by no means always a lepromatous one. To open large numbers of outpatient clinics was not regarded as a satisfactory plan because of poor attendances at such clinics, due in part to the long, twice-weekly journeys necessary, to the tendency of patients to quit when they feel better, and to the risk of giving patients tablets for a prescribed period. The Uganda treatment village is not a segregation camp, but it results in a large measure of segregation and makes possible continuity of treatment, while the patients have a happy communal life not far from their own homes. There are now more than 40 such villages with 20-400 patients each, the optimum size being 100. Except for three large ones provided by the local government, all others have been built by communal labor, with financial help from community development funds. Each village is located as near a hospital or dispensary as possible, and has land for cultivation. The salary of the leprosy orderly is paid by the local government, and all drugs are supplied by the central government, which also provides £3,000 a year to assist the local government in this matter. The aim is to admit all lepromatous cases and child patients within a radius of 15 miles, together with all tuberculoid cases living within that boundary but outside a 5-mile radius. The distance from a dispensary should be 2 miles. Families are not admitted, except for babies at breast who are sent home on weaning. The treatment is with DDS twice weekly. The regular leprosaria continue their work in a fashion similar to that of the larger hospitals in general medicine. There is no rigidity about whether a patient is treated in a leprosarium or a treatment village. Propaganda is also carried on by posters and booklets in five languages, available at very moderate prices. In 1951 less than 5% of the leprosy patients in the country could obtain regular treatment easily, but by means of the treatment villages this has risen 30-40%.

—J. ROSS INNES

BASOMBRIO, G. and BALIÑA, L. M. El matrimonio de los enfermos de lepra; su posibilidad y manera de proceder. [Marriage of leprosy patients; its possibility and method of procedure.] *Prensa Med. Argentina* **43** (1956) 1042-1045.

Nobody can be deprived of the right to marry. Diseases are no impediment to marriage, unless they affect the reasons that make marriage possible and valid: free will, and capacity for procreation. There are no scientific reasons for prohibiting marriage of a leprosy patient, because the disease is not hereditary and it is now

possible to avoid contagion. Nevertheless, nobody has the right to subject another to the risk of infection. A necessary condition is that the healthy partner should know the whole truth. The authors propose suppression of the law that prohibits the marriage of leprosy patients, and propose its substitution by another one that would specify that the contracting parties should testify, in the presence of a public official, their knowledge of each other's health. —AUTHORS' SUMMARY

C
rich
BASOMBRIO, G. and BALIÑA, L. M. La participación cristiana en la lucha antileprosa. [Christian participation in the fight against leprosy.] *Iatria* **27** (1956) 16-20.

The authors explain why, even today, leprosy causes horror and repulsion. Most of the causes of this attitude disappear with scientific progress. Invoking social and sanitary well-being, much harm is done to patients. The social assistance sections of the last two international congresses tried to correct that harm with wise and useful resolutions which, however, have not always been respected. The doctrine of the Catholic Church, which is firm, clear and definite, is also the best guarantee of human rights. Its interest, the well-being of the patients from the beginning of Christianity until now, is revealed by the magnitude of the work done, which is not attained by any of the others. But the principal drawback is lack of organization, which reduces its efficacy. The authors propose that such organization should be under the direction of the Sacred Congregation for the Propagation of the Faith, because the disease exists principally in mission countries and because the problems of social order, of natural, civil and religious rights, need the support of a sound doctrine. The Sovereign Military Order of Malta, which has resources for that purpose, might under the guidance of the Congregation help materially as regards subsistence of the patients and their families, medicines, etc. That would be a step to reach what Mary of the Passion called "the union of the faith and the union of charity."—[From authors' summary.]

C
rich
PERRIN, S. R. and CAPLIN, I. Leprosy acquired during World War II. *A. M. A. Arch. Derm.* **71** (1955) 742-744.

Although Aycock and Gordon in 1947 predicted an appreciable increase of leprosy cases resulting from service in endemic regions during World War II, this is only the second case yet reported among the U. S. Armed Forces, apart from 2 in which leprosy developed in tattoo marks. The patient was a Negro who worked in the navy and when in the Philippines was employed in rounding up persons with leprosy. The appearance was that of a very obvious lepromatous case, but there was considerable difficulty and delay in making a diagnosis, showing how necessary was Levan's comment to be "watchful for leprosy in veterans of World War II and the Korean campaign who have served in endemic areas."—[From abstract in *Trop. Dis. Bull.* **52** (1955) 1096.]

C
rich
LARA, C. B. and IGNACIO, J. L. Observations on leprosy among children born in the Culion Leper Colony during the presulphone and the sulphone periods. *J. Philippine Med. Assoc.* **32** (1956) 189-197.

This study was prompted by a suspicion that there has been some insidious change in the prevalence and character of childhood leprosy in the Culion colony during the past several years, and observations made during periods before and since the introduction of the sulfones are compared. Clinical observations were made regularly at 2-3 months intervals during both periods, with bacteriologic examinations and, in many cases, biopsies. For the presulfone period the 8 years, 1933-1940, were selected, during which time 955 children were born; the observations extended through 1941, a total of 9 years. The recent period comprises the years 1947-1954, when 246 children were born; observations of them similarly extended during another year, 1955. With respect to gross incidence, the number of children found with leprosy lesions during the presulfone period was 200 (20.9%); the corresponding

figure for the sulfone period was 49 (19.9%, excluding the children isolated at birth). There is, then, no appreciable difference in the gross-incidence figures for contact children during the two periods. Analysis of the data on age of onset, however, indicates a retardation of onset during the recent period. Among the 49 cases that have developed lesions during the recent period, the average age of onset (i. e., when the lesions were discovered) was 33.5 months. Among the 200 cases of the presulfone group, that age was only 20.7 months, or 12.8 months earlier. In an earlier report by one of the authors, the average age at onset for all cases observed up to December 1941 was given as 20.4 months. The morphology and bacteriologic characteristics of the lesions were essentially the same for the two periods, but there was a preponderance of lesions chiefly with round cell collections, mixed with some epithelioid cells, in the later period. From the data available it cannot be said whether or not there has been an absolute lowering of morbidity, or only a lag in the incubation process; nor can it be said whether the observed change has been influenced by the introduction of sulfone therapy or by some other causes. —J. O. NOLASCO

BROWN, J. A. K. Leprosy and childhood. *Central African J. Med.* **2** (1956) 173-180.

At the present time 29% of all the patients in the leprosaria in Uganda are children, while the proportion of children in the whole country is 40%. This does not, for Uganda, support the belief that leprosy has a predilection for children, and childhood is not the period of greatest incidence. It is sound policy to do everything possible to prevent children from coming into contact with the disease, but it is an error to think that susceptibility diminishes with age. It may be distressing that 27% of the people with leprosy in East Africa are under the age of 20, but it is important to remember that the other 73% got safely through childhood and adolescence only to become infected after reaching maturity. The paper continues with details of diagnosis, classification, treatment on modern lines, and the probable value of BCG vaccination as a means of prevention. The value of DDS in prevention is considered doubtful. The author places great reliance on morning and evening pulse and temperature charts to warn of complications. This article is illustrated with 7 clinical photographs of child leprosy and conditions which may be confused with it in Uganda, more especially tinea and scarring. —J. ROSS INNES

YOSHIE, Y. Clinical and histopathological studies on leprosy of the larynx. Part I. Clinical studies on leprosy of the larynx. *La Lepro* **24** (1955) 392-401 (in Japanese; English abstract p. 392).

The author, during the period 1938-1943, studied the lesions of the larynx of 973 leprosy patients (711 lepromatous, 129 tuberculoid, and 133 neural) with respect to the rate and the time of the involvement, the part of predilection, and the symptoms and course of the affection. Of the 711 lepromatous patients, 460 (64.7%) presented laryngeal lesions of some form—96.6% of the more advanced cases. Tuberculoid changes in the epiglottis were found in 7 tuberculoid cases (5.4%), one of which was proved free from tuberculosis by histopathological examinations and animal inoculation. Paralysis of the laryngeal nerves was seen in 12 (9.0%) of the 133 neural cases. In most cases the larynx was involved during the 10-year period after onset of the disease, usually within 6 years. The initial lesions were mostly in the epiglottis, manifested by congestion and swelling of the epiglottis, arytenoids or vocal cords. Generally this condition lasted for only a few months, followed by recession almost to normal, but after a quiescent period of years characteristic infiltration and nodulation developed in successive steps. Nodules were frequently seen around the entrance of the larynx, and in the advanced stage they appeared in rosary shape. Sometimes plaques with red halos were found symmetrically on the arytenoid on both sides, ulcerating superficially with relative rapidity. Diffuse infiltrations occur in the epiglottis, arytenoid, and the false and vocal cords. Infiltrated mucous membrane

changes to dry and yellowish, covered with leukoplakia, at the site of advanced hypertrophy. Ulceration was observed in only 9.4% of all cases. Scar-formation and constriction occur at the site of infiltration, resulting in many kinds of distortions, e. g., backward inclination and destruction of the epiglottis, stricture of the laryngeal tract. Immobility of the cord rarely occurs in laryngeal leprosy; restriction of abduction of the cord develops as the result of the paralysis of *m. posticus* and, in more advanced cases, fixation of the cord in the cadaver position because of paralysis of the recurrent laryngeal nerve, which invites severe dyspnoea. In a number of autopsy cases the author proved involvement of the superior laryngeal nerve in all cases, and frequently of the inferior nerve in severe cases of laryngeal leprosy. Laryngeal dyspnoea in lepromatous leprosy is therefore believed to result from advanced infiltration and paralysis of the recurrent nerve. Lepromatous involvement of the larynx frequently occurs 3-6 years after the onset of leprosy, persistent huskiness after another 3-6 years, and laryngeal stridor after still another like period. Nowadays, because of chemotherapy, lepromatous involvement of the larynx is seldom observed, and although it may occur it will be absorbed sooner or later without leaving any disturbance.— [From abstract. A prefatory note states that the author's monograph, Leprosy of the Upper Respiratory Tract, was destroyed while being printed during the bombing of Tokyo in 1943, and that this article was a part of that monograph.]

