

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.

[CONGO BELGE] Rapport Annuel de la Direction Générale des Services Médicaux, 1953 (unsigned). Mimeographed, 112 pp.

In 1952 the FOPERDA (Fondation Père Damien pour la lutte Contre la Lèpre) and FOREAMI (Fonds Reine Elizabeth pour l'Assistance Médicale au Indigènes) entered into an agreement whereby the latter would develop a special section for the campaign against leprosy and for aid to persons with the disease. The estimated total number of cases has increased from 90,000 in 1949 to 210,000. Confidence in modern treatment has resulted in an apparent increase of new cases and has brought many old ones out from hiding. The endemic is most severe in the *cuvette centrale* (équatoriale), where in some parts the prevalence ranges from 5% to 20%. The seriousness of the situation has led to undertaking an intensive campaign. The program envisions the segregation of some 40,000 patients, 18% of the total (i.e., 8% B+ cases and 10% bed-ridden invalids); the other 82% are to be given ambulatory treatment at different centers. The program includes the organization of a "Communauté de Isolement" at each of several of the leprosaria [see THE JOURNAL 22 (1954) 354]. Some 21,000 of the patients to be segregated will be in 19 relatively large leprosaria, 2 to 5 in each of the 6 provinces, while the other 19,000 will continue to be cared for in the smaller leprosaria or the regional centers. The statistics for 1953 show a considerable increase in cases, with 34,774 in the 180 existing leprosaria, of which 11,418 were newly admitted. The total number of cases enregistered by all the services concerned with them is now 188,420. There are 4 Europeans with leprosy, all in Katanga province.

—H. W. W.

HIND KUSHT NIVARAN SANGH. Annual Report of the Hind Kusht Nivaran Sangh (Indian Leprosy Association) for the Year 1952. *Lep. India* 25 (1953) 215-226.

The report contains a message from Dr. Rajendra Prasad, president of the Association, appealing to medical and lay workers to come forward in large numbers for service in the field of leprosy; the speech of the Honorable Rajkumari Amrit Kaur, chairman; and the description of the research activities carried on during the year under the Association, at the School of Tropical Medicine, Calcutta. These activities included therapy studies with thiosemicarbazone, which was found to be well tolerated in doses of 200 mgm. orally per day, and to produce satisfactory clinical and bacteriological improvement in cases of all types. Moreover, the drug appeared to possess some special features, viz., restoration of sensation in anesthetic parts, and growth of hair in affected parts. A study of treatment with ACTH and cortisone showed the main indications to be acute febrile reactions with pain, nodulation, iritis, etc., and apart from general reaction acute or subacute eye complications, for which local application or conjunctival injection of the hormone is indicated. Studies with BCG vaccination confirmed reports that it changes negative into a positive lepromin reaction, but this change was in a much lower proportion of vaccinated persons than elsewhere. A method developed for the concentration of leprosy bacilli from "closed" cases consisted essentially of excising a piece of the skin lesion, cutting it into small bits and mincing them, and grinding the resulting mass in a little chloroform; smears are then made from the supernatant chloroform. A study of healthy contacts revealed scanty acid-fast bacilli by the method

of Figueredo and Desai in 12 of 180 of them (6.5%). A correlation of the bacillus findings with the results of the lepromin test showed that the bacilli were found in 4 of 67 lepromin-positive contacts and in 8 of the 98 lepromin-negative contacts.

—DHARMENDRA

DAVISON, A. R. Leprosy in South Africa. *South African Med. J.* **27** (1953) 659-661.

The author discusses the policy of segregation as applied in South Africa. By comparing the incidence in that country with neighboring territories he concludes that, without segregation, leprosy would have constituted as formidable a problem as tuberculosis does today. In addition to receiving free medical and nursing care, patients are accommodated, fed and clothed at the expense of the state. Visitors to patients receive free transport, board and lodging. Maintenance grants are given to dependents. The patients are paid for the work they do and are granted agricultural plots. Sports, schools and churches are provided. The European patients have declined from 198 to 56, eight of whom remain at their own request. The Cape Colored patients have declined from 345 to 65, and the Transkeian Bantus from 1,250 to 648. In the Transvaal the number of cases is stationary, but the duration of the disease prior to admission has dropped from 10 years to 2 years. It is stated that, "the policy of compulsory segregation, when it is humanely applied as it is in the Union of South Africa, is a successful public health measure and an inestimable boon to the patients."

