CURRENT LITERATURE

It is intended that the current literature 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.

[Hind Kusht Nivaran Sangh] Annual Report, 1958, of the Hind Kusht Nivaran Sangh (Indian Leprosy Association), with which is incorporated a brief account of leprosy work of other agencies, government and voluntary. New Delhi, 1959, 74 pp.

The introductory report of the chairman Rajkumari Amrit Kaur, constitutes as usual a comprehensive general survey of activities in India. Information from the Director-General of Health Services is that, under the leprosy control scheme, there have been established 4 main treatment and study centers and 68 subsidiary centers in 13 states (many more being planned), implemented by the state health directorates, with a director of leprosy control responsible for coordination of activities. A Leprosy Advisory Committee was established in 1958. The population of the project areas is over 8 million, of whom some 3.5 million have been examined with the finding of 53,617 cases. A total of 45,935 patients attended for treatment, plus 23,474 from outside the areas. (How many clinics are being operated is not stated, but apparently each center has several. For example, 4 of the 7 subsidiary centers in Madras State have in total 55 clinics, ranging from 6 to 19 per center.) Included are summary reports of the Central Leprosy Teaching and Research Institute at Chingleput, the Mission to Lepers, the Gandhi Memorial Leprosy Foundation, the Belgian Leprosy Centre at Polambakkam in Madras; of research under the auspices of the Indian Council of Medical Research; and of the work of the Sangh itself and its 11 sections.—H. W. W.

Hemerijckx, F. Report on the activities and the leprosy control campaign during 1955-1958 of the Belgian Leprosy Center, Polambakkam. Privately printed (1959), 86 pp., paper.

This is a report on the Belgian-supported project in Madras State, which was initiated in 1955. The area covered is roughly 25 × 40 miles in contiguous parts of the Chingleput, North Arcot and South Arcot Districts, extending southward from below Chingleput town nearly to Pondicherry, bordered on the east by the Bay of Bengal and centered at Polambakkam where Cochrane once had a night segregation center (Cochrane Griham). After considering the basic principles in leprosy control and methods used in certain other countries, the operation—actually a pilot project—was set up for mass treatment and case finding from 45 outpatient centers, with limited hospitalization facilities at headquarters. Most of the present staff of 54 people (12 of them ex-patients) are paramedical workers ("rural leprosy workers") who had to be trained for the job locally. Expenditures (not including salaries of the Belgian personnel—the author, Dr. Claire Vellut, and 2 nurses—which are paid in Belgium), amounting to about 100,000 Rs per annum, are reported in informative detail. The population of the area is over 393,000, of whom about 310,000 have been examined. The average prevalence of leprosy is about 34 per thousand. Counting only patients from the control area, nearly 25,000 were under treatment and control in 1958. Nearly 15% of them were lepromatous and 8% "N?L"; a full 77% were classed as "nonlepromatous." Children constitute 29% of all cases. The sex ratio is 2:1, but males are much more predominant (4.5:1) among the

lepromatous cases. The report contains a wealth of information and comment, on irregularity of attendance, its cause and effects; the three types of surveys, contacts, general and intensive; the treatment, route, dosage, and results (DDS is given by mouth, that method being considered more feasible than injection); reactions and their treatment; and various other subjects. Anyone concerned with this type of work should have this exceptionally valuable report, obtainable from the Belgian Leprosy Centre, Polambakkam P.O., Madurantakam Taluk, Madras, India.—H. W. W.

FAWDRY, A. L. Notes on leprosy in Aden. Leprosy Rev. **30** (1959) 114-117.

Leprosy is not a major public health problem in Aden Colony. Most of the 126 patients recorded in the last 2 years came from outside the colony, 60% from Yemen, and most of them live by begging. The tuberculoid form predominates, only 19 cases being recorded as lepromatous. Since April 1958 there has been a leprosy clinic, but attendances are irregular as patients have to come long distances. A former mission leprosy hospital was closed during the war and has not been restarted. The chief difficulty in eradicating the disease is lack of supervisory health personnel.—[From abstract in *Trop. Dis. Bull.* **56** (1959) 727.]

SCHUJMAN, S. El problema de la lepra en China. [The leprosy problem in China.] Bol. Soc. cubana Dermatol. y Sifilog. **16** (1959) 16-19.

The author reports briefly on his one-year stay in the *"República Popular China"* to advise on antileprosy work, train leprologists, and initiate research. Three intensive courses were given, two of them postgraduate courses of 3 months each in Canton and Shanghai for a total of 150 physicians with some experience in leprology or dermatology. Surveys were made of a total of 65,000 people near those two cities. The indices of prevalence were between 25 and 30 per thousand, and—considering that there are large provinces with practically no leprosy—it was concluded that the general index for the country is probably between 1 and 2 per thousand. An integral antileprosy campaign is being undertaken, including noncompulsory segregation (*únicamente con métodos persuavivos*, but apparently intensive persuasion) of the bacteriologically positive cases. Segregation, it appears, will be in beautiful villages (*hermosas villas*) with good medical attention and facilities for work. The internees with their products aid in sustaining the villages, while the government looks after their families. [This article is followed by comments by Dr. V. Pardo-Castello, who emphasized particularly the fact that in democratic countries obligatory segregation, even by "persuasive methods," is fundamentally odious.]—H. W. W.

MONTESTRUC, E., GARCIN, D., BERDONNEAU, R., BENOIST, J. and CHABANNES, J. La lèpre à la Martinique en 1958. [Leprosy in Martinique in 1958.] Arch. Inst. Pasteur Martinique **12** (1959) 63-78.

This annual report contains certain optimistic observations. This optimism is based on: The small number of lepromatous cases encountered during the year, they for the first time being less than 20% of the total, while the proportion of tuberculoid cases rose to 43.5% from only 11.8% five years ago. The proportions of young patients under 20 years of age have decreased regularly in the past 4 years. Hospitalization of positive patients has regularly increased in the last 5 years, from 30% to 92%. The percentages of negativization in properly-treated patients has increased. Lastly, the results obtained by control of the sources of infection and protection by BCG permits great hope of eradication. On the other hand, detection of cases, although improved, is still unsatisfactory; too many patients are still treated very irregularly, and some not at all, for lack of an adequate rural service; too many contacts escape surveillance; the ignorance of some patients is discouraging; and, lastly, although the number of malign cases has decreased the total number of cases is still very high.—[From authors' summary, supplied by N. Bourcart.]

MONTESTRUC, E., GARCIN, D., BERDONNEAU, R. and BENOIST, J. La prophylaxie antilépreuse chez les enfants contacts de lépreux à la Martinique. [Antileprosy prophylaxis in child contacts in Martinique.] Arch. Inst. Pasteur Martinique **11** (1958) 18-27.

Emphasizing the importance of familial leprosy and the surveillance of child contacts is the fact that 39% of the cases found in Martinique from 1951 to 1957 were under 20 years of age, and they included 4 bacteriologically positive babies. Contacts of new cases are examined clinically and bacteriologically and tested for allergy to the Koch and Hansen bacilli. All tuberculin-negative contact children are vaccinated with BCG, and those among them who are lepromin positive are also required to take preventive sulfone treatment. All are followed-up periodically.—N. BOURCART

MONTESTRUC, E. Les raisons de la tenacité de l'endémie lépreuse à la Martinique. [The reasons for the persistence of leprosy in Martinique.] Bull. Soc. Path. exot. **51** (1958) 149-153.