KÖNIGSTEIN, R. P. Beziehungen zwischen Lepra und Tuberkulose. [Relations between leprosy and tuberculosis.] *Wien. Ztschr. inn. Med.* **37** (1956) 145-154.

This is a review of progress with respect to the pathology and therapy of leprosy during the last 25 years. Reference is made to the cross immunity between leprosy and tuberculosis, and to prophylaxis by BCG vaccination. The author holds that in examinations for fitness for the tropics the immunity level should be determined by means of the cutaneous tuberculin test, BCG vaccination to be given persons in whom the reaction is negative. —ERNST KEIL

MOTOJIMA, T. Six cases of lingua nigra in leprosy patients. *La Lepro* **24** (1955) 337-341 (in Japanese; English abstract p. 337).

Six cases of lingua nigra in lepromatous patients have been observed, 4 of them in males and 2 in females, the age range being 24-52 years. In every case the dorsal surface of the tongue was black or dark gray, suggestive of wet rat skin. The patients tasted astringent, but there was no complaint of severe pain. The upper half of the papillae filiformes was minutely keratinized. The lesion spread from the anterior part of the papillae circumvallatae to the whole dorsal surface, and was less nearer to the lip and disappeared, leaving intact one- or two-thirds of the tip of the tongue. No pain was complained of when this hairy body was pulled off by forceps, but loss of taste was recognized. Blood, urine, and bacterial examinations and tests for syphilis gave no distinctive findings. Treatment by rinsing with 2% boracic acid, 0.2% acriflavin, application of caustic silver, and curettage produced favorable effects in all cases in 1-4 weeks. This lingua nigra appeared after extraction of teeth or after treatment of the teeth duct of the lower jaw.—[From abstract.]

ROY, A. T. Sulphone treatment of leprosy; a preliminary report on trial with D. J. 51. *Antiseptic* **52** (1955) 709.

This is a report of a trial of oral administration of sulfone D. J. 51 of Grimault Laboratories (obviously a DDS derivative, the exact nature not indicated) in 22 previously untreated cases (18 lepromatous, 3 tuberculoid and 1 neuromacular) treated for 9 months. The drug was well tolerated, better than DDS, and the reactions were fewer than with DDS. The maximum daily dose was 5 tablets (250 mgm.), which was tolerated by all except one. Clinical and bacteriological improvement was seen in 17 cases—8 improved and 9 much improved—while the condition remained

stationary in 2 and became worse in another 2; 1 discontinued treatment early. The results are said to be significant, but extended trials are necessary to find out the time required for rendering patients bacteriologically negative. —DHARMENDRA

TRAPPMANN, R. Die Behandlung der Lepra mit Neoteben (INH). [The treatment of leprosy with Neoteben (INH).] *Madjalah Kedokteran Indonesia (J. Indonesia Med. Assoc.)* 6 (1956) 60-65.

At the Djakarta leprosarium 13 hospitalized leprosy patients, bacteriologically 3+, were treated with INH (Neoteben): initially 50 mgm. 3 times daily, then 4-6 times daily. Of 7 patients who had had no preliminary treatment, 3 showed marked bacteriological and clinical improvement after 5-6 months, and 1 was negative and discharged; 2 did not benefit and become worse. The lepromas, which partly were of the size of a hazel-nut, disappeared to a considerable degree and left scar tissue. The nasal mucosa became negative, but the bacillus count in the skin was only slightly reduced. The 6 other patients, who had been unable to take sulfone drugs because they always had severe reactions, tolerated Neoteben as well as did those of the first group; side-effects were almost completely absent. Of these 6 patients 3 were significantly improved; in 2 others there was a marked reduction of the bacillus count; only in 1 case was the treatment unsuccessful. In 8 of the 13 patients there was a notable increase of weight, and in 10 there was a tendency to normalization of the red-cell sedimentation rate and increase in the leucocyte count. Neoteben is not less [?] effective than the sulfones, but can be used with success when the sulfones are not tolerated. —ERNST KEIL

DAVIDSON, W. S. Isoniazid alone and combined with thiosemicarbazone. *Leprosy Rev.* 26 (1955) 104-106.

In a previous paper [see *THE JOURNAL* 23 (1955) 103] the author described improvement of leprosy cases at the end of 6 months treatment with isoniazid, but further experience showed that after 6-9 months the improvement was not maintained. Therefore, 47 patients were put on a combination of INH and thiosemicarbazone, which had shown promise. The final dosage, reached after about 2 months, was 350 mgm. of the former and 200 mgm. of the latter, daily for 6 days a week. Of the 47 patients, 22 suffered from toxic symptoms, chiefly neuritis and anemia. After 10 months an index of progress of 1.2 was shown, which is regarded as satisfactory. It is considered that this form of treatment is suitable only in an institution under medical supervision.—[From abstract in *Trop. Dis. Bull.* 52 (1955) 1099.]

CAMPOS MAGALHAES, M. J. Lugar da isoniazida e das tiosemicarbazonas na terapêutica da lepra. [The place of isoniazid and the thiosemicarbazonas in the treatment of leprosy.] *J. do Médico* 28 (1955) 909-914.

The author tells of some sulfone-resistant cases, and of others in which sulfone therapy had to be discontinued because of drug intolerance. In these cases isoniazid and TB-1 were used with good results. —A. SALAZAR LEITE

SCHEEL, M. Zur kombinierten Behandlung der Lepra. [Combination treatment in leprosy.] *Hautarzt* 7 (1956) 283.

A combination treatment was given 350 cases of leprosy in the course of more than 3 years. For 6 months they received increasing daily doses, according to body weight, of INH up to 200 mgm., of Conteben up to 150 mgm., and of sulfone up to 100 mgm; and, in addition, 0.5 cc. per week of a gold-bismuth preparation in oil (Au-Bi-01). The best results were obtained with the Conteben + Au-Bi-01 combination. Response to a triple combination, INH + sulfone + Au-Bi-01, was also good. In no case were side-effects seen. The majority of the cases were of the tuberculoid form, in which prognosis is relatively favorable. However, in lepromatous cases the results of the combination treatment were also better than those of either Conteben or the

sulfones alone in the controls. The spectacular results had a favorable psychological effect in that the patients came for treatment more regularly. The treatment is easy, and there is no risk when it is carried out by the assistant personnel under medical supervision. —ERNST KEIL

c
revis
+
RAMOS e SILVA, J. and PERYASSÚ, D. Algumas observações sobre o tratamento da lepra, particularmente da forma tuberculóide, pela estreptomicina só ou associada à sulfona. [Observations on the treatment of leprosy, particularly the tuberculoid type, with streptomycin, alone or in combination with sulfones.] *Brasil-Méd.* **68** (1954) 439-450.

The authors describe their experiences with dihydrostreptomycin treatment of 27 cases (26 tuberculoid and 1 indeterminate), for periods varying from 3 months to 3½ years, 20 for more than a year. The dose was 1 gm. daily, in 1 or 2 intramuscular injections, the total doses 80-180 gm. All signs of activity disappeared in all but 1 case. Lesions became flattened and lost their erythema. Nerve thickening subsided almost entirely, and there was considerable restoration of sensation. Histologically, there was quick change in the tuberculoid granuloma, the epithelioid cells becoming vacuolated cells like those of Virchow. Later, lymphocytic infiltration alone remained, and this also gradually disappeared. After the streptomycin treatment, sulfone was given lest bacilli set free by the former drug should form fresh lesions, but the good results are ascribed chiefly to streptomycin. In only 1 patient was there a relapse, with an outbreak of tuberculoid reaction occurring 5 months after the lesions had apparently cleared up.—[From abstract in *Trop. Dis. Bull.* **52** (1955) 1098.]

c
revis
+
SCHUJMAN, S. Reacción leprosa provocada con fines terapéuticos. [Provoked lepra reaction as therapeutic measure.] *El Día Méd.* (Buenos Aires) **27** (1955) 527-532.