—AUTHOR'S ABSTRACT

MARKIANOS, G. [Foci of leprosy in Greece.] *Arch. Hyg. Athens* **3** (1953) 37-40 (in Greek; English summary p. 108).

The English summary appended to the paper is as follows: "The writer, on the basis of his observations as director of the Leprosy Station of Athens on 1,314 cases, determines the areas in Greece which constitutes the main foci of the disease. Among those areas the Attica region and the Aegean islands show the greater number of cases."—[From *Trop. Dis. Bull.* **51** (1954) 272.]

DE MONTAIGNE, E. L. Leprosy in Jamaica. *West Indian Med. J.* **2** (1953) 125-133.

In describing the early signs of leprosy in Jamaica the author writes: "Ocular involvement often may be the first indication of leprosy. Acute ocular invasion may precede dermatological manifestations in many cases... Lesions of the fundus can be seen as distinct 'pearls,' which may appear and disappear... These pearl-like lesions of the fundus and the vascular changes in the capillary network of the limbus are both early signs of leprosy..." [See reports by Elliott, *THE JOURNAL* **16** (1948) 347-350; **17** (1949) 229-235.] Regarding the introduction of sulfone treatment in the leprosy hospital, in the 7 previous years only 71 patients had been discharged, and only 5 of them had had lepromatous leprosy. In 1948 most of the tuberculoid cases were discharged, to receive domiciliary treatment, and of the 28 patients discharged that year only 1 had been lepromatous. In the 4 years since sulfone therapy has been well established, 109 patients have been discharged—some four times the usual rate—and of these 64 were originally lepromatous.—[From abstract in *Trop. Dis. Bull.* **51** (1954) 273.]

ROGERS, J. and ADAMSON, D. G. Leprosy: report on four cases. *British Med. J.* **2** (1953) 259-260.

The interest of this note consists in the fact that as many as 4 cases of leprosy should have been found in one clinic in Britain during some 2 or 3 years. The first patient was a Goanese with a single tuberculoid lesion; the second had been in India (as well as Cyprus and Syria) during the second world war, and had the lepromatous type which went undiagnosed for nearly two years; the third, who had seen 30 years' service in India, was of the polyneuritic group without bacilli; the fourth was an Indian with the lepromatous type. Thus all four patients probably acquired the disease in India.—[From abstract in *Trop. Dis. Bull.* **50** (1953) 1050.]

KLUTH, F. C. The epidemiology of Hansen's disease. *Nursing Outlook* 2 (1954) 77-80.

This article, written for nurses, discusses the following topics: history, distribution, source of infection, mode of transmission, environmental factors influencing transmission, and factors influencing susceptibility and control. There is a table showing world distribution of cases of leprosy, supplied by the American Geographical Society.

—SR. HILARY ROSS

CORDERO SOROA, A. La lucha contra la lepra. [The campaign against leprosy.] *Actas Dermo-Sif.* 44 (1952-53) 109-126.

The author, the chief of the leprosy control section in the General Health Administration, reports the results obtained in 1951 from the triple point of view: preventive or sanitary, assistential or medical, and social protection, for the patients and their families as well. This is a report of the year's work and contains many graphs and tables. Comments are made on the outstanding progress achieved.

—F. CONTRERAS

GOUGEROT, H. Mesures de prophylaxie antilépreuse. [Leprosy control measures.] *Arch. Inst. Pasteur Guyane et Terr. Inini*, Publ. No. 311, 1953 (Dec.).

The author cites 31 measures which in his opinion are important for leprosy control, from compulsory declaration to measures of international control. He points out that even if all health specialists are in agreement on the necessity for and principles of isolation, there are differences in the means of application. It is the same in the control of other diseases, as tuberculosis, syphilis, etc., there being two contradictory systems, coercion and voluntary treatment. However, these two systems are not as incompatible as they are believed to be. It has been demonstrated in the control of prostitution and syphilis that they can be reconciled by dividing the "subjects" into those who do not submit to rules, and hence have to be subject to coercive measures, and those who are docile and benefit from abolitionism, or paroling, but with the possibility of being subjected to coercive regulation in case of disobedience. The measures envisioned are reconcilable, and the ideal thing would be to employ all of them simultaneously by making them adaptable to the various kinds of patients and the mentality of the people.