Despite the preventive measures already in force in Martinique, which are much more rigorous than those generally taken in the neighboring islands in the Caribbean, it would seem that leprosy has not notably diminished. It is believed that this persistence of the endemic is due to defects of the preventive measures. These defects are especially: (1) in detection, (2) in segregation, (3) in the surveillance of children contacts, and (4) failure to vaccinate with BCG all the babies at birth.—[From author's summary, supplied by N. Boureart.]

BROWN, J. A. K. and BLENSKA, W. M. Leprosy control in Uganda. Duration of treatment of inpatients and outpatients. Leprosy Rev. **30** (1959) 108-109.

Statistics are given of 410 leprosy patients discharged since January 1957 from the Buluba and Nyenga leprosaria in Uganda. Of these 111 were inpatients and 299 outpatients. Of the tuberculoid and indeterminate types, despite the fact that inpatients are drawn from the more advanced or more seriously ill patients, their discharge rate under four years was higher than that of outpatients. The authors do not argue in favor of increased or enlarged leprosaria, but emphasize the importance of treatment villages built by the community.—[From abstract in *Trop. Dis. Bull.* **56** (1959) 733.]

KITANO, H. Investigations on the awareness of high school students to the problem of leprosy. La Lepro **27** (1958) 457-463 (in Japanese; English abstract).

The knowledge and appreciation of high school students regarding leprosy was investigated. Five thousand questionnaires were distributed in each of two prefectures, one (Gifu) where leprosy is relatively prevalent and one (Ibaragi) where it is relatively rare. The response was 78.5%. The results show that of all the major diseases, leprosy is the most feared and this fear is extreme compared with others. The cause for the fear was emotional in the greater number (43%), followed by belief in incurability (33%). The causal factor was reported as infection in the wide sense by 58%, but 26% believed that heredity was the cause. [Further details, for which the original should be consulted.] Knowledge concerning leprosy was lower in Ibaragi than in Gifu, and more girls than boys still had mistaken ideas about leprosy.—[From abstract.]

KUNG, C. H., CHANG, T. C., HSU, P. Y., YU, H. W. and WU. C. H. Bone and joint changes in leprosy. Chinese Med. J. **79** (1959) 130-137.

The authors report on 55 patients with advanced leprosy in the Shanghai Municipal Leprosarium, 32 lepromatous and 23 tuberculoid. The bone and joint changes were classified as specific and nonspecific. The specific changes, due to direct invasion of *M. leprae* into the bone tissue and bone marrow cavity, were found in 7 patients. In 5 of them they appeared as small areas of decreased density, with a hazy border and distor-

tion or disappearance of the trabeculae, usually located in the metaphysis of the phalanges or metacarpus (pseudocystic formation). In the other 2 there was change of expansion of the small tubular bone, with decrease in density, thinning of the cortex, and rarefaction of the trabeculae. The nonspecific changes were of several kinds: Enlargement of the nutrient foramen, seen in 6 patients of whom 5 were lepromatous. Diffuse osteoporosis of various degrees, seen in all but 3 patients. Absorption of the small bones of the hands and feet, the chief cause of mutilation of the extremities, observed in 75 hands and 30 feet. In some patients small bones were completely absorbed with loss of fingers and toes; but in others there was only atrophy of the soft tissue, the fingers and toes remaining intact. Concentric absorption, in 26 patients, with the shaft itself and the marrow cavity of the small tubular bones gradually narrowed evenly, the ends being preserved. Fractures, in 7 patients; 5 had chip fractures and 2 had fractures of the middle metatarsals, with fairly well-healed callus formation. Small loose bony fragments were observed in the larger joints (elbow, knee, ankle), with some degree of subluxation similar to that of Charcot's joint. It is suggested that neurotrophic changes of the osseous system are accelerated by trauma and secondary infection.—[From abstract in *J. American Med. Assoc.* **172** (1960) 291, supplied by Sr. Hilary Ross.]

Davison, A. R. Erythema nodosum leprosum. Leprosy Rev. **30** (1959) 112-113.

The author has studied the effect of erythema nodosum leprosum (ENL) reactions as regards length of treatment and the bacterial index (BI). Of 100 patients with low BI (average 1½), 24 with no ENL took 57 months to become negative, whereas 76 who had ENL took 65 months or more. Of 98 patients whose treatment had been of long duration (average 79 months), 85 with ENL took 79 months to become negative, and 13 without it took 77 months. From this and other observations it is concluded that ENL is of bad prognostic significance, and that the lower the original BI the less likely is it that ENL will develop. ENL does not depend on the degree of positivity, but on the duration of treatment.—[From abstract in *Trop. Dis. Bull.* **56** (1959) 730.]

Silva, C. and Tuma, M. Reação leprótica e hormônios corticosteroides. (Algumas informações fornecidas pelo laboratório.) [Lepra reaction and corticosteroid hormones. (Some information supplied by the laboratory.)] Bol. Serv. Nac. Lepra (Rio de Janeiro) **18** (1959) 24-32.

The Thorn test was made with 2 lepromatous patients, 1 of them subject to severe lepra reactions. Both reacted as do normals with respect to eosinophile counts and the titers of 17-ketosteroids and corticoids in the urine, indicating that liability to reactions is not attributable to adrenal insufficiency. Reported chemical determinations were made with a reaction-liable patient before, during and after a reaction. There was a slow and progressive decrease of the 17-ketosteroids during the reaction, with only slight changes in the corticoids; neither went below the lower limit of normality.—H. W. W.

Tran-Van-Bang. Traitement de la lèpre par la D-cycloserine. Résultats après un an de traitement. [Treatment of leprosy by D-cycloserine. Results after one year of treatment.] Bull. Soc. méd. Hôp. Paris **74** (1958) 669-676.

This is a report of treatment of 11 cases with cycloserine for 6 months to 1 year. There was significant clinical improvement except in one case. Histologically, there was evolution from the acute stage to the stage of chronic inflammation (perivascular and peripapillary histiolymphocyte infiltrates without Virchow foamy cells). Improvement of the blood sedimentation rate occurred. Immunologically, there was no favorable conversion of the Mitsuda reaction. The drug is well tolerated and was given without interruption even during two lepra reactions. In 3 cases treated for 1 year there were 2 successes and 1 failure.—R. Chaussinand

SCHNEIDER, J., JARDIN, C., JONCHERE, H., RAUD, J., TATE, J., PRIOLET, G. and CHAVANNE, P. Essais de nouvelles suspensions aqueuses de diamino-diphénylsulfone pour injections-retard dans le traitement de la lèpre. Emploi de la carboxyméthylcellulose, succédané stable de la gélose. [Trial of new aqueous suspensions of DDS for depot injections in the treatment of leprosy. Use of carboxymethylcellulose, stable substitute for agar.] Méd. trop. (Marseilles) **19** (1959) 23-35.

The use of DDS in spaced injections is called for under some circumstances. The authors had previously used a chaulmoogra vehicle, but they found that local tolerance was better, and that the sulfonemia lasted longer, when the DDS was suspended in a 0.2% agar solution. However, they met with practical difficulties in preserving this suspension in Africa, as some lots of it flocculated. Consequently, for the present study they substituted a better-defined suspension agent, sodium carboxymethylcellulose, 0.2% in saline. This preparation having been found to have good keeping qualities, it was tested comparatively with the others mentioned in the rabbit and in man in the treatment of leprosy. It was concluded that this vehicle is the best one available for making DDS suspensions designed for long-acting injections.—[From authors' summary, supplied by N. Bourcart.]

TOUZIN, R. and BOCAT, R. Contribution a la chimiothérapie-retard de la lèpre par l'hyrgathione. [Contribution to the depot chemotherapy of leprosy by Hyrgathione.] Bull. Soc. Path. exot. **51** (1958) 23-31.