Convinced of the favorable effects of lepra reaction on the subsequent evolution of the disease in lepromatous cases, the author attempted artificial induction of lepra reaction in such patients by means of potassium iodide in one group, and smallpox vaccine in another. Reaction could not be provoked in all the lepromatous patients, but in those in which that was accomplished the symptoms were similar to those presented in spontaneous reactions. As many as three repeated reactions have been induced in the same patients with potassium iodide, and two repeated reactions a year apart with smallpox vaccine, without any ill effects. In the cases with induced reactions have been seen the same beneficial effects, both immediate and remote, as are usual with spontaneous reactions.—[From author's summary, supplied by G. Basombrio.]

c
revis
+
MONTESTRUC, E. Les réactions lépreuse^s. Leur traitement par corticothérapie prolongée. (Deuxième note.) [Lepra reactions; their treatment by cortisone therapy. Second report.] *Bull. Soc. Path. Exot.* **48** (1955) 631-635.

Treatment by cortisone was continued for 15 months in daily doses of 25-175 mgm., at the same time as the sulfone treatment, in 5 lepromatous cases observations on which were reported in a previous note [see *THE JOURNAL* **23** (1955) 478]. Attempts to suspend the hormone treatment were followed by recurrence of the lepra reactions. In a sixth case it was possible to suspend the hormone treatment after several months. In all 6 patients there was improvement of the skin lesions. The nasal mucosa became negative for bacilli in 8 months in 4 cases, and in 10 months in 1 case. The patients were kept under observation during the hormone treatment (red-cell sedimentation rate, eosinophile count, blood pressure, blood sugar, and blood coagulation time). The diet was rich in proteins and low in sodium chloride, and the patients were also given potassium salts (*ferrocyanure*), vitamin C, and, twice a week, sterandryl. One patient developed the moonface of the Cushing-disease type, and the cortisone was replaced for some time by ACTH. The other patients

showed no untoward effects. Lepra reactions are unfavorable to the course of the disease and should be suppressed. Long-term treatment with cortisone seems satisfactory from this point of view.

—M. VIETTE

MERKLEN, F. P. and RIOU, M. V. Survenue d'une tuberculose pulmonaire dans une lèpre lépromateuse au cours de traitement cortisonique d'une réaction lépreuse. [Occurrence of pleuropulmonary tuberculosis in a lepromatous case during cortisone treatment for lepra reaction.] Bull. Soc. Path. exot. **48** (1955) 778-782.

A patient with lepromatous leprosy was treated for 15 months by intramuscular injections of the parent sulfone (1.25 gm. every two weeks), and because the lesions apparently did not subside there was added 1 gm. Cimedone daily every other week. Lepra reaction occurred 15 days after the beginning of the mixed treatment. Antihistamine, calcium, and vitamins C and K proved ineffective, and the patient was then given cortisone, at first 300 mgm. daily and then decreasing doses. This treatment was maintained for 4 months at doses above 100 mgm. daily, because the reaction reappeared whenever the dose of cortisone was decreased below that level. Serofibrinous pleurisy then developed, with Koch bacilli in the sputum. This condition was arrested by antibiotic treatment (streptomycin, INH and PAS). Because of the risks of cortisone treatment the authors propose, whenever it is necessary because of persistent lepra reaction, to combine with it an antibiotic antituberculosis treatment (streptomycin), and perhaps other antibiotics in case of the possibility of other infections.

—M. VIETTE

ABERDEEN, E. Surgical aspects in the management of leprosy. Report of the Commissioner of Public Health, Western Australia, 1953; Perth, 1955.

When the author, an orthopedic surgeon, was associated with the Derby leproseries he was impressed with the opportunities of improving the deformities of the inmates. Of the 246 patients, 89 (36%) had deformities, which are tabulated. Ulnar palsy had invariably preceded median palsy; when the latter existed, the former was usually a severe one with contracture. Males are much more liable to have foot-drop than females, and there were indications that a nerve lesion may be aggravated in its early stage by exercise. The apparent course of development of hand deformities is described. There are two periods in the course of leprosy when operation may help: (1) during development, when according to the author's experience opening the nerve sheath relieves pain dramatically and probably lessens later complications, and (2) after the disease is "burnt out" or controlled by therapy, when deformities can be corrected by standard surgical techniques, the late neural complications in leprosy being fundamentally similar to those that follow trauma. Suggestions for surgical management are given, and nonoperative procedures are discussed. Special mention is made of the work of Brand; there is no indication that the author has done any reparative operations himself.

—H. W. W.

HODGES, W. A. A. The treatment of deformities of the foot in leprosy. East African Med. J. **33** (1956) 302-303.

This Tanganyika surgeon has operated during the last 3 years on 15 patients with footdrop due to leprosy. He used a Lambrinudi (1933) type of triple arthrodesis, aiming at a foot which would not drop more than 5 degrees below the right angle. The varus element of the deformity, when present, was corrected by removing a horizontal wedge of bone with its base laterally. Of the 15 patients, 10 had ulceration of the lateral side of their deformed feet, and the operation was performed as soon as the ulcer was clean without waiting for it to heal. A very large wedge excision of bone is required to produce a plantigrade foot in a patient with severe equinovarus deformity. A curved lateral incision was used, and where possible it was modified so as to excise the ulcer. A padded plaster cast was applied and left for 3 weeks, when the stitches were removed and a walking plaster cast was applied and retained

for 9 weeks. These measures were successful. All patients were seen 4 months after operation; all were walking well, and their feet had remained healed. Two patients seen 15 months after operation were walking well and working in the fields.

—J. ROSS INNES

FISHER, C. Experience with the treatment of trophic ulcers by plaster casts. *Leprosy Rev.* **26** (1955) 107-111.

In the treatment of ulcers of the sole, dead bone when present must be removed but, apart from this, rest of the foot is necessary. This is ensured by the author's method of applying plaster casts. The patient remains ambulant, and a minimum of treatment and maintenance is needed. After rest in bed for 2 days to reduce swelling, dry dressings are applied to the ulcers and the leg is bandaged with cotton from toes to knee without wrinkles. Three 6-7 inch and one 4-inch plaster bandages are first applied over the whole length of the cotton bandages. Small wooden rockers (locally made; described) are then fixed to the instep with two 4-inch plaster bandages, after which the patient is put to bed for 48 hours to allow the plaster to harden before walking. The optimum time for treatment is 3 to 4 months. At the time of the report the plaster had been removed from 50 patients. Results: ulcers healed and ready for weight-bearing, 25; healed, another 11; improved, 9; no change, 5; none was worse. During the period the patients had been "able to live a more or less normal life," and requests for plaster treatment were multiplying.—[From abstract in *Trop. Dis. Bull.* **52** (1955) 1100.]

MANDEL, W., COHN, M. L., RUSSELL, W. F. JR. and MIDDLEBROOK, G. Effect of para-aminosalicylic acid on serum isoniazid levels in man. *Proc. Soc. Exper. Biol. & Med.* **91** (1956) 409-411.

The observation that INH is metabolized (acetylated) at different rates in different individuals seems important, because only the free, unaltered INH has significant activity against tubercle bacilli. *In vitro* experiments by Johnson (Johnson, W. J., *Nature* **174** (1954) 744) had shown that para-aminosalicylic acid (PAS) inhibits the acetylation of INH by a competitive mechanism. The present paper describes a method for the microbiological assay of INH in the presence of high concentrations of PAS. The concurrent administration of PAS along with INH is shown to cause an elevation of serum levels of INH in 22 of 25 tuberculous patients. This combination should be particularly useful in patients who dispose of INH so rapidly that effective levels cannot be achieved or maintained.

—J. H. HANKS

JOHNSON, W. and CORTE, G. Inhibition of isoniazid acetylation *in vitro* and *in vivo*. *Proc. Soc. Exper. Biol. & Med.* **92** (1956) 446-448.

PAS, administered to rabbits in conjunction with INH, produced a marked increase in the plasma level of free INH. A similar effect was obtained with sulfanilamide. A colorimetric method for the determination of free INH in the presence of aromatic amines is described. The acetylation of INH by pigeon liver extracts was found to be inhibited by various amino, amido, and hydrazino compounds.

—J. H. HANKS

TAKAHASHI, T. Studies on the blood sedimentation rate in leprosy patients. *La Leprosy* **24** (1955), Supplement, pp. 19-28.

(1) The relationship between the ESR and type of the disease was determined (Westergren method) in 209 uncomplicated cases, 133 lepromatous, 64 neural, 12 tuberculoid. Four measurements were made of each case, 3 at intervals of 3 months, and the fourth after 5 years. The lepromatous cases gave by far the highest average readings, increasing with severity with advancement of the disease; the tuberculoid cases gave slightly less than the neurals, approaching normal. Among the cases in which the disease worsened, there was marked acceleration of the rate [figure given not understood], and numerous others (mostly L_3 cases) showed acceleration

without worsening. With improvement from L_2 to L_1 there was decrease (in 2 of 3 cases). Of the 76 N and T cases, 21 changed to L, all but 3 with acceleration. (2) All of the cases were tested with tuberculin, with no evidence of relationship between the reactions and either the disease or the ESR. (3) Comparing the rates before and after promin treatment there was generally at first a slight increase in the rates, not necessarily related to dosage, but later a gradual return to normal values with improvement. This temporary increase is regarded as a side-effect. (4) Treatment of rabbits with promin and chaulmoogra oil was followed by slight increase. Long-period injections of human, murine, and pseudomurine bacilli caused marked acceleration, no change occurring in a control group which received injections of a suspension of normal skin tissue. (5) A study of the relationship between the ESR and serum proteins in patients showed that the more severe the leprosy, the greater the increase in globulin, especially the gamma fraction, and corresponding changes in the ESR. In the animals, there was no increase of globulins in those given the drugs mentioned, or the controls, but an increase of gamma globulin in those that had the injections of bacilli. It is believed that not only breakdown products of the leprosy lesions but also of the bacillus itself are involved in the production of increased gamma globulin and acceleration of the sedimentation rate. —H. W. W.