—H. FLOCH

BLANC, M. and PROST, M. T. Nos conceptions et nos réalisations en ce qui concerne la prophylaxie antilépreuse. [Our conceptions and our results as regards leprosy prophylaxis.] *J. Sci. Méd. Lille* 71 (1953) 139-142.

The region described is believed to contain 4,000 people with leprosy in a population of 600,000 (6.6%). The authors hold that segregation, in spite of its antiquity, has nothing venerable about it. It would be impossible psychologically to disorganize the life of so many people. It would also be impossible economically, as it would mean a town of 50,000 to hold all the people with leprosy in the French Cameroons. The system planned by the authors comprises a center with a dispensary sufficient to treat 1,500 patients, a pavilion for case-taking and 4 wards to hold 150 patients. The dispensary would have a large dressing hall, a pharmacy, 3 injection rooms, consulting rooms, a laboratory and an operation room. A second block would contain a research pavilion, a church, a school and a building for professional re-education. Four subcenters for treatment are visited as frequently as possible. Full particulars of local conditions, and of other patients in the villages, are gathered from those attending for treatment, thus making it easier to find new cases when the villages are visited. It is hoped that a certain number of the children who would otherwise be exposed to infection can be taken care of, and it is also proposed to conduct a campaign of prophylactic vaccination with BCG and "Chauviré vaccines." [From abstract in *Trop. Dis. Bull.* 50 (1953) 1057. For more information about the Cameroons generally, see Madrid Congress abstract, *THE JOURNAL* 21 (1953) 604.]

GINES, A. R. B.C.G. en la profilaxis de la tuberculosis y de la lepra. [BCG in the prevention of tuberculosis and leprosy.] Arch. uruguayos Med., Cir. y Espec. **43** (1953) 21-26.

In this study, carried out in Paraguay in 1941-1944, the author performed 10,000 BCG vaccinations using the multipuncture method of Rosenthal. [He did not use the oral route.] The report is divided into two parts, dealing with the results of the Mantoux and Mitsuda tests. He obtained manifest tuberculin allergy as follows: 3+, none; 2+, 15%; 1+, 59%; weak, 32%. Distinct resistance to tuberculosis was observed in 2,388 vaccinated persons who were followed up, in comparison with the unvaccinated controls. In healthy lepromin-negative persons who had to be vaccinated with BCG for various reasons he obtained 80% positive Mitsuda reactions. He does not believe that tuberculosis infection can, by itself, induce lepromin positivity, but BCG can. He agrees with the opinion of Rotberg expressed in this equation: Lepromin + Factor x of resistance = Mitsuda positivity, and this factor can be excited by BCG. He does not believe that there is cross sensitization between tuberculosis and leprosy, or vice versa. The author ends with this expressive fourth conclusion: "The tuberculin and lepromin allergy which BCG vaccination is capable of exciting has made it necessary, as we postulated in 1945, to use that vaccine in the prevention of both tuberculosis and leprosy, without implying acceptance of an antigenic similarity, much less a microbial or pathological one, between tuberculosis, leprosy and BCG. BCG possesses antigenic properties which are favorably useful in the prevention of tuberculosis and leprosy, but we cannot conclude from this fact that the Koch bacillus has them for leprosy, or the Hansen has them for tuberculosis.

—G. BASOMBRI

FLOCH, H. and RIVIEREZ, M. Discussion sur la rôle possible de l'hérédité dans la transmission de la lèpre. [Discussion of the possible role of heredity in the transmission of leprosy.] Bull. Soc. Path. exot. **46** (1953) 922-925.

The authors report the case of a newborn baby of a leprous mother (advanced tuberculoid form) who exhibited, 8 days after birth, an erythemaous macule that clinically was very suspicious. No bacteriological or histological examination could be made. This observation was the occasion for a rapid historical study of the question of the role of heredity in leprosy, and the following opinion of Rotberg and Bechelli is agreed to: "In conclusion, after surveying the different epidemiological data and those supplied by biology and pathologic anatomy, only one conclusion stands out: the hereditary transmission of leprosy, considered broadly, is admissible only as the congenital process, which is very rare and therefore of no practical value."