This report is of treatment of leprosy by spaced injections of Hyrgathione, a suspension of DDS in guiacolated ethyl chaulmoograte with aluminum monostearate. The normal dosage is 5 cc. (1.25 gm. DDS) every 15 days. The authors have sought to increase the interval between injections to the maximum by following regularly the blood sulfone levels. The results show that it is possible to give the injections monthly. The sulfone levels found after 48 hours were well maintained, and the sulfonemia dropped to below 2 mgm./1000 only at the end of the third week. A dose of 2.0 gm. of DDS seems preferable to 2.5 gm., although clinical observations for a longer period are required to permit making a choice of the two dosages.—N. BOURCART

MERKLEN, F. P. and RIOU, M. V. Essai de la nivaquine dans le traitement de la lèpre. [Trial of Nivaquine in the treatment of leprosy.] Bull. Soc. Path. exot. **50** (1957) 888-895.

Observations on 12 patients have shown that Nivaquine gives remarkable relief in severe and stubborn reactional conditions provided it is given in large doses at the beginning and is continued sufficiently long, at least several weeks. The effect is slower but more lasting than is obtained with cortisone therapy, interruption of which it permits. The drug also permits continuation of sulfone therapy. Nivaquine may relieve neuritic affections, causing lessening of the pains and regression of the hypertrophy of the nerves. In addition to the reactional conditions, Nivaquine associated with sulfone may accelerate the regression of the clinical symptoms and even accelerate bacteriologic negativity. Tolerance was perfect, despite the massive and prolonged doses.—N. BOURCART

THANGARAJ, R. H. Camoquin in the treatment of acute lepra reaction. Leprosy Rev. **30** (1959) 106-107.

Of 3 groups of 15 patients each suffering from lepra reaction, 1 group was left untreated as a control, another group was treated with potassium antimony tartrate (0.02-0.05 gm. intravenously on alternate days), and the third group had Camoquin [Amodiaquin], one 0.25 gm. tablet twice a day for 4 days. The best results were with Camoquin, under which the reactions subsided in 4 patients in 2 days, in 4 in 3 days, in 3 in 4 days, and in 2 in 5 days; the last 2 had to be given PAT before the reactions sub-

sided on the 10th day. With PAT the reaction subsided in 5 patients by the 4th day, in 6 by the 8th day, and in 3 by the 12th day, the last patient having to be given cortisone. In the control group 3 subsided by the 4th day, and another 6 by the 8th, while the rest had to be given PAT or cortisone. Thus Camoquin is effective and acts more rapidly on the whole than PAT.—[From abstract in *Trop. Dis. Bull.* **56** (1959) 730-731.]

RAMU, G. A preliminary trial of chloroquine diphosphate in lepra reaction. J. Indian Med. Assoc. **33** (1959) 127-129.

The author observed 8 patients with lepromatous leprosy with lepra reaction. One of them had complicating amebic hepatitis, and chloroquine was given for that. In addition to improvement in the hepatic condition, the reaction also subsided. Chloroquine was therefore given to the 7 other patients with reaction. All of them showed symptomatic relief, with disappearance of fever and the subsidence of inflammatory skin lesions, ENL, arthritis, and orchitis. The author recommends a dose of 250 mgm. thrice daily for one week and later 250 mgm. twice daily for another 2 weeks.—[From Foreign Letters, *J. American Med. Assoc.* **171** (1959) 1861; reference data supplied by N. Mukerjee.]

TARABINI C., G. and HERNANDEZ, V. La triamcinolona en el tratamiento de las leprorreacciones. [Triamcinolone in the treatment of lepra reactions.] Rev. Leprol, Fontilles **4** (1959) 481-487. (English summary).

The female sex is more inclined than the male to water retention induced by the corticoids, prednisone inclusive. Triamcinolone (Trialona) tried on 4 female patients had a marked action against fever and disturbances of the hepatic function; marked water depletion caused by intense perspiration; rapid improvement of the skin manifestations; fall of arterial pressure without serious consequences (also in 2 cases with gastritis when using prednisone); disappearance of slight albuminuria in 1 case.—[From authors' summary.]

COURMES, E. and BENZ, M. Action de la "Rovamycine" dans le traitement des réactions lépreuses. [Rovamycine in the treatment of lepra reaction.] Arch. Inst. Pasteur Guadeloupe (1959) 73-84.

The antibiotic Rovamycine, obtained from *Streptomycés ambofacius*, is said to give patients with lepra reactions a new tolerance for the DDS treatment. The results reported have been confirmed by Montestruc in Martinique and by Floch in French Guiana.—E. MONTESTRUC

JONQUIERES, E. D. L. Diferente toxicidad de las sulfonas en lepromatosos y en tuberculoides. [Differences of toxicity of the sulfones in lepromatous and tuberculoid leprosy.] Leprología **3** (1958) 126-132.

From a comparative study of so-called toxic reactions supposedly due to the sulfones in lepromatous and tuberculoid cases, the author thinks that only a few cases of anemia, exfoliative dermatitis, and psychosis are of that nature. From the incidence of blood, liver and kidney disturbances in the two types (30% vs 13%, 17% vs 2.2%, and 11% vs 0%, respectively), it is assumed that the greatest part of the instances of anemia, hepatitis and kidney damage are ascribable to previous concealed insufficiencies caused by specific infiltration and/or reactions (lepromatous lepra reaction) rather than to direct action of the sulfones on the organs or systems. Thus the sulfones, which are much better tolerated in tuberculoid than in lepromatous cases, are less toxic in therapeutic doses than has been assumed.—[From author's summary, supplied by G. Basombrio.]

SATAKE, Y. Studies on anti-leprotic agents. Chemicopharmacological studies on acetylated derivatives of 4,4′-diamodiphenylsulfone (DDS). Kumamoto Med. J. **12** (1959) 77-90.

It has been found that 4,4′-diacetylaminodiphenyl sulfone (Di-Ac) can be hydrolized to 4-acetylamino-4-aminodiphenyl sulfone (Mo-Ac) or 4,4′-diaminodiphenyl sulfone (DDS); and that, on the other hand, DDS can be changed to Mo-Ac by acetylation in the body. Mo-Ac was found in the body after oral administration of either DDS or Di-Ac. The pharmacologic activities and toxicities of three compounds are compared as follows: DDS>Mo-Ac>Di-Ac.—[From author's summary.]

SATAKE, Y. Studies on therapeutic agents in leprosy; the effect of acetylated DDS. La Lepro **27** (1958) 464-479 (in Japanese; English abstract).

The majority of the therapeutic agents of the DDS series are those with an aromatic ring attached to 4-aminophenyl sulfone, and the amino radical in the 4 position is considered important with respect to therapeutic effect. When the amino on both sides of DDS is replaced by the acetyl radical, there is a great difference therapeutically. The toxicity is reduced, but the effect should also be affected. As 4,4-diacetaminodiphenyl sulfone has been found to be effective against pneumococci and streptococci, it can be assumed that it is converted to an effective form in the body. The mechanism of action was therefore investigated. Deacetylization was demonstrated in extracts of the urine and blood by paper chromatography; DDS and monoacetate were found. Monoacetate was also demonstrated after administration of DDS. The toxicity of the monoacetate and the diacetate were found to be much lower than that of DDS. The 4,4′-diacetaminodiphenyl sulfone was then used clinically in 10 cases of leprosy and found to be effective. It is suggested that this compound would be useful in cases in which ordinary sulfones cannot be tolerated, or are no longer effective.—[From abstract.]