CHATTERJEE, K. R., RAY, H. N. and MUKERJEE, N. Observations on polysaccharides in the skin lesions of lepromatous cases of leprosy. Bull. Calcutta Sch. Trop. Med. 4 (1956) 73-74.

Specimens from untreated lepromatous cases were fixed in chilled formalin and chilled 80% alcohol and embedded in paraffin. Sections were subjected to the periodic and Schiff technique (PAS) for polysaccharides, Brachet's toluidine blue for mucopolysaccharides, and the Ritter and Oleson technique for acid polysaccharides. The findings are given very briefly. PAS-positive material was found in foci in the stratum corneum, heavily in the subepidermal zone, and in the dermis especially where bacilli were concentrated. The bacilli were positive, with minute greenish areas in their cytoplasm, probably indicating the nuclear zones. Reactions in the outer covering of the bacillary bodies indicate the presence of mucopolysaccharides. Macrophages showed metachromatic granules in their cytoplasm, and the bacilli also showed gamma metachromasia. The mucopolysaccharides of the bacilli probably help to create a fluid zone around them, thus promoting osmosis, and mucopolysaccharides in the macrophages probably have a tropic influence on the bacilli. This may help to explain the intracellular parasitism of the bacilli, chiefly in the macrophages.

—H. W. W.

o mesmo trabalho
 RICHTER, R. Studien zur Neurohistologie der nervösen vegetativen Peripherie der Haut bei verschiedenen chronischen infektiösen Granulomen mit besonderer Berücksichtigung der Langerhans' schen Zellen. [Neurohistological studies of the peripheral vegetative nerves in various chronic infectious granulomas, with special reference to the Langerhans' cells.] Arch. klin. exper. Dermat. 202 (1956) 518-555.

The changes of the peripheral vegetative nerves, of the end organs of the sensory nerves, and of larger nerves in the skin, in lepromatous and indeterminate leprosy were investigated, confirming the findings of previous workers and adding new information. Degeneration of the cytoplasm of the basic elements of the peripheral nerves in leprosy proceeds generally in the same way as in tuberculosis, tertiary syphilis and dermal leishmaniasis. The injury is followed by nonspecific vacuolar and granular degeneration and breakdown. Remarkable is the fact that no regenerative and proliferative processes take place. A characteristic of leprosy is that, even with intact epithelium, the Langerhans' cells (LC) are affected very early by the toxins of the leprosy bacilli. The LC's at the border between the epithelium and cutis consist of aurophile cells emigrated from the connective tissue. Comparative studies of areas

of skin with disorders of sensitivity and normal skin showed that there is no connection between the LC and the sensitivity disorders. The LC's are closely related to the "intercalary" cells of the epithelium. The "intercalary" cells also bear no relation to the sensitivity disorders, but probably have a neurohormonal function.

—ERNST KEIL

NISHIURA, M. *Mycobacterium leprae* and peripheral nerves. *La Lepro* **24** (1955) 204-213 (in Japanese; English abstract pp. 204-205).

Inoculation of several kinds and strains of acid-fast into the peripheral nerves of rabbits, guinea-pigs, rats and monkeys resulted in multiplication, especially in the endoneurial cells, in susceptible animals, e. g., the tubercle bacillus, causing tuberculous lesions, and the rat-leprosy bacillus in rats. There was no multiplication of *M. leprae*. In tissue cultures, lepromatous nerves gave the most frequent growth of endoneurial fibroblasts; contrarily, tuberculoid nerves showed scanty growths. Growth of Schwann cells, frequently seen with normal nerves, rarely occurred in the cultures of leprosy nerves. Small numbers of leprosy bacilli were sometimes seen in the growing cells, but it could not be said that they were multiplying. Biomicroscopy of the corneal nerves of leprosy patients confirmed the "beaded effect" in both lepromatous and tuberculoid cases, indicating affinity of the leprosy bacillus for the peripheral nerves in both of the polar types of the disease. Histochemical examinations revealed both acid and alkaline phosphatase in tuberculoid nerves, but only the former in lepromatous nerves, and it is thought that the latter may play a role in the calcification of tuberculoid nerve lesions. The polarizing microscope was found useful in tracing the remaining myelin sheath in the highly degenerated nerve stumps in reamputated legs of leprosy patients. In conclusion it is said that the leprosy bacillus has an affinity for the axone in both lepromatous and tuberculoid leprosy, where it causes different lesions according to the tissue resistance of the individual. There is a bacteriolytic factor in the epithelioid cells of the tuberculoid lesion but not of the lepromatous lesion. That factor is supposed to have a neurolytic effect, which explains the presence of that effect in tuberculoid nerves and its absence in lepromatous nerves.—[From abstract.]

GODDEN, J. O., CLAGETT, O. T. and ANDERSEN, H. W. Sensitivity to alcohol as a symptom of Hodgkin's disease. *J. American Med. Assoc.* **160** (1956) 1274-1277.

Note is made of this article because the illustrations depict involvement of peripheral nerves in Hodgkin's disease in ways not unlike what is sometimes seen in leprosy. Three forms of this nerve involvement are illustrated. One picture shows a nerve ensheathed by dense, hyaline, perineural fibrosis as it passes between two active foci of Hodgkin's disease; the second shows a nerve fascicle completely surrounded by the specific pathological process, the perineurium apparently invaded; the third shows small nerves with invasion (plasma cells, lymphocytes, and an occasional eosinophil) of the perineural lymphatics. In no instance, however, is there invasion of the nerve-fiber bundles themselves.

—H. W. W.

HARADA, Y. and TAKASHIMA, S. Studies on the lepromatous leprosy, especially, on the lepromatous vasculitis. *La Lepro* **24** (1955) 297-321 (in Japanese; English abstract p. 295).

This two-page English presentation is difficult to summarize satisfactorily. The study was based on three cases, two boys 17-18 years old and a man who died of a suppurative meningitis which, since bacilli were found in the meninges and brain, is regarded as leprosy meningoencephalitis. The vascular changes found are listed as (a) hyaline, necrotizing vasculitis with thickening of the vessel walls, chiefly small arteries but also partly small veins; (b) proliferative alteration or thickening involving both arteries and veins; (c) distinctive and deformative changes of the veins, including involvement by the leprosy; and (d) perivascular infiltrations, especially

periarterial, into the capillaries and arterioles. Each of these conditions is described. It is concluded that leprous asculitis arises from hypersensitivity. Details of the differentiation from polyarteritis nodosa are given. The article is illustrated with 32 photomicrographs and 7 colored drawings—the legends entirely in Japanese.

—H. W. W.

OKADA, S. Pathological studies on the changes in the livers of leprosy patients and murine leprosy rats by means of biopsy. *La Lepro* **24** (1955), Supplement pp. 9-18.

(1) Liver-puncture biopsies were made of 5 Mitsuda-positive tuberculoid cases which had been thoroughly proved negative for tuberculosis; syphilis and certain other pertinent diseases were also eliminated. A typical tuberculoid lesion was found in only one case, but in it and all the others there were various earlier stages of such lesions. The initial one is composed of stellate cells and several small round cells (once an acid-fast bacillus was seen); other stages range upward from that. [See the author's original report in *THE JOURNAL* **22** (1954) 41-46.] (2) Similar liver biopsies made of 3 neural cases revealed only slight, incharacteristic infiltrations, composed mainly of small round cells, although a lesion resembling an atypical tuberculoid might sometimes be found. Since two of these "neural" cases had previously been tuberculoid, it is assumed that as the tuberculoid skin macules disappear and the case becomes "transformed" to neural the tuberculoid lesions of the liver also disappear or remain as small round-cell infiltrations. (3) Similar specimens from lepromatous cases were also examined to determine the effect of promin treatment, 1 from an untreated case, 5 from cases treated 3-30 months, and 2 from secondary neural cases previously lepromatous, recovered and Mitsuda positive. Granular bacilli were common among those found in the untreated case, but in the treated ones there were segmented and other forms, with diminution in numbers, accompanied by increase of monocytic or small-round-cell reaction in the most improved cases. Vacuoles [meaning vacuolated cells?] which have attained a certain size remain, even in recovered cases. Transformation of the monocytes to epithelioid cells appears, with production of the tuberculoid picture. Mobilization of monocytes plays an important part in improvement of the lesions, and their ratio to the numbers of bacilli is an index of improvement; the lymphocytic reaction is secondary. Thus, the secondary neural case is one whose resistance or immunological condition has become similar to that of the tuberculoid case. (4) Changes in the liver in ENL cases were studied by 4 specimens from 3 cases. In one specimen, in and around groups of lepra cells, there was infiltration of polymorphonuclear leucocytes and swelling of connective-tissue fibers, although not as marked in the skin lesions. (5) Finally, the development of the liver lesion in experimental murine leprosy was studied in 133 specimens obtained from 30 rats by hepatotomy.