—AUTHOR'S ABSTRACT

[It is not clear if the authors, by quoting Rotberg and Bechelli, intend to point out that if a child is infected by the mother before birth it can be only a matter of congenital infection, and not one of abnormality of the genes which are responsible for heredity but have nothing to do with bacteria or any other infectious microorganisms.—EDITOR.]

OGATA, K. Physiology of leprosy, especially on the regulation of body temperature. La Lepre **22** (1953) 158-177 (in Japanese; English abst. p. 158).

The work reported was carried out by the staff of our laboratory in cooperation with resident physicians of the Kikuchi Keifu-en National Leprosarium. [The rest of this "abstract" is a topical summary or index of the article, which shows how comprehensive the study was but indicates none of the findings.]—[From abstract.]

MONTEL, M. L. R. Les lésions cutanées de début de la lèpre. La lèpre tuberculoïde, les névrites. [The initial lesions of leprosy. Tuberculoid leprosy, nerve lesions.] Bull. Soc. Path. exot. **47** (1954) 198-201.

From his experience in Indo-China and in the Hospital of St. Louis in Paris, the

author considers that the great majority of cases of leprosy show a tuberculoid histological picture in their early stages. He, however, gives a somewhat wide scope to his definition of "tuberculoid," and subclassifies it under 5 categories: pure nerve lesions without affection of the skin; plain white or red macules with perivascular infiltration and with or without epithelioid cells; classical major or minor tuberculoids (Wade); borderline (Wade); indeterminate forms. He considers that the nerves are the first tissue to be affected and the last to heal.—[Abstract from *Trop. Dis. Bull.* 51 (1954) 937.]

✓ CONTRERAS, F. Método de Orsini que serve para resaltar el valor diagnóstico de la prueba de Pierini, y Rodriguez y Plantilla. [Orsini's method that serves to enhance the diagnostic value of the test of Pierini, and of Rodriguez and Plantilla.] *Actas Dermo-Sif.* 44 (1952-53) 561-563.

At the session of March 11, 1953, of the Spanish Academy of Dermatology recognition was given the Orsini's method [*THE JOURNAL* 21 (1953) 117] because of its simplicity and because it facilitates and intensifies the results of the histamin test, recognizing the results obtained in the use of this simple modification.

—AUTHOR'S ABSTRACT

✓ WISE, H. S. Genesis of nasal perforation in lepromatous leprosy; its prevention and care. *A. M. A. Arch. Otolaryng.* 59 (1954) 306-311.

The parts of the nasal septum attacked by syphilis, tuberculosis, lupus and leprosy are discussed. Lepromatous leprosy destroys the septal cartilage by ulceration of the anterior inferior quadrangular plate at its junction with the palatine crest. The initial point of invasion is very specific, being 1 cm. back from the mucocutaneous line and 0.5-1 cm. in diameter. Five stages of progression are outlined. Prevention and care depend upon the stage at which the patient is seen, all nasal therapy being useless unless the disease itself is controlled (sulfones recommended). In treating the nose three things must be kept in mind: (a) prevention of crust formation, (b) healing of ulcerations, and (c) maintaining of a clean, healthy membrane once perforation and/or ozena occur. Recommended therapy is outlined, such as gentle spray with warm saline and application of equal parts anhydrous lanolin and hydrosorb where crust formation has occurred. When ulceration has been present, bacitracin ointment has been used with good results. For the patient with perforation, daily cleaning with a fine saline spray should be followed by removal of accumulated debris by forceps. Any abraded areas are covered with an ointment composed of equal parts of anhydrous lanolin and petrolatum, with peppermint to disguise the odor.

—SR. HILARY ROSS

✓ GOTOH, S. Report of leprosy changes of trachea observed through the fistula of trachea (chiefly about the autoscopic views). *La Lepro* 23 (1954) 29-31 (in Japanese; English abst. p. 29).