MAKIN, M., ALKALAY, I. and WEINBERG, H. Surgical repair of the orthopedic disabilities caused by leprosy. Israel Med. J. **18** (1959) 113-119.

This article deals with the orthopedic treatment of patients at the Hansen Hospital in Jerusalem, where 44 operations were performed in 1955-1958. The clinical picture of leprosy paralysis follows a definable pattern. In the upper extremities the ulnar nerve from the level of the elbow joint, and the median nerve from below the wrist joint were most frequently involved. In the lower extremity the external popliteal was the main nerve affected, giving rise to drop-foot, and perforating ulcers of the foot occurred frequently. This localization of involvement was most important for reconstructive surgery. The most common operation was tendon transplant to overcome opponens paralysis, using Thomson's modification of Royle's procedure. Twenty-four operations were performed on hands, of which 15 were opponens transplant, 4 amputation of finger, 4 interphalangeal arthrodesis, and 1 flexor-to-extensor tendon transplant. Following this surgery the patients were able to button their clothes, to thread a needle, and to sew. On the lower extremities 20 operations were performed, of which 7 were filleting of metatarsi for perforating ulcer, 3 triple arthrodeses, 2 below-knee amputation, 2 mid-tarsal amputation, and 6 transfer of tendons. The postoperative period in all patients was uneventful, and as soon as immobilization ceased active exercises under the control of physiotherapists were carried out. These operations, in the majority of cases, allow the patients to be independent in their daily lives, and a large proportion of them are earning their living as active wage earners.—F. SAGHER

BRAND, P. W. and SELVAPANDIAN, A. J. Transfer of the tibialis posterior in foot drop deformities. Indian J. Surg. **21** (1959) 157-160.

Transfer of the tibialis posterior tendon to correct drop foot has not been popular because of the difficulty of reeducation. The authors have performed this operation on 116 patients, in all of whom the lateral popliteal nerve was involved, and found that proper muscle coordination will result if the postoperative reeducation is carefully carried out. The transfer was done by either the interosseous or circumtibial route to bring the tendon to the dorsum of the foot. After operation the foot is put in a plaster

cast with a wooden sole-plate and rocker. The patient is allowed to walk after 4 days, the cast is removed after 6 weeks, and weight-bearing exercises are started about 10 days afterward. In 39 cases followed up for 3 to 27 months, the interosseous route had been used in 25, and the circumtibial route in 14. In the former group the results were excellent in 5, good in 12, fair in 7, and poor in 1; the gait was normal in 11, mildly high-stepping in 13, and high-stepping in 1. In the latter group the results were excellent in 5, good in 8, and fair in 1; the gait was normal in 11 and mildly high-stepping in 3.—[From Foreign Letters, *J. American Med. Assoc.* **171** (1959) 87; reference data supplied by N. Mukerjee.]

CURRIER, D. P. Neurotrophic ulcers of the foot. Corrective shoes for leprosy. Phys. Therapy Rev. **39** (1959) 674-677.

In 70 patients with foot ulcers, of the total number of ulcers 85% occurred on the plantar surface, 8% on the lateral aspect proximal to the fifth toe, 4% over the dorsum, and 3% elsewhere. At Carville, metatarsal inlays, metatarsal bars, and properly fitted and styled shoes have been used in the prevention of ulcers, and as corrective treatment for them once they have formed. The metatarsal inlay and metatarsal bar, and the selection and fitting of shoes, are described and illustrated with photographs.—SR. HILARY ROSS

MONTESTRUC, E. La "C-reactive protein" dans l'infection lépreuse. [C-reactive protein in leprosy.] Bull. Soc. Path. exot. **52** (1959) 561-564.

This article is very similar to the one in the present issue of THE JOURNAL, which however deals only with the effects of reaction in lepromatous leprosy, except that at the time this one was written somewhat fewer cases has been tested, and the author was not aware that the test had already been applied in leprosy. On the other hand the table also comprises 6 tuberculoid cases—2 reactional, 1+ positive; and 4 nonreactional, all negative—and 6 indeterminate cases, all negative.—H. W. W.

COURMES, E. and BENZ, M. Diagramme protéique de M. F. Jayle et J. Badin. Electrophorèse du sérum dans la lèpre. [The protein diagram of Jayle and Badin; electrophoresis of the blood serum in leprosy.] Arch. Inst. Pasteur Guadeloupe (1959) 43-72.

From their study of 95 "diagrammes proteiques" of Jayle and Badin and 317 "protéinodiagrams," the authors conclude that the most significant tests in leprosy are electrophoresis of the blood serum, the Kunkel phenol test, the red-cell sedimentation test, and Jayle's (or gross) test.—E. MONTESTRUC

LECHAT, M. Diagnostic des macules lépreuses et plus particulièrement des lésions tuberculoïdes et border-line. [Diagnosis of the leprous macules, particularly of tuberculoid and borderline lesions.] Colloque d'Histopathologie de la Lèpre. FOREAMI Bull. Inform. sur la Lèpre No. 6 (1958) 36-60.

(*Late Reactions with Various "Lepromins"*)

In one part of this article, which otherwise is largely a review, the author asserts that the greatest obstacle to the wider use of the Mitsuda test is the impossibility of obtaining a standardized antigen. Even if one holds strictly to the original Mitsuda-Hayashi method of preparation, different lots of lepromin show notable differenees of activity. Data are given of comparisons he had made [apparently in tuberculoid cases] of a lepromin (C) made in Coquilhatville [type not stated] with a lot obtained from Fontilles in Spain (F), and with four visceral preparations likewise from Fontilles (F), and also a liver preparation (K) supplied by Kooij of South Africa. All of the Fontilles preparations [it has been learned from Tarabini, personal communication] were prepared by the Hayashi-Mitsuda method; the "cutaneous" lepromin was made of bacillus-rich lepromas; of the "visceral" lepromins the one made from the spleen was

even richer in bacilli; while the lung preparation was the poorest but nevertheless contained bacilli which had been shown by test not to be *M. tuberculosis*. The findings are assembled in the following tabulation.

Comparison antigen	No. of cases	Lepromin (C)		Comparative		Agreement
		Result	Cases	Positive	Negative	
Lepromin (F)	184	Positive	48	17	31	35%
		Negative	136	78	58	43%
Spleen (F)	46	Positive	25	3	22	12%
		Negative	21	0	21	100%
Liver (F)	121	Positive	65	40	25	62%
		Negative	56	5	51	91%
Lung (F)	87	Positive	41	16	25	39%
		Negative	46	11	35	76%
Adrenal (F)	74	Positive	33	8	25	24%
		Negative	41	3	38	93%
Liver (K)[a]	161	Positive	73	51	22	70%
		Negative	88	24	64	73%

[a]Two-year interval between the test with the control (Coquilhatville) lepromin and the experimental (comparison) antigen.

Considering only the two regular lepromins (C and F), of the 48 cases (out of 184, or 26%) that were positive to the local product, only 17 (or 35%) were also positive with the Fontilles lot [which alone is difficult to understand if the cases were truly tuberculoid]. The latter lepromin, however, elicited positive reactions in 57% (78 of 136) of the cases that were negative with the locally-made antigen. In contrast are the almost negative results with the spleen antigen, in spite of its high content of bacilli. The author simply points out that errors arise from the use of lepromins from different sources. [The results with the Fontilles lepromin are anomalous. On the one hand it gave relatively few positives among those positive to the local (C) lepromin—this whole picture here not to be understood if the cases were truly tuberculoid—but on the other hand it elicited positive reactions in more than one-half of the C-lepromin negatives. These results are not open to the simple explanation that one lepromin was weaker than another; nor does Tarabini's suggestion that there was an error in the figures seem to be the answer. The matter of reactivity to suspensions of normal tissue elements (i.e., Kooij's liver antigen) is not discussed.]—H. W. W.