—H. W. W.

SUGUE, K. Pathology of allergic reaction. The IV Japan Medical Congress, 1955; Kyoto (1956), I, 81-87.

In this highly condensed presentation, in which much emphasis is placed on the Aschoff body as evidence of allergic process, it is said that these bodies appear in about one-half of the hearts of leprosy patients. In 1942 the author had reported finding them in 16 out of 31 cases; and later, H. Hayashi—working under the author's guidance—had reported 31 out of 58 to be positive. In summary, they had found Aschoff nodes in the hearts of persons infected by tuberculosis, leprosy, myoma, beriberi, Basedow's disease, typhoid fever, and many other diseases, in the processes of all of which there is supposed to exist a mechanism of allergic reaction. The Aschoff body, therefore, is "a histological presentation of allergic reactive mechanism."

—H. W. W.

YANAGISAWA, K., ASAMI, N., MAEDA, M., SAITO, T., SONE, M., HAYASHI, Y.,

YOSHI, Y., TAJIRI, I., INABA, T., TACHIKAWA, N., TAKASHIMA, S., ISHIWARA, S., BABA, S., NAKAMURA, Y., KOJO, H., YAJIMA, R., GOTO, S., KOBAYASHI, S., HONJO, K., TERAKADO, S., NOGAMI, H., MITSUDA, K., MIYATA, T., SAKURAI, H., SHIONUMA, E., ITO, M., NAWA, C., NAGATA, M., YOKOTA, T., SAIKAWA, K., SUZUKI, M., HIBI, H., JINGU, R., NAMBA, M. and TODA, E. Studies on the lepromin test. (The first report.) A comparative observation of the skin reactions produced by the Mitsuda or Dharmendra antigen. *La Lepro* **24** (1955), Supplement, pp. 29-34.

— *Idem.* (The second report.) Basic observations for the settlement of criteria for reading the reactions. *Ibid.* pp. 35-46.

— *Idem.* (The third report.) Relation between the lepromin reaction and the tuberculin reaction. *Ibid.* pp. 47-59.

The extraordinary galaxy of thirty-five authors comprises representatives of seven institutions. In its regular issue for September 1955, *La Lepro* has the first two of these reports in Japanese (pp. 322-326 and 327-336), and in connection with the English abstracts the problem of the multiplicity of authors and their locations is solved essentially as follows: YANAGASIWA *et al.*, National Institute of Health; SAITO *et al.*, Sanitarium Section, Public Health Division, Welfare Ministry; HAYASHI *et al.*, Tama Zenshoen Leprosarium; TAKASHIMA *et al.*, Suruga Leprosarium; YOJIMA *et al.*, Kuryu Rakusenon Leprosarium; MITSUDA *et al.*, Nagashima Aiseien Leprosarium; and JINGU *et al.*, Oku Komoyoen Leprosarium. These names are in full capitals above to effect this separation into groups and indicate the senior member of each. In an earlier *La Lepro* abstract [**24** (1955) 221] the authorship credit was still simpler, YANAGISAWA *et al.* In the original articles recognition is given the Statistic Census Section of the Welfare Ministry for the statistical treatment of the data.

In the introduction to the first paper (which contains a few inaccuracies of history) it is said that the term lepromin reaction should be applied to all such skin tests, but that the kind of antigen used should always be stated. [The time of reading might also have been mentioned as an important point.] Solution of the problems of utility of the test as regards prognosis and epidemiological work must await standardization of the reaction, and the first two studies are concerned with antigens and criteria of positivity.

1. The antigens compared were those of Mitsuda and Dharmendra, the techniques of preparation of which are given. (It is noted that the heatings, both original and final, were at 100°C for 30 minutes.) The tests were made on a total of 3,137 patients selected at random in five leprosaria, the lots numbering from 262 to 1,010; 2,321 were classified as lepromatous, and 816 as neural or macular [tuberculoid]. Each patient received one injection of each antigen. The readings consisted of measurements of the areas of redness after 2 and 15 days, because redness "is measured without error." "The redness in the late reaction" (it is said in the second report) "was a rather faintly pigmented area which can be considered as the faded erythema of the early reaction." A tabulation of the 48-hour measurements "shows the fact that the individual who reacted with a larger reaction [to the] Mitsuda antigen also presented a larger reaction [to] the Dharmendra test in almost every case"; and the correlation was high (coefficient $\gamma = 0.8466$). A similar result is shown for the redness at 15 days, again with high correlation ($\gamma = 0.8652$); had the size of induration been used, it is stated, the results would have been the same. In the early reaction the Dharmendra antigen tended to cause stronger effects, whereas with the late one the Mitsuda antigen caused more induration, often with ulceration. These effects are ascribed, not to a qualitative difference, but to the intracellular location of the active principle in the Mitsuda antigen. It is concluded that, so far as the lepromin test is concerned, these antigens are the same.

2. The basic data on which the readings of the reactions have heretofore been

based were poor in academic value when given at all. It has not been determined if the early and late reactions are essentially the same phenomenon. These questions are tackled here. Correlation tables of the early and late reactions to the two antigens (both measured for redness) show that, although the size after 15 days was usually less than after 48 hours, the correlations were good—gamma being 0.7674 with Mitsuda and 0.8056 with Dharmendra. This leads to the conclusion that in their essential nature, the two reactions are the same phenomenon, like the relationship between the early and late reactions to killed tubercle bacilli after vaccination. For determining the criteria of positivity, frequency distribution curves based on the size of the reactions are constructed and analyzed mathematically after the method of Nobechi, Yanagisawa and associates for determining the criteria of positivity of tuberculin reactions. A histogram of the early reactions to the Mitsuda reaction shows a bimodal curve with peaks at 4-5 mm. and 16-20 mm., representing two different curves of the normal (Gauss) distribution type. The first curve is taken to result from nonspecific reactions unrelated to leprosy, and the second to be due to specific reactions—the former negative, and the latter positive, with a "doubtful" zone between. Then follows a demonstration of the mathematics by which a theoretical differentiation of positive and negative reactions is arrived at. This maneuver gives, for the early reaction to the Mitsuda, with a 2% probability of error: 0-6 mm., negative; 7-10 mm., doubtful; larger than 11 mm. [*sic*] positive. For the early reaction with Dharmendra, with the 2% factor: 0-11 mm., negative; larger than 12 mm. [*sic*] positive (no "doubtful" indicated). For the late reactions with Mitsuda: 0-4 mm., negative; 5-6, doubtful; larger than 7 mm. [*sic*] positive; with Dharmendra: 0-3 mm., negative; 4-5 mm., doubtful; larger than 6 mm. [*sic*] positive. This scale, it is pointed out, will give fewer positive late readings than previous scales. The grading of the intensity of positive reactions is also dealt with. For the early reaction (size not mentioned): 1+, redness with no or slight induration; 2+, redness plus definite induration; 3+, redness, induration and double redness [*sic*]. For the late reaction, 1+, induration less than 9 mm., 2+, induration 10-14 mm.; 3+, induration larger than 15 mm. (nothing said of where 9 mm. and 15 mm. indurations should be placed).

3. Summarizing the present position, it is generally recognized that in healthy persons and tuberculosis patients there is an intimate relation between the reactions to lepromin and tuberculin, but not in leprosy patients. Experimental observations: (a) Three groups of 6 guinea-pigs were used, 1 normal, 1 vaccinated intramuscularly with 30 mgm. of BCG 2 months previously, and 1 injected intramuscularly with 6 mgm. of a killed virulent tubercle bacillus in liquid paraffin 10 months previously. Tests were made with the Mitsuda and Dharmendra antigens, OT 1:2000, and phenol-saline. Readings in this instance, made after 48 hours, were of indurations because they were almost the same in size as redness. In the BCG animals the reactions to tuberculin and Dharmendra had vanished almost completely in 2 weeks, but not those to Mitsuda. In the virulent bacillus-oil animals the 24-34 hours reactions to all three tests were intense, especially those to tuberculin, and after 2 weeks there remained notable indurations at the Mitsuda and Dharmendra sites. It is concluded that the reactions were of specific nature involving antigen-antibody reactions. (b) This observation was of 245 schoolchildren (ages not stated), 55 of them naturally tuberculin positive, 191 BCG-vaccinated. The tests were with the 1:2000 tuberculin and the Dharmendra antigen diluted 1:3. Measurements of redness were made up to 72 hours. With both test substances the reactions, which were similar, were stronger at 24 hours than later, and both gave higher intensity curves in the naturally-infected individuals than in the vaccinated. There was a rather high correlation ($\gamma = 0.753$). (c) In this observation 2,912 leprosy patients were tested, 2,119 lepromatous and 793 neural, for 48-hour reactions to tuberculin and to both the Mitsuda and Dharmendra antigens, redness being measured. Correlations: tuberculin and Mitsuda in lepromatous patients, $\gamma = 0.3991$; the same, neural cases, $\gamma = 0.2419$; tuberculin and

Dharmendra, lepromatous, $\gamma = 0.1406$; the same, neural, $\gamma = 0.1635$. The correlation between positive tuberculin and late reactions was especially low, $\gamma = 0.0025$. In short, there was hardly any correlation in any clinical type. —H. W. W.