Autoscopic changes of the trachea following tracheotomy in 14 leprosy patients have been studied. The pathological changes of the trachea are influenced by the tracheotomy in all cases. Constriction of the left bronchus is rarely induced by the mistreatment [*sic.*]. After treatment with promin and other sulfones, ulceration of the trachea is healed or markedly improved, but scars and infiltrations of that organ are not so improved.—[From abstract.]

✓ DHARMENDRA and CHATTERJEE, S. N. A case of reactional tuberculoid lesions wrongly diagnosed as cellulitis. *Lep. India* 25 (1953) 212-214.

The authors report a case of reactional tuberculoid leprosy wrongly diagnosed and treated in a hospital as a case of cellulitis. This mistake in diagnosis arose from the fact that the patient had an angry looking patch on the face and was running an intermittent temperature. The patient was given large doses of penicillin, but

without any appreciable effect. Three other cases with lesions of similar nature are cited, indicating that such reactional cases were not uncommon especially during the summer months.

—AUTHORS' ABSTRACT

CURRENT, E. J. and FURNESS, A. L. Leproma presenting as carcinoma of the penis. *J. Christian Med. Assoc.* **28** (1953) 321-322.

A case is described in which a solitary leproma on the prepuce presented as carcinoma. The patient, aged about 40 years, had been suffering from lepromatous leprosy for about 15 years. An ulcer on the prepuce of 1 month's duration was circular, indurated, 1 cm. in diameter, exuding a little seropurulent material, the edges slightly raised and everted, not particularly painful. Complete retraction of the prepuce was not possible. Firm, enlarged inguinal lymph glands were felt on both sides. The possibility that the lesion might be a leproma was considered, but because of the close resemblance of an early carcinoma a biopsy was made. This revealed typical lepromatous structure, and no evidence of a neoplastic process.—DHARMENDRA

GAY PRIETO, J. and DAUDEN SALA, C. Les formes initiales de la lèpre. La lèpre tuberculoïde nodulaire infantile. [Early forms of leprosy. Nodular tuberculoïd leprosy of childhood.] *Bull. Soc. française Derm. et Syph.* **60** (1953) 16-18.

A child 30 months old showed 7 nodular and 1 hypochromic lesions. The Mitsuda reaction was positive, the intradermal tuberculin reaction negative. A biopsy of one nodular lesion showed an infiltration consisting of epithelioid cells, fibroblasts and lymphocytes. No acid-fast bacilli were found. This child seems to have been infected by his lepromatous grandmother during a contact of several weeks, 4 months before the appearance of the lesions. The child was given INH treatment. The authors note that periodical examinations of the families of patients in Spain has permitted the observation of recent primary lesions, among which 90% were achromic or hypochromic macules with the indeterminate type of histology, while 10% were of the nodular tuberculoïd type.

—M. VIETTE

GAY PRIETO, J. and DAUDEN SALA, C. Un caso de lepra tuberculoïde nodular. [A case of nodular tuberculoïd leprosy.] *Actas Dermo-Sif.* **44** (1952-53) 144-147.

This case, presented at a meeting, is of a 3-year-old boy with multiple lesions of 5 months duration. Clinically they were hard nodules of sizes ranging from that of a millet of grain to a bean, of dark erythematous color, situated on the face and extremities. There were also fairly distinct hypochromic areas on the left buttock. Histological examination (Dr. Rodriguez Puchol) of a specimen from one of the nodules revealed a tuberculoïd structure. The case was identified with the "tuberculoïd or papuloïd" variety described by Souza Lima and Souza Campos.—F. CONTRERAS

FLOCH, H. and GELARD, A. Il est possible en thérapeutique antiléprouse de ne pratiquer qu'une injection intramusculaire toutes les trois semaines de 1gr50 de D.D.S. en eau gélosée. [It is practicable in treatment of leprosy to inject intramuscularly but once every 3 weeks 1.5 gm. of DDS in agar solution.] *Arch. Inst. Pasteur Guyane et Terr. Inini, Publ. No. 312*, 1953 (Dec.).