TARABINI C, G. Importancia de los estudios comparativos sobre la actividad de las leprominas de distintos países. [Importance of comparative studies of the activity of lepromins from different countries.] Rev. Leprol. Fontilles **4** (1958) 455-459.

The author discusses the results of the comparative tests reported by Lechat (see preceding abstract). From his experience in Fontilles he is less pessimistic than Lechat. The small number of cases available does not permit him to do much comparative testing, but he reports the results in 14 patients so tested with the Fontilles lepromin and one from Venezuela. With respect to the late reaction, the results were essentially similar with the two antigens. Both gave (*a*) positive reactions in the 4 tuberculoid cases (with differences of degree in 2 instances), and (*b*) doubtful results in 1 indeterminate case. The only actual difference with respect to the late reactions was a single doubtful one with the Fontilles antigen. The situation was very different, however, with the early reaction, for the Fontilles lepromin gave many more positive results than the other—10 (and 3±) against only 5. The difference is explained on the ground that the early reaction is more sensitive to quantitative differences in the antigen. It is concluded that it is desirable to employ a purified and standardized "bacterial lepromin" for all comparative studies.—H. W. W.

Olmos Castro, N. and Arcuri, P. B. Investigación de la hipersensibilidad en convivientes con leprolina proteica total. Influencia de la inyección prévia con leprominas integrales o bacilares. [Investigation with total protein leprolin of hypersensitivity in contacts. Influence of previous injection with integral or bacillary lepromin.] Leprología **3** (1958) 103-108.

The Fernandez reaction was provoked with total protein leprolin (LPT) in a group of 122 contacts, leading to the following conclusions. Previous intradermal injection of integral lepromin creates a state of hypersensitivity in a high percentage of cases, making it impossible to distinguish between naturally-acquired and induced hypersensitivity. The periodic investigation of the naturally-acquired hypersensitivity must be performed exclusively with a nonsensitizing protein antigen.—[From authors' summary, supplied by G. Basombrio.]

Olmos Castro, N., Arcuri, P. B., Bonatti, A. A., Conejos, M. A., Usandivaras, R. L., Lebron, E. and Zamudio, E. Estudio comparativo de la duración de hipersensibilidad a la L.P.T. provocada por vacunación con BCG y lepromina integral en personal supuestas sanas de lepra. [Comparative study of the duration of hypersensitivity to LPT induced by BCG vaccination and integral lepromin in supposedly nonleprous persons.] Leprología **3** (1958) 109-113.

This comparative study of hypersensitivity (Fernandez reaction) to total protein leprolin (LPT) in people supposedly free from leprosy was carried out on two groups, one of 19 insane individuals who had twice been inoculated with integral lepromin a year before, and the other 36 women vaccinated with BCG 7 months before. It is concluded that there are appreciable differences in hypersensitivity to LPT. The persistence of hypersensitivity was greater in the individuals who had been inoculated with integral lepromin than in those vaccinated with BCG, the loss of hypersensitivity being greater in the latter than the former group. In the lepromin-injected group the percentage of hypersensitives tended to increase during the elapsed year, whereas in the BCG group there was a tendency for the percentage to diminish during the elapsed 7 months.—[From authors' summary, supplied by G. Basombrio.]

Olmos Castro, N., Arcuri, P. B., Bonatti, A. A., Conejos, M. A., Usandivaras, R. L., Lebron, E. J. and Toranzos, L. B. Estudio comparativo de la reacción de Fernandez realizado con antígenos proteicos totales de lepromas (L.P.T.) y de piel infiltrada de lepra tuberculoide. [Comparative study of the Fernandez reaction to the total protein antigens of lepromas (LPT) and of infiltrated skin of tuberculoid leprosy.] Leprología **3** (1958) 114-116.

Two total protein antigens were used, one made from lepromas and the other from tuberculoid lesions. The tests were made on 66 individuals, 25 of them supposedly healthy, 24 contacts, and 17 leprosy patients (10 tuberculoid and 7 lepromatous). The tuberculoid antigen gave negative results. It is concluded that the antigenic activity of the total protein extracts of lepromas is due to the bacillary protein contained in them, and that the tissue proteins which accompany it have no part in the activity.—[From authors' summary, supplied by G. Basombrio.]

Consigli, C. A. La reacción de Mitsuda como estado de resistencia. [The Mitsuda reaction as a state of resistance.] Leprología **3** (1958) 117-125.

The Mitsuda reaction can probably be attributed to the lipid fraction of the bacillus. The reaction depends on an immunity state of resistance of the organism, due to various causes and not to one only as is sometimes believed. We can continue to support the prognostic value of the Mitsuda reaction as a manifestation of a certain degree of resistance to *M. leprae*, corroborating what was described by Fumio Hayashi in 1933 based on the observations of Mitsuda.—[From author's summary, supplied by G. Basombrio.]

FLOCH, H. and MAILLOUX, M. Relations entre l'apparition rapide de plusieurs cas de lèpre tuberculoïde et la vaccination par le BCG intra-dermique chez des enfants en pays d'endémicité lépreuse. [Relations between the rapid appearance of many cases of tuberculoid leprosy and intradermal BCG vaccination in children in a leprosy-endemic country.] Bull. Soc. Path. exot. **51** (1958) 353-359.

In considering the numbers of new cases of leprosy seen in Cayenne in recent years, the authors observed an evident increase of cases in children of school age after systematic intradermal BCG vaccination: 13 children in 1957 as against 3 in 1956 and 4 in 1955, whereas the total numbers of cases detected in the same years were 31, 30 and 39 respectively. In 6 of them, the observations of which are reported, they found, after a delay of 1-3 months after vaccination, the appearance of tuberculoid lesions aspect in some part of the body. These observations are similar to those made by Bechelli and Quagliato. One is reduced to hypotheses as regards the interpretation of these findings. Nothing similar was observed after BCG vaccination of babies less than 2 months of age.—N. BOURCART

BROWN, J. A. K. and STONE, M. M. The depot lepromin test and BCG vaccination. Leprosy Rev. **30** (1959) 110-111.

The object of the depot lepromin test is to provide an indicator of weak reactors to normal lepromin. The depot medium used consisted of 1 part anhydrous lanolin and 8 parts light liquid paraffin. Autoclaved lepromatous tissue 0.25 gm. was ground into 4 cc. of this medium and 1 cc. saline to make a 1:20 suspension. Also, a 1:100 dilution was made by adding medium and saline in the same proportions. This antigen is applied to the skin by the multipuncture method. The test was applied to 14 young, healthy contact children, both concentrations being used. All but 1 child were negative to both concentrations, the exceptional one being positive to both. Five weeks later 12 of the children were tested with tuberculin, and all were negative. Ten were vaccinated with BCG and retested with the 1:20 depot lepromin, when all reacted positively. The signs of conversion appeared first within 4 weeks, and about 2 weeks later conversion in the original lepromin sites appeared, the antigen having remained in the skin long enough to act as an indicator.—[From abstract in *Trop. Dis. Bull.* **56** (1959) 729.]