CHAUSSINAND, R., VIETTE, M. and PRUDHOME, R. O. Note préliminaire sur la préparation d'une lépromine standardisée. [Preliminary note on the preparation of a standardized lepromin.] Bull. Soc. Path. exot. **48** (1955) 784-788.

There is described a modification of the Mitsuda-Hayashi and Wade techniques for the preparation of lepromin. The lepromatous nodules are subjected for 15 minutes to the action of 0.1% papain. This eliminates one-third of the volume of the tissue debris, which is sometimes the cause of certain isolated reactions in lepromatous patients. The suspension thus obtained is heated at 70°C for 10 minutes and boiled for 5 minutes, then filtered through nylon as in the technique of Wade. The preparation of lepromin dilutions would be of interest, but because the Hansen bacilli are often grouped in masses and globi the dilutions are liable to be irregular. Treatment with papain, even with a wetting agent added, is without effect on these masses. Attempts have therefore been made to break them up by means of ultrasonic irradiation (960 kilohertz frequency, 90 watts acoustic power). Preliminary trials with a suspension of the Stefansky bacillus showed an improvement of dispersion, although several masses persisted after 3½ hours. With a Hansen-bacillus suspension (lepromin), after 4 hours there was almost complete disappearance of the masses, and also of 90% of the bacilli. Lepromin so treated produces slightly stronger Fernandez reactions, and Mitsuda reactions fairly similar to those produced by classical lepromin.

—AUTHORS' ABSTRACT

LEW, J. and CARPENTER, C. M. The separation of *M. leprae* from tissues by enzyme digestion. American Rev. Tuberc. & Pulm. Dis. **74** (1956) 152.

The previously described methods for the separation of leprosy bacilli from the tissues have undesirable features, especially the deleterious effects of reagents like chloroform and ether on viability, antigenicity, specificity, and physical and chemical characteristics. The authors have used trypsin to obtain a tissue-free lepromin. Cleaned lepromas are boiled for 30 minutes, ground finely with a minimal quantity of Sorenson's buffered saline, pH 7.6, and centrifuged at 400 rpm for 4 minutes to remove large tissue particles. The supernatant is then recentrifuged at 4,000 rpm for 10 minutes to remove the tissue lipids. Sufficient Sorenson's solution containing 0.5% trypsin (Difco Laboratories, 1:250) is added to the sediment to make a 1:20 dilution, and this preparation is incubated at 37°C for 90 minutes with frequent agitation. Remaining tissue particles are removed by recentrifuging at 400 rpm for 10 minutes. This method applied to unboiled tissue, the digestion continued for 2 hours, was less effective with rat leproma than when the tissues was boiled, but the bacilli remained infective. The method may also be applied to leprosy tissue for the finding of bacilli for diagnosis. The authors assert that a tissue-free lepromin for the detection of leprosy ("for diagnostic use") would be more specific and more accurately standardized than one which contains extraneous tissue particles, and the method makes available such a suspension of bacilli for more accurate biochemical and metabolic studies. [This method would not be economical in making lepromin, for the tissue particles that would be separated out by the repeated low-speed centrifugings would carry with them large numbers of bacilli; the lipoid material that floats after high-speed centrifuging often consists largely of bacilli of low specific gravity; and the supernatant after that treatment would not, as a rule, be cleared of bacilli.]

—H. W. W.

MONTESTRUC, E. Le B. C. G. possède une communauté antigénique avec la bacille de Hansen dont ne peut se prévaloir le *Myc. marianum*. [BCG possesses an antigenic relationship with the Hansen bacillus which is not shown by *M. marianum*.] Bull. Soc. Path. exot. **48** (1955) 629-631.

The reactions to the lepromin test performed on lepromatous patients were negative in 90-95% of the cases, which is normal. In these same patients, 90-95% of the reactions to *M. marianum*, and 50% of the BCG tests, have been positive. From this the author deduces that *M. marianum* is not the leprosy bacillus, but can be classed in the paratuberculosis group. Furthermore, in a lepromatous patient who had lepra reaction 21 days after the intradermal test with *M. marianum* and 15 days after a BCG test, a large lesion appeared during the reaction centered on the traces of the scarification of the BCG test, whereas the intradermal reaction to *M. marianum* on the opposite arm was not accompanied by any local reaction. It is concluded that BCG possesses an antigenic community with the Hansen bacillus which the *M. marianum* does not have.

—M. VIETTE

CHATTERJEE, K. R. and BOSE, R. Immunological skin test in leprosy with a new antigen prepared from Kedrowsky's bacillus; a preliminary note. *Bull. Calcutta Sch. Trop. Med.* **4** (1956) 127-132.

This extremely short report tells of the results of skin testing leprosy patients with an antigen prepared (how not stated) from cultures of the Kedrowsky bacillus, as compared with the Dharmendra antigen. The results, which concern only the early reaction, are shown by a tabulation to have been similar. If this new antigen proves successful, it "would solve the great problem of obtaining the antigen in bulk."

—H. W. W.

DHARMENDRA and MUKERJEE, N. Lepromin not inactivated by lepromatous serum. *Leprosy Rev.* **26** (1955) 111-116.

Experiments were made to test the findings of Ridley [see *THE JOURNAL* **23** (1955) 353] that incubating lepromin with sera from lepromatous cases destroyed the capacity of the lepromin to evoke (early) skin reactions in tuberculoid leprosy. In this study sera from three active, advanced lepromatous cases were used, and two different antigens: Dharmendra's, and Wade's modification of Mitsuda's. Controls were: lepromin and serum from a tuberculoid case, and lepromin and saline (also lepromatous serum and saline, and tuberculoid serum and saline). The patients, all frank tuberculoid, were divided into 4 groups of 6 each, and each group was injected with the lepromin-lepromatous serum mixture, and with 2 or 3 of the control mixtures. The early reactions to the test mixtures (lepromin in lepromatous serum) were in no case less marked than to the controls of antigen plus saline or tuberculoid serum; on the contrary it was always somewhat more marked. The late reactions (not reported by Ridley) to the Dharmendra antigen with lepromatous serum were a little stronger than to these two controls. Reactions to the Wade antigen were, as expected, stronger, and in this case there was not much difference between the test preparation and these controls. Thus the findings of Ridley were not confirmed. —[From abstract in *Trop. Dis. Bull.* **52** (1955) 1096.]

CHOUCROUN, N. The role of the lipo-carbohydrate of the tubercle bacillus in hypersensitivity, acid-fastness, and acquired resistance. *Tuberculology* **11** (1949) 25-30.

In this short article the author reviews previous work, basically, and investigation of the factors responsible for the two distinct, if often associated, phenomena in tuberculosis—hypersensitivity and immunity. Extracting heat-killed, dried tubercle bacilli with paraffin oil and precipitating the extract with dioxane, she obtained, after further treatment of the precipitate, two biologically significant components: (1) a protein residue which, injected intraperitoneally into normal animals in paraffin oil, established the true tuberculin type of hypersensitivity; and (2) from the supernatant, an ether- and chloroform-soluble, partially acid-fast lipocarbohydrate (Pmko) which, similarly injected, induces antibody formation but not hypersensitivity. However, the protein fraction was found to be contaminated with traces of the other one, and

when that was more thoroughly removed the protein was no longer able to cause hypersensitivity; but addition of some of the Pmko restored that capability. Both fractions, therefore, are required to sensitize. It is recalled that, in 1927, Boissevain and Schaefer showed that tubercle bacilli deprived of acid-fastness by mild hydrolysis in HCl were unable to sensitize animals. The author has confirmed this observation, and discusses the relation of the Pmko fraction to acid-fastness and other properties of the whole tubercle bacillus. Suspecting that the Pmko component may play an important part in the mechanism of acquired resistance, she has studied its effects in guinea-pigs, finding that it gives them a definite degree of acquired resistance. [The major part of this work is reported in detail in an earlier article, in the *American Rev. Tuberc.* **56** (1947) 203-226.] —H. W. W.

KOCH-WESER, D., BARCLAY, W. R. and EBERT, R. H. The influence of isoniazid and streptomycin on acid-fastness, tetrazolium reduction, growth, and survival of tubercle bacilli. *American Rev. Tuberc. & Pulm. Dis.* **71** (1955) 556-565.

Tubercle bacilli exposed to isoniazid in cultures lose their acid-fastness. The appearance of nonacid-fast rods in liquid Tween-albumin medium is gradual, and parallels the slowing of the growth rate and the decrease in tetrazolium reduction. Completely nonacid-fast bacilli fail to multiply when transferred to a favorable environment. Streptomycin-treated bacilli show complete inhibition of growth and tetrazolium reduction almost immediately, yet their acid-fastness is preserved. Once removed from the influence of streptomycin, they eventually resume growth and the ability to reduce tetrazolium. This indicates that streptomycin is bacteriostatic, whereas isoniazid is bactericidal.—[From authors' summary.]