The insolubility of DDS has led the authors gradually to abandon repeated injections of it. For a vehicle they prefer saline containing 0.2% agar, which gives regular resorption and blood levels and which can be injected easily, in contrast to oily vehicles. The delay in absorption of DDS after intramuscular injection depends largely upon the size of the "crystals" or "grains" injected. The deposit effect is definitely higher where crystals of 100 μ size are injected than with crystals of 20 μ size. The present trend with leprologists is to decrease the daily dose of DDS administered. The authors think that one may consider the use, at least with patients accustomed to sulfones, of a single dose of 1.5 gm. in agar-saline (filter 150 and

180) every 3 weeks. Caution must be used in cases not previously treated with sulfones.

—AUTHORS' ABSTRACT

DHARMENDRA and CHATTERJEE, S. N. Routine use of yeast and iron not necessary during sulfone treatment of leprosy. *Lep. India* **25** (1953) 194-195.

The authors studied the blood changes (erythrocytes and hemoglobin) in 3 groups of nonlepromatous ("neural") outpatients subjected to the following treatments: Novophone (DDS), Novophone with yeast, and Novophone with yeast and iron. Most of the cases were observed for 100 to 106 weeks. The following conclusions were drawn: In doses of 100 mgm. per day, DDS given by mouth does not produce any marked hematological changes, even on prolonged administration. In most cases it produces a slight reduction in red cells and hemoglobin in the first 6 to 12 weeks, which is followed by complete or partial restoration in subsequent weeks. In some cases there is another fall about 6 to 12 months after treatment, but this is also restored in most cases. In only about one-quarter (3) of the cases in each group, there was seen a lasting reduction of the order of 1/2 million erythrocytes and 1.5 gm. hemoglobin. The addition of 1 gm. yeast alone, or in combination with 3 grains of ferrous sulfate, did not change the course of events to any appreciable extent. It is therefore apparent that the routine use of yeast or iron is not indicated for non-lepromatous patients under treatment with DDS, provided a daily dose of 100 mgm. is not exceeded.

—AUTHORS' ABSTRACT

LOWE, J. The treatment of leprosy with TB1/698. Interim report based on a two and a half years' experience. *Lep. India* **25** (1953) 188-193.

This is a preliminary report on the treatment of 182 cases of leprosy (109 lepromatous and 73 tuberculoid) with TB1/698 for periods up to 29 months. The drug was administered orally twice a day for 6 days a week, starting with 50 mgm. (25 mgm. in the case of children) and going up to 200 mgm. Among the toxic effects and manifestations of intolerance, the following were observed: hepatitis (1 death), jaundice and nephritis (1 case), severe acute agranulocytosis (3 cases), acute allergic dermatitis (1 case), severe recurrent drug fever (1 case), and severe recurrent reaction (3 cases). The results of treatment are discussed separately for: (a) cases given TB-1 from the beginning, and (b) cases in which previous sulfone treatment was replaced by TB-1 for various reasons. In the first group, improvement was seen in both the lepromatous and the tuberculoid cases; 7 of the 25 lepromatous ones treated for 20-30 months had become bacteriologically negative; in the tuberculoid cases, subsidence of clinical activity was sometimes accompanied by return of pigment and of sensation in the patches. In the second group, the change of treatment from sulfone to TB-1 was beneficial in most cases, as the complications seen with DDS (reaction, neuritis, drug fever, allergic dermatitis, etc.) were not encountered. It permitted resumption of chemotherapy early "instead of after a long period of desensitization to sulfone," the results of which are uncertain. It is concluded that TB-1 is a most useful therapeutic agent in leprosy, the results closely paralleling those of the sulfones and sometimes possibly being better. There are advantages and disadvantages, but the author suggests that it may prove to be the best treatment for leprosy yet tried.

—DHARMENDRA

CHAUSSINAND, R., GABBAÏ, A., DORENLOT, H. and VIETTE, M. Action de l'hydrazide de l'acide isonicotinique sur la maladie de Hansen. [The action of isonicotinic acid hydrazide in Hansen disease.] *Bull. Soc. Path. exot.* **46** (1953) 905-910.