LI, F-T and LI, C-K. Lepromin made from visceral organs of cadaver of lepromatous leprosy victim. Chinese J. Dermat. **7** (1959) 6-8 (in Chinese; English abstract)

Autopsy of the body of a patient with lepromatous leprosy of long duration, who had received little treatment because of intolerances, revealed numerous acid-fast bacilli in the liver and especially the spleen, as well as the skin lesions. Lepromin suspensions were made of these 3 tissues, by the method recommended by Wade. Every 30 gm. of liver tissue yielded 400 cc. of lepromin, and every 23.5 gm. of spleen yielded 800 cc., thus large quantities were obtained. The efficacy of the visceral lepromins was tested in 10 lepromatous and 15 tuberculoid cases. The results were negative in the lepromatous cases, except for one late reaction. The late reactions in the tuberculoid cases were all positive, except for 1 negative with the liver antigen, although in 4 cases the early reactions were all negative or doubtful. It is concluded that these visceral organs, when they contain large numbers of bacilli (and provided the patient has received little anti-leprosy treatment) are satisfactory for making lepromin, the advantage being that large quantities can be made.—[From abstract in *Chinese Med. J.* **78** (1959) 396.]

YANAGISAWA, K. and ASAMI, N. Studies on the lepromin reaction. IX. Lot tests of lepromin potency in leprosy bacilli and tubercle bacilli sensitized animals. La Lepro **27** (1958) 482-484 (in Japanese; English abstract).

The potency of 8 lots of lepromin prepared at different times was tested in animals sensitized to the leprosy and the tubercle bacilli. The potency of the lots showed a

similar trend in both groups of animals at 24 hours, and aside from a single lot also at 48 hours. In view of the weak allergic response in animals sensitized with the leprosy bacillus, and the difficulty of obtaining supplies of leprosy bacilli, it is suggested that animals sensitized with the tubercle bacillus can be used for testing potency of lepromin. —[From abstract.] [It is to be noted that this potency test refers only to the early reaction.—EDITOR.]

OKAMURA, K. Studies on lepromin reaction. I. Lepromin reaction and tuberculin reaction in normal guinea pigs inoculated with the ascitic cells of the guinea pig sensitized with tubercle bacilli. La Lepro **27** (1958) 488-492 (in Japanese; English abstract).

When sensitized to the tubercle bacillus or inoculated with BCG, early lepromin reactions similar to the tuberculin reaction occur in the normal human, guinea-pigs and rabbits. According to Chase, normal guinea-pigs attain tuberculin allergy by passive cell transfer from the guinea-pig sensitized with the tubercle bacillus. While confirming this report the author also tested for the lepromin reaction. The results suggest that the ascitic cells of the tuberculin-sensitive guinea-pig contain a heat-labile reaction factor in common to both the tuberculin and lepromin reactions.—[From abstract.]

OSHIMA, S., TAKAHASHI, T., MORIYA, M., NOJIMA, T., YANAGISAWA, K., ASAMI N., NISHIMURA, S. and YASUKAWA, T. Immunological studies on murine leprosy. III. The effect of crude wax-liquid paraffin emulsion of human tubercle bacilli on murine leprosy infection. La Lepro **27** (1958) 441-445 (in Japanese; English abstract).

An antigen was prepared by adding liquid paraffin to crude wax extracted from human tubercle bacilli. Rats were injected intraperitoneally with this antigen and then challenged after 10 and 20 weeks with the murine leprosy bacillus. (1) Regarding leproma development, after challenge with 1:500 murine bacillus suspension at 10 weeks there was almost no difference from the control. With a 1:5000 suspension there was slight inhibition at 10 weeks, but a considerable inhibition at 20 weeks. (2) In the injected animals the weights of the lepromas were less, and there was some suppression of bacillary distribution to the inguinal and axillary lymph nodes. The results suggest that the crude wax of the human tubercle bacillus has some, though slight, onset-suppressing action towards murine leprosy.—[From abstract.]

HOYT, A., THOMPSON, M. A., MOORE, F. J., and SMITH, C. R. Some fractions of tubercle bacillus wax and their immunogenicity for mice. American Rev. Resp. Dis. **80** (1959) 216-222.

Anderson's tubercle bacillus wax has immunizing powers against tuberculosis in mice. Believing that effect to be due to the many highly extracted bacilli and bacillary fragments contained in that wax, the authors have separated it into 5 fractions by differential centrifugation. Four of the fractions still proved to have significant immunizing properties. Filtering 2 of those fractions through Millipore filters did not lower their immunizing powers. It seems probable that the effective fractions contain immunizing components not due to contamination with the mycobacteria.—H. W. W.

SINDO, T., NAKANISHI, S., YAMAGUCHI, I., HOSADA, Y., ITOI, M., HIYAMA, A., HAGA, K., UTAHASHI, T., NARITA, M. and OKADA, S. Investigation on humoral antibodies against tuberculin fraction in leprosy. La Lepro **28** (1959) 6-12 (in Japanese; English abstract).

Serum samples of 200 leprosy patients without tuberculosis were tested by (1) the Middlebrook-Dubos passive hemagglutination test and (2) the hemolytic test after Sindo-Middlebrook's formula, using the tuberculin fraction Fr. II as the antigen. In the first of these tests the total positive rate was 80%, and the mean value of end titers was

1:33.2. The figures by type were: lepromatous, 85% and 1:39.7; tuberculoid, 68% and 1:17.6. In the second test the total positive rate was 81%, the mean of end titers 1:85.8. By type: lepromatous, 83% and 1:93.0; tuberculoid, 76% and 1:65.5. Thus in both tests the lepromatous cases gaves higher figures than the tuberculoid cases. The averaged pattern of the two-dimensional hemolytic test was less steep than in tuberculosis. There was no correlation between results of the tuberculin skin test and the hemolytic test. These results are quite different from those in healthy adults in Japan. In them the positive rate of the hemolytic test is lower in tuberculin-negative persons than in tuberculin positives, while the mean value of the hemolytic titer of the former is higher than that of the latter.—[From abstract.]

SCHMIDT, H. Reactivity of a lecithin-free cardiolipin preparation (cardchol) in leprosy sera. Bull. Wld. Hlth. Org. **20** (1959) 1175-1191.

Previous results with leprosy sera which showed that they were highly reactive with cardchol but nonreactive or only weakly reactive with CWRM (an "ordinary" cardiolipin antigen) have been fully confirmed by further tests on 161 sera of leprosy patients obtained from Egypt. Cardchol gave 65% positives with those from lepromatous cases, and 38% with those from nonlepromatous cases. [This comparative study of the two antigens has nothing to do with a search for one with which leprosy sera would not give false positives.]—H. W. W.

KRAG, P. and BENTZON, M. W. Third international reference preparation of cardiolipin; with special reference to its use in improved serological tests for treponematoses. Bull. Wld. Hlth. Org. **20** (1959) 1193-1200.

This report will be of interest to workers who use cardiolipin in antigens for the testing of sera from leprosy patients. An international reference preparation of egg lecithin will be the subject of a future publication.—H. W. W.

PALMER, C. E. [Protection against tuberculosis infection associated with low grade, nonspecific tuberculin sensitivity.] Bull. Internat. Union Tuberc. **27** (1957) 106-111.

In this contribution (without title) to a panel-symposium held in New Delhi in January 1957 on the value of the tuberculin test in selecting persons for BCG vaccination, the author points out that data obtained in England among outgoing schoolchildren, and in the United States among student nurses [THE JOURNAL **24** (1956) 500 and 501], suggests that whatever it may be that is responsible for the low-grade, nonspecific reactivity to tuberculin also gives some degree of protection from tuberculosis infection. In both studies it was found: (1) That the reactors to small test doses (3 or 5 TU)—who in no case would be given BCG—(*a*) those showing the largest reactions were the most liable of all to develop the disease, while (*b*) the smaller-reaction positives had low infection rates, one-third or less. (2) That of the individuals who ordinarily would be subject to BCG vaccination, (*a*) those positive to large test doses (100 or 250 TU) had little if any more liability to infection than the 1(b) group, whereas (*b*) large-dose negatives not vaccinated with BCG had materially higher infection rates. The hypothesis that this "natural vaccination" is in some degree protective is in line with the facts that BCG vaccination is most effective in northern regions, such as Scandinavia, where nonspecific sensitivity to tuberculin is relatively infrequent, while it is of less value in countries such as India where the "natural vaccination" is common. [Four of the other panel members—not all, apparently, really familiar with the subject—discussed this presentation. One member, J. Frimodt-Møller, who was working in India, contributed what amounts to a complementary paper on this subject.]—H. W. W.