RUSSE, H. P. and BARCLAY, W. R. The effect of isoniazid on lipids of the tubercle bacillus. *American Rev. Tuberc. & Pulm. Dis.* **72** (1955) 713-717.

Knowing that the tubercle bacillus loses its acid-fastness in the presence of isoniazid provided it is actively metabolizing (see above), but not in the cold or after exposure to other antituberculosis drugs, the authors have investigated that matter further, and also the relation of acid-fastness to the production of hypersensitivity. In one of the experiments here reported (the other dealing with quantities of lipids extractable), cultures treated with isoniazid were found 10 days later to be 95% nonacid-fast, whereas others treated similarly but refrigerated at 6°C were fully acid-fast, as were those which had been treated with streptomycin before the isoniazid. In guinea-pigs, the nonacid-fast organisms failed to sensitize to tuberculin, whereas the untreated control culture caused them to become strongly hypersensitive. [Mention is made of work by Boissevain and Schaefer (1927), who had found that tubercle bacilli rendered nonacid-fast by mild hydrolysis with HCl had lost their ability to sensitize animals to tuberculin. This statement was taken from a report by Choucroun, an abstract of which is above.] —H. W. W.

WHITE, R. G., COONS, A. H. and CONNOLLY, J. M. Studies on antibody production. IV. The role of a wax fraction of *Mycobacterium tuberculosis* in adjuvant emulsions on the production of antibody to egg albumin. *J. Exper. Med.* **102** (1955) 83-104.

Attention is drawn to the active adjuvant properties of tubercle-bacillus wax in potentiating serum antibody responses to protein in a water-in-oil emulsion of the Freund type, the protein in the watery phase, the wax in the oil. Freund used whole killed tubercle bacilli mostly, but showed that other mycobacteria are also effective in this way, indicating a common property. Raffel showed that defatted tubercle bacilli are incapable of establishing tuberculin sensitivity, but that addition of the chloroform-soluble waxy lipid—which alone in a water suspension lacked adjuvant effect with egg albumin—restores their ability to induce that sensitivity [see *THE JOURNAL* **20** (1952) 167-171]. With the emulsion containing egg albumin

and the wax (Anderson) the authors obtained as much as an 8-fold increase in antibody production, and marked 48-hour sensitivity of the skin to the albumin. The emulsion with wax also caused a much more severe and persistent lesion at the site of injection, and much greater macrophage stimulation there and at a distance, than did the same emulsion without the wax. In the former case many cells were of epithelioid appearance, and Langhans giant cells were numerous. Even the visceral organs (lungs, spleen and liver) were affected. —H. W. W.

MAGNUS, K. and EDWARDS, L. B. The effect of repeated tuberculin testing on post-vaccination allergy. *Lancet* 2 (1955) 643-644.

The authors had previously reported observations showing that the intensity of BCG-induced tuberculin sensitivity remains constant for at least five years. Other workers have found that postvaccination allergy wanes and may even disappear after several years. To investigate the possible effect of repeated tuberculin testing in this matter, the authors have searched their records for pertinent material. In one study the 4 children tested for the first time three years after vaccination gave reactions averaging only 7.8 mm., against 20.9 mm. for the 416 who had been tested each year. In another study the 6 children first tested after four years gave reactions that averaged 6.5 mm., against 16.7 mm. for the 207 tested annually. Children of the "mass campaign" in two districts gave the following results: District A, 114 tested for the first time three years after vaccination, 12.0 mm.; the 54 who had been tested annually, 18.6 mm. District B, 138 tested for the first time four years after vaccination, 9.5 mm.; 102 tested annually, 17.7 mm. It is pointed out that the material is not large and is not the result of a systematic trial, but the consistent trend would seem to indicate that repeated tuberculin testing may influence the intensity and persistence of postvaccination tuberculin allergy. —H. W. W.

LAURET, L. and KERBASTARD, P. Le problème des fausses réactions syphilitiques dans le lèpre. [The problem of false syphilis reactions in leprosy.] *Bull. Soc. Path. exot.* 48 (1955) 789-795.

The Kolmer, Kline and VDRL tests in 126 healthy Sudanese gave 79 negative, 4 dissociated, and 43 (34%) positive reactions. In 239 long-tested leprosy patients they gave 163 negative, 3 dissociated, and 73 (31%) positive reactions. In 142 untreated leprosy cases (56 lepromatous, 72 tuberculoid and 14 indeterminate) they gave 77 negative, 4 dissociated and 61 (42%) positive reactions. Fifty-four treated patients with positive syphilis serology were given antisyphilis treatment (3 injections of 2,400,000 units of penicillin at 3-week intervals). The Kline quantitative test made on these patients 1 and 3 months after this treatment showed a decrease of titer in 40 cases. On the other hand, the Kolmer, Kline, VDRL, Palignast and Nelson tests have been compared in 42 untreated leprosy patients, 30 with positive syphilis serology and 12 with negative serology. The results were practically all concordant. Of the 30 patients with positive serology, 6 gave histories of syphilitic chancre and 13 of yaws. There then remained 11, or 37%, without definite history of treponematosis. In healthy persons this figure is 20%. In view of these findings—i. e., comparable percentages of positive serology in healthy subjects and in leprosy patients, treated or untreated; decrease of the titer of the Kline quantitative test in leprosy patients after antisyphilis treatment; concordance of the different reactions and of the Nelson test; frequency of positive serology without known syphilis history in healthy persons—the authors believe that the classical notion of false syphilis serological reactions in leprosy should be abandoned. —M. VIETTE

HONDA, H. and OSHIMA, T. Studies on serum reaction in leprosy. (The 5th report.) Complement fixation test with modified antigen. *La Lepro* 24 (1955) 364-372 (in Japanese; English abstract p. 364).

With a modification of the antigen devised by Honda and Yoshino (1951) for

the complement fixation test, treated with 0.1% kaolin, 110 sera were tested. Positive results were obtained with 60 (92%) of 65 from lepromatous cases, 17 (74%) of 23 from macular [tuberculoid] cases, and 19 (86%) of 22 from neural cases. Of 38 cases of syphilis, 3 (8%) showed a nonspecific positive result, while all of 19 cases of tuberculosis, 6 of cancer, and 40 healthy subjects were negative. Of 10 pregnant women 2 were positive, which does not seem significant with respect to the diagnosis of leprosy. The reaction was little affected by therapy during the following 6 months; on the contrary, some cases showed an increase of the reaction.—[From abstract.]

GAN, K. H., SOEKARDI ATMAJJA, R. and TWA TJOA TJONG LIAM. Concentration of acid-fast bacilli in skin biopsy of leprosy patients and contacts. *Documenta Med. Geograph. et Trop.* **7** (1955) 136-139.

With the concentration method of Khanolkar and Rajalaksmi no acid-fast bacilli were found in 20 clinically healthy leprosy contacts but they were obtained from 2 of 10 tuberculoid cases and 1 of 18 undifferentiated-type cases. In 1 case the result with the concentration method was negative when by the direct method it was positive. As a result of findings in 53 examinations the authors say that the concentration method is perhaps somewhat better than single examinations of preparations from the nasal mucosa or the skin for the diagnosis of tuberculoid and [indeterminate] leprosy, but definite concentration of acid-fast bacilli could not be demonstrated in their cases.—[From abstract in *Trop. Dis. Bull.* **52** (1955) 1095.]

UYEDA, S. The possibility of the growth of *Mycobacterium leprae* *in vitro*. *La Lepro* **24** (1955) 214 (abstract).

It is held possible to verify the growth of the leprosy bacillus *in vitro* without using the ordinary serial transfer method, by observing increase in the numbers of bacilli in comparison with unincubated control tubes and the characteristic arrangements of the multiplied bacilli—formation of cords, production of colonies—all within the microscopic range. These developments were seen in cultures in Kirchner fluid and on solid media, the multiplication being similar in rapidity to that of tubercle bacilli to a maximum at 3-5 weeks of incubation; but the amount of growth that can occur is limited. It was assumed that the best time to make transfers would be at that time, but transfers were not successful. In attempts to determine factors which influence development of the bacilli, they were found to develop better at 37° than at 30°C, and also better in media containing 2-4% glycerol than without it. Sera of the rabbit and the rat promoted development better than those of man, the goat, or the guinea-pig.—[From abstract.]

CHATTERJEE, K. R., DASGUPTA, B., MUKERJEE, N. and RAY, H. N. Some cytochemical observations in *Mycobacterium leprae*. *Bull. Calcutta Sch. Trop. Med.* **4** (1956) 18.