EDWARDS, L. B. and KROHN, E. F. Skin sensitivity to antigens made from various acid-fast bacteria. American J. Hyg. **66** (1957) 253-273.

Tests were made in India and the Philippines comparing reactions to 5 TU of human

PPD with, in each instance, an equivalent dose of one of several other antigens of similar nature (made from *M. balnei*, from two chromogenic saprophytes isolated in India, and from an acid-fast Nocardia). Nearly all of the subjects reacted to the tuberculin, the reactions mostly in the small range (3-8 mm) regarded as frequently nonspecific. Nonspecificity of these reactions was confirmed by similar reactions to the other antigens. On the contrary, when the reactions to tuberculin were strong those to other antigens were weaker, indicating specificity of the response to tuberculin. The low-grade tuberculin sensitivity seems to reflect a response to an antigenic factor common to various types of acid-fast organisms. *M. balnei* seemed to be antigenically more closely related to the tubercle bacillus than the others used.—H. W. W.

EDWARDS, L. B. and PALMER, C. E. Epidemiologic studies of tuberculin sensitivity. I. Preliminary results with purified protein derivatives prepared from atypical acid-fast organisms. American J. Hyg. **68** (1958) 213-231.

In continuation of their studies of nonspecific reactions to tuberculin (T), the authors have made comparative tests with "B" and "Y" products (PPD type) of two kinds of "atypical" acid-fasts, "Battey" (from Georgia) and "yellow" (from Kansas City). At the Battey Tuberculosis Hospital, (*a*) the 145 tuberculosis patients almost all reacted more or less strongly to tuberculin, but much less when at all to the B antigen, whereas (*b*) most of the 28 Battey-infected patients reacted most strongly to B. Generally speaking, the reactions to the homologous antigen in each case are regarded as specific, and those to the heterologous antigen as nonspecific. The results were different in a hospital in Illinois, where tuberculin and the Y antigen were compared in 103 cases of tuberculosis and 31 infected with the yellow organism; there the differences were small, if in general or similar trend. Thus, some atypical acid-fasts may be very similar, antigenically, to typical tubercle bacilli, while others may be quite different. A total of 12,037 healthy young men (navy recruits) were tested with tuberculin and with either the Y or the B antigen (2,546 and 9,491, resp.) In total, 7.3% were tuberculin positive, although a considerable proportion of the smaller reactions were regarded as nonspecific. The B antigen gave 38.7% positives against only 11.5% positives with the Y antigen. This suggests that infection with the Battey organism, or a closely related one, is very prevalent in the general population, least (29%) in the Northeastern region of the country, somewhat more (39%) in the Mideast, and by far the most (68%) in the Southeast—in which region nonspecific reactivity to tuberculin is most prevalent. There were only slight regional differences with respect to tuberculin positivity, and those were ascribed to different frequencies of nonspecific reaction. [The word "positive" is not used by the authors; it is applied here, for convenience, to reactions measuring 6 mm. or more.]—H. W. W.

ARONSON, J. D. and KRAUS, W. The correlation of the reaction to protein from certain mycobacteria (paratubercle bacilli) with the reaction to tuberculin (OT). American Rev. Tuberc. & Pulmon. Dis. **79** (1959) 731-737.

In the introduction the authors review several previous reports of cross (nonspecific) reactions. The antigens used were, besides OT tuberculin, PPD products of 8 paratubercle ("atypical") cultures isolated from human lesions, including *M. balnei*. The test subjects were 1,210 patients in tuberculosis sanitaria and 1,745 inmates of a state industrial school, both lots divided into groups so that each individual received only 2 tests, OT and one of the other antigens. Most of the other antigens gave high positive rates—usually above 90% in the tuberculous subjects (the intensity usually correlated with that of the reaction to OT), and roughly of the order of 50% in the industrial school population. On the other hand, the antigens of 2 of the cultures gave few or no reactions. The authors consequently stress the fact that there is marked variability in antigenicity of the protein fractions of such organisms. Thermostability is also variable, but [this being of interest because lepromin is heated, often autoclaved] the tables show that the

products of heated cultures gave higher positive rates than those of unheated cultures in more instances than not. In one instance the heated lot gave 57% reactions while the unheated one gave none in the tuberculous group, and 43% as against 8% in the industrial school group.—H. W. W.

[Medical Research Council] B. C. G. and vole bacillus vaccines in the prevention of tuberculosis in adolescents. Second report to the Medical Research Council by their Tuberculosis Vaccines Clinical Trials Committee. British Med. J. **2** (1959) 379-396.

This is the second report [see The Journal **24** (1956) 501] of this extensive investigation involving more than 56,000 nontuberculous, noncontact children, mostly under 15 years of age at the beginning. The original report gave data for the first 2½ years; the present one gives complete data to 5 years, and incomplete data to 7½ years. In the original tuberculin testing only those nonreactive to 100 TU or OT were considered negative; none of the positives were vaccinated. The annual incidence of tuberculosis has been consistently several times as high among the unvaccinated negatives as among the vaccinated ones, the vole-vaccine group having a slight and possibly chance advantage over the BCG group. In this report the reactors to 3 TU of tuberculin are divided into two groups: stronger reactors, more than 15 mm.; and weaker reactors, less than 15 mm. The stronger reactors had in the first period almost 5 times as high an annual tuberculosis rate (3.50) as the weaker reactors, or as those reactive only to 100 TU (the last two being closely alike). That rate for the stronger reactors was halved in the second period (1.67), and halved again so far in the third period (0.88)—in each instance still twice as high as for the weaker-reacting group. The latter shows that best recent figures for the three unvaccinated groups, but nevertheless the 100 TU group has shown only about 50% as much liability to development of the disease as the unvaccinated negatives. In other words the lowest-grade reactions, whether or not they may have been of specific nature, are accompanied by some degree of protection.—H. W. W.

Binford, C. H. Histiocytic granulomatous mycobacterial lesions produced in the golden hamster (*Cricetus auratus*) inoculated with human leprosy; negative results in experiments using other animals. Lab. Invest. **8** (1959) 901-924.

In 1956 the author began a comprehensive project in animal inoculation with human leprosy, the skin specimens used for inoculation material being obtained from the Philippines, the National Leprosarium at Carville, and Washington, D. C. The following is mainly a condensation of the author's summary. In 35 experiments approximately 1,500 animals of several kinds were employed. Total body irradiation and/or cortisone were used with some groups, with the idea of reducing resistance. The inoculations were made into the cooler parts of the animal. Thirteen completed experiments gave completely negative results. In two experiments with the golden hamster certain animals developed, approximately 18 months after inoculation, histiocytic granulomatous lesions in the testes and ears which resembled human lepromatous leprosy in their histiologic pattern, the numbers of intracellular acid-fast bacilli, and the presence of bacilli within nerves. A heavy growth was produced in the ear of hamsters inoculated with skin specimens from the Philippines which had been frozen with solid carbon dioxide for shipment and stored for nearly 10 months before use. There was no evidence that total body irradiation influenced infection in the hamsters; the animals treated with cortisone died too early to permit an evaluation of the results. Preliminary studies after five months indicate successful transfer of the infection to other hamsters. Further studies are required before conclusions can be drawn. The article contains 27 photomicrographs, study of which is essential for an appreciation of the results reported. [See the author's earlier report to the Tokyo Congress in The Journal **26** (1958) 318-324.]—Sr. Hilary Ross

LAGOA, F. P. R. Ensaio sôbre o crescimento do *Mycobacterium leprae* em culturas de células renais de macacos rhesus. [Attempt to cultivate *M. leprae* in cultures of renal cells of rhesus monkeys.] O Hospital (Rio de Janeiro) **56** (1959) 141-144.