The primary purpose of the study here reported with extreme brevity was to ascertain the cytochemical patterns of certain morphological features of the bacilli which the authors have recently observed, with special reference to polar bodies and the nucleus. The polar bodies and similar structures in the cytoplasm are Nadi positive, indicating the presence of cytochrome oxidase. Consequently, these bodies may be regarded as bacillary mitochondria, a view confirmed by the formazan reaction. The central zone is Feulgen positive, indicating that the desoxyribonucleic acid (DNA)-containing central dot is the nucleus. This dot is also positive for alkaline phosphatase, more so in dividing nuclei than in resting ones. In dividing forms the DNA appears to concentrate toward either pole of the bacillus, simulating a mitotic figure. Ribonucleic acid (RNA) was demonstrated in the cytoplasm of the bacillus by the Unna-Pappenheim stain.

—H. W. W.

MIDDLEBROOK, G., COHN, M. L. and OESTREICHER, R. Chromogenic acid-fast bacilli

from human sources. *American Rev. Tuberc. & Pulm. Dis.* **72** (1955) 693 (correspondence).

A recent report of chromogenic acid-fasts from human sources insensitive to isoniazid *in vitro*, some of them thought to be like the "yellow bacillus" of Buhler and Pollack (see above), has led the authors to relate their own experience. In three years there had been 584 culture-proved cases of tuberculosis in their hospital, and 6 cases from different parts of the United States with tuberculosis-like disease of the lungs attributable to the yellow-bacillus group. By the air-borne infection method these bacilli were found to be nonpathogenic for guinea-pigs, moderately pathogenic for hamsters, and highly pathogenic for mice. They were susceptible to isoniazid in relatively low concentrations before the patients were treated with that drug, and 3 patients treated with it gave clear-cut chemotherapeutic results. It is therefore believed unwise to conclude that the photochromogenic yellow bacilli are highly resistant to isoniazid. —H. W. W.

WOOD, L. E., BUHLER, V. B. and POLLAK, A. Human infection with the "yellow" acid-fast bacillus; a report of 15 additional cases. *American Rev. Tuberc. & Pulm. Dis.* **73** (1956) 917-929.

The authors had previously reported [see *THE JOURNAL* **22** (1954) 250] two cases of human disease due to an atypical acid-fast organism called the "yellow bacillus" because of its appearance in cultures. This yellow color distinguishes this bacillus grossly from human tubercle bacilli and from the saprophytic "orange bacillus." The yellow bacillus is larger than the H₃₄Rv strain of *M. tuberculosis*, and it produces a smooth colony. It does not cause progressive fatal disease in guinea-pigs, but does so in Syrian golden hamsters. The present report is of 15 additional cases of this infection. The 17 comprised 5 women, 11 men, and 1 infant. The bacillus was cultured from 16 of them. The initial diagnosis was tuberculosis in all instances, and the patients were treated accordingly. Most of them received antimicrobial therapy consisting of some combination of streptomycin, isoniazid, and aminosalicylic acid, and most of them showed some clinical and roentgenographic improvement; but those with generalized disease showed no favorable response. Experimental data indicated that the yellow bacillus is susceptible to streptomycin in therapeutic concentrations. Aminosalicylic acid produces only a temporary inhibition of growth. The effects of isoniazid are variable; most of the strains are resistant to moderate or even high concentrations, and this applied to some strains from patients who had not received this drug. At present, 4 of the 17 patients are well and working, and another has neither roentgenographic nor bacteriological evidence of disease but complains of some disability. One is still under treatment; 5 could not be followed; and 6 had died, 5 of the disease. The prognosis seems to be poor, but many of these patients came to the attention of the writers after the disease had become advanced. —[From abstract in the *J. American Med. Assoc.* **161** (1956) 1506.]

NISHIMURA, S., MASUDA, T., IWASA, K. and KODAMA, M. Studies on chemotherapy of leprosy. (Part 18.) On the relation of administered doses of INAH and the resistance of the murine leprosy bacillus. *La Lepro* **24** (1955) 402-404 (in Japanese; English abstract p. 402).

Material from leprosy rats which had been treated with INH for 2 months (4 mgm./kgm. per os, daily, total 51 mgm.) was transplanted into new rats. The second leproma [produced in them] was diluted and 0.5 cc. of a 10⁻⁴ suspension was injected subcutaneously into 40 rats, in four groups of 10 each. Groups 1 to 3 were given INH by mouth, in doses of 4, 20 and 40 mgm./kgm., respectively; Group 4 was the untreated control. The disease appeared in Groups 1 and 4, whereas the larger doses [Groups 2 and 3] completely prevented its development. Therefore, the bacillus presented INH-resistance against the 4 mgm. dose, but not the 20 mgm. dose. This

strain, however, produced the disease soon after the treatment was discontinued.—[From abstract.]

NISHIMURA, S. and IWASA, K. Fundamental studies on the screening test of chemical agents against murine leprosy. (Part 2.) I. Judgment of the evolution of murine leprosy; its simplification using our subcutaneous inoculation method, and II. Selection of the murine strains. *La Lepro* **24** (1955) 405-415 (in Japanese; English abstract p. 405).

This paper reports the simplest and the most exact evaluation of the development of murine leprosy, and selection of an adequate strain of mice after subcutaneous inoculation. Heretofore, evaluation has generally been based on the size of the local leproma (weight and area), macroscopic and microscopic changes in the lymph nodes and viscera, and distribution of bacilli in the various organs. Our experiments have shown that there is a proportional relationship between the area and weight of the local leproma, and the dissemination of bacilli and the degree of other changes. Therefore, when the area is measured the other two features mentioned may be neglected. We grade the lepromas as follows: 1-10 mm², ± (index 1); 11-30 mm², 1+ (index 2); 31-70 mm², 2+ (index 3); 71 mm² and over, 3+ (index 4). Ten strains of mice have been studied: NA1, NA2, S417 (Osaka Junkeidobutsu Kenkyusho), DD (Takeda Pharmaceutical Institute), dbr, DBA, S (National Institute of Genetics), B (Nagoya University), SM (Tokyo Chuo Jikkendobutsu Kenkyusho) and a nonpure strain (Gifu-ken, Japan). The highest sensitivity to murine leprosy and the smallest individual variations were found in the B strain, (GEN. CCSSaaBB, BW ♂ 16.23g±0.61, ♀ 17.02g±0.40, CHA. Black, small strain), the order of the others being dbr, S, S417, DD, SM, NA1, NA2, DBA. Large-scale production of the B strain animal is impossible, however, and the dbr, S, S417 strains have high mortality rates. We are therefore obliged to employ the NA1 and NA2 mice, in which the mortality is low and which can be produced easily.—[From abstract.]

NISHIMURA, S. and MASUDA, T. Studies on the chemotherapy of leprosy. On the resistance of the murine leprosy bacillus against INAH and prevention of INAH resistant by the combination INAH and SM. *La Lepro* **24** (1955), Supplement, pp. 1-7.

1. Resistance to isoniazid. This part attempts to determine if the murine leprosy bacillus may acquire resistance to chemical agents, done by *in vivo* tests since the bacillus is not cultivable. Two experiments were made with different strains of bacilli. (a) The seed-material rats were given 4 mgm./kgm. of INH for two months, total amount 51 mgm., when the persisting lepromas were extirpated and reinoculated into other rats which were not treated. Some three months later their lepromas were removed for the inoculations of the 60 drug-test animals, which were given varying amounts; one-half of each group were treated with INH as before. No essential differences were seen between the treated and control groups, indicating that the bacilli had acquired resistance. (b) Seed rats were treated with the same dose of INH for nearly 4 months, the total amount 91 mgm. The lesions receded, but the pinhead remnants were removed and reinoculated into other rats (untreated, as before), whose lesions were removed after 164 days for the inoculations of 60 test animals. In those given the largest inocula, there were no material differences between the developments in the treated ones and the controls, but in those given smaller inocula the drug showed a definite inhibitory effect. Why there should have been this difference between the "51 mgm. strain" and the "91 mgm. strain," the latter of which seemed to have partially recovered sensitivity to INH, remains to be explained.

2. Prevention of INH resistance. The procedure was similar to that of the first experiment, except that the original treatment to see if INH sensitivity would

be affected was with a combination of that drug and streptomycin. As before, the test rats (30) were given different inoculation doses and then treated with INH for 150 days. The results showed slightly more INH resistance than with the original, sensitive strain, but much less resistance than was developed in the first experiment. The combination, therefore, largely inhibits the acquisition of resistance. —H. W. W.

NAKAMURA, M. Attempts to approach to the clarification of chemical composition of *Mycobacterium leprae murium*. II. Some properties of the bacilli from the subcutaneous tissue of rat infected with *Mycobacterium leprae murium*. *Kurume Med. J.* **3** (1956) 29-33.

Continuing this study [see *THE JOURNAL* **24** (1956) 124], the author found that the wet weight of the bacilli obtained by chloroform extraction of 11.6 gm. of rat leproma was 608 mgm., or 5.24%. These bacilli were compared with *M. tuberculosis* and *M. Phlei* as regards their content of water, alcohol-ether extractible element, phosphorus, carbohydrate, and nitrogen (from the previous report.) The results show that *M. leprae murium* contains approximately the same amount of water and carbohydrate, somewhat less nitrogen, and more abundant alcohol-ether extractible and phosphorus fractions than the other acid-fast bacilli studied, which can be cultivated *in vitro*. —H. W. W.