The author first washed biopsy material from lepromatous lesions in a balanced saline solution, digested it with trypsin, shook it vigorously, and centrifuged it. Smears of the sediment showed numerous acid-fast bacilli free from tissue residues. Resuspended in the saline solution and again concentrated, the sediment was inoculated into rhesus kidney-cell cultures containing penicillin; also onto various culture media, on which no growths occurred. Smears from the cell cultures after 15 days showed complete absence of the bacillary forms inoculated, and the appearance of a cloud of fine, diffusely distributed, acid-fast particles. Examinations repeated on the 25th, 30th, and 35th days showed a striking progressive transformation of the granules and cells. On the 25th day several large fuchsinophilic granules were observed in some areas of the cloud of fine particles, as well as a few renal cells which were less intensely stained and presented a central vacuole with a small fuchsinophilic granule. On the 30th day smears showed the presence of some young acid-fast bacillary forms outside of the cells, and a larger number of the paler cells with intravacuolar fuchsinophilic granules. On the 35th day there was a greater number of the less-intensely stained cells with still larger fuchsinophilic granules, some of them with an elongated, quasi-bacillary form, and at the same time there were outside of the cells, numerous typical *M. leprae*. The material of these cultures when reinoculated into other renal-cell cultures reproduced the same progressive cycle. The bacillary forms were never seen in the interior of cells, but the infectious material was always seen in the granular form. The author concluded that, in the life cycle of *M. leprae*, the intracellular granules are the young infectious elements, and that the extracellular bacilli are the final or adult form of the organism.—[From Foreign Letters, *J. American Med. Assoc.* **172** (1960) 129-130.]

HAYASHI, K. Studies on the inoculation of animals with human and murine leprosy bacilli (I). Changes in the number of leprosy bacilli inoculated into various organs of mice. La Lepro **28** (1959) 17-23 (in Japanese; English abstract).

Inbred ddN mice were divided into 5 groups and infected with murine bacilli by (1) pernasal instillation, (2) intratesticular inoculation, (3) intracerebral inoculation, (4) intravenous inoculation, and (5) direct inoculation into the spleen after laparotomy. Periodically, 2-3 mice of each group were sacrificed and examined by smears and bacillus counts of the organs. The Group 1 mice developed no lesion detectable by smear over a period of 7 months, after which they suddenly became positive and the bacilli showed logarithmic proliferation. The Group 2 mice showed logarithmic proliferation with a generation time of 7-10 days. The Group 3 mice also showed good growth, but the proliferation of the bacilli in the brain was not lethal to the animal. In the Groups 4 and 5 mice there was no significant difference in the growth curves of the bacilli in the spleen (indirect *vs* direct inoculation).—[From abstract.]

HAYASHI, K. Studies on the inoculation of animals with human and murine leprosy bacilli (II). Fate of the leprosy bacilli and several kinds of acid-fast bacilli inoculated into the testicles of mice. La Lepro **28** (1959) 24-29 (in Japanese; English abstract).

Living and heat-killed human and murine leprosy bacilli, tubercle bacilli, and certain kinds of nonpathogenic acid-fast bacilli (smegma and M-III) were inoculated into the testicles of mice. The mice were sacrificed periodically and bacillus counts were made. 1. Heat-killed human leprosy bacilli became reduced in numbers, but living bacilli remained for over 300 days without appreciable reduction. 2. Heat-killed murine leprosy bacilli, like the living human bacilli, remained without decrease for nearly 100 days.

3. Both living BCG and heat-killed tubercle bacilli H37Rv reduced gradually in numbers. The living BCG, however, could be recovered in culture as long as 90 days after inoculation. The nonpathogenic acid-fast bacilli, whether living or heat-killed, showed a rapid reduction in numbers. Nevertheless, in both cases the living bacilli could be recovered in culture as long as 70 days.—[From abstract.]

OOTAKA, K., SATOO, S., SATOO, J. and MIURA, N. Une nouvelle coloration différentielle entre les bacilles de la tuberculose et les bacilles de la lèpre. [A new differential stain for the tubercle and leprosy bacilli.] Hirosaki Med. J. **10** (1959) 237 (in Japanese; French abstract, suppl. 67-70).

Technique: Cover heat-fixed smears with a 30% dilution of Ziehl carbol-fuchsin and heat gently 1-2 minutes. After washing treat 1-5 minutes with 5% antiformin. Counterstain 30-60 seconds with methylene blue (¼ strength Loeffler's or 2% aqueous). Whereas the Sudan black method of Chaussinand and Viette is not wholly reliable, because some tubercle bacilli are not stained, they are always stained blue or rose by this method while the Hansen and Stefansky bacilli are unstained.—H. W. W.

HIRANO, N. and SUSHIDA, K. Chemotherapy of murine leprosy. 4. Isonicotinoyl-3-4-diethoxybenzal hydrazone. La Lepro **27** (1958) 485-487 (in Japanese; English abstract).

(1) The substance in question markedly suppresses the onset of murine leprosy. When treatment is continued for 3 months (3 mgm. daily by mouth), it becomes difficult to find acid-fast bacilli at the site of inoculation. (2) In mice infected 9 months previously and showing definite lesions, administration of 5 mgm. daily for 2-3 months results in macroscopic cure of the leproma or ulcer at the site of inoculation, although acid-fast bacilli are still present. When treated with INH (3 mgm. daily), acid-fast bacilli were found not only at the site of inoculation but also in the liver and spleen.—[From abstract.]

YASUKAWA, T. The effect of cycloserine in murine leprosy. La Lepro **27** (1958) 493-495 (in Japanese; English abstract).

Cycloserine was administered in a dose of 1.0 mgm. daily, 6 days a week for 120 days, to mice inoculated with a small quanitiy or a large quantity of murine leprosy bacilli. No effect was noted, no difference between the treated and the untreated control groups. The results differ from those of Chang, but this may be attributed to the difference in experimental methods. A universal standard screening method should be set up.—[From abstract.]

SUSHIDA, K. Serum protein fractions of mice infected with murine leprosy. La Lepro **27** (1958) 449-456 (in Japanese; English abstract).

Mice were inoculated with murine leprosy bacilli (Hawaiian strain) and the protein, lipoprotein and polysaccharide fractions of the serum studied by paper electrophoresis. (1) Serum protein fractions: From about the 16th week after infection, β-globulin increased and albumin decreased, more marked when there was ulcer formation than in the nodule group. In animals without macroscopic lepromas, i.e., the "spontaneous cure" group, the values were close to normal. From about 10 months after infection an increase in α-globulin was found, marked in the ulcer group at 12.5 months. (2) Serum lipoprotein fraction: A marked increase in α-lipoprotein was found in both leproma and ulcer groups, present 10 months after infection. (3) Serum protein-bound polysaccharide fraction: There was a marked increase in α-polysaccharide after 7 months in the ulcer group, but no marked increase in the leproma group.—[From abstract.]