Forty-four patients (31 lepromatous, 1 indeterminate and 12 tuberculoid) were treated for from 3 to 12 months with INH alone or in combination with DDS. Another 6 patients were given INH in the course of reactions occurring during sulfone treatment. The initial daily dose of 50 mgm. was gradually increased to 8-12 mgm. per kgm. of body weight. The side-effects with small doses in some cases consisted of

gastric disorders, tingling muscular cramps, euphoria and dizziness; these ceased with continued treatment. With very large doses there were observed vomiting, palpitation and extra systoles, which disappeared upon suspension of treatment and did not reappear when treatment was resumed with smaller doses. Ten patients who had had reactions before any treatments, or during treatment with sulfone, also had reactions during treatment with INH. The combined treatment (150-300 mgm. INH and 100 mgm. DDS daily) was well tolerated. The effect of INH alone 4-5 mgm./kgm. was practically nil. With higher doses, definite improvements were observed in 14 cases (13 lepromatous and 1 indeterminate). Bacteriological improvement was generally slight. In 3 cases (2 tuberculoid and 1 lepromatous) the cutaneous lesions became aggravated. Polyneuritic lesions improved in 4 cases, but worsened in another 4. In 4 of 5 patients with reactions under sulfones, the substitution of INH resulted in the arrest of the reactions. It thus seems that INH has little effect on leprosy itself, but it has a very favorable effect on the general condition and the appetite; there was increase in weight in 28 cases (up to 11 kgm.). Furthermore, the addition of INH for patients who do not tolerate the sulfones well was very favorable in building up the tolerance to those drugs. The importance of INH apparently lies in its use in combination with sulfones.

—AUTHORS' ABSTRACT

- 8 FLOCH, H. and SUREAU, P. Quelle est la place de l'isoniazide dans la thérapeutique antiléprouse? [What is the place of isoniazid in leprosy therapy?] *Bull. Soc. Path. exot.* **46** (1953) 1001-1009.

The authors report on the treatment of 23 cases, for 2-13 months, with daily doses of 300-500 mgm. of isoniazid. In 4 early lepromatous cases they saw slow improvement, somewhat less rapid and less pronounced than with sulfones; but in one of them they obtained in 11 months marked clinical and histological improvement, with disappearance of the bacilli. In another there was remarkable clinical improvement after 2 months of mixed DDS-INH treatment. In 3 early tuberculoid cases and 1 indeterminate case there was practically no improvement. The action of INH in patients already treated with sulfone whose improvement is still incomplete, or who do not tolerate the sulfones well, is held to be significant; e.g., reactions may be less frequent or avoided entirely. In some cases, however, the combination has no effect, nor is there benefit in old cases already much improved under sulfones. The drug is very interesting in part because of the inconsistency of effects; at times these are spectacular, but sometimes much inferior to those of sulfones. INH is useful in patients who are intolerant to sulfones and in those who have reached an "amelioration threshold" difficult to pass. The problem of possible development of drug resistance on the part of the bacilli is discussed, and also the possible virtues of combinations of INH and sulfone and INH and thiosemicarbazone.

—AUTHORS' ABSTRACT

- 8 LIPPI, M. and TUCCI, A. Terapia della lepra con idrazide dell'acido isonicotinico. (Note preventiva.) [Treatment of leprosy with isoniazid; preliminary note.] *Arch. italiano Sci. Med. Trop. e Parassit.* **34** (1953) 459-472.

Nineteen leprosy patients, 15 neural and 4 mixed, ages 16-60 years, were given isoniazid, 300 mgm. daily for 40 days. Any with ulcers also received local applications of an ointment containing 1% of the drug. The plan is to wait for about a month after this course and then repeat it for a longer period. The treatment was well tolerated by all; mild disturbances like insomnia, pruritus, joint pains and diarrhea that occurred in the early days were not severe enough to interrupt the treatment and passed off in a few days. The fact that the patients themselves felt the improvement was evidenced by their returning to ask for the cure to be completed and bringing others with them for the treatment. Appetite improved, they slept well, nodules became smaller and anesthetic patches reduced. Bacterial examinations of the nasal mucus and of the lymphatic glands became negative in 16

of the 19. The authors intend to continue the treatment with a calcium methane-sulfonate of the drug, as it is better tolerated.—[From abstract in *Trop. Dis. Bull.* 51 (1954) 187.]

MITSUDA, K., MIYATA, T., ITO, M., SAKURAI, H., SHIONUMA, E., NAWA, CH., NAGATA, M., YOKOTA, T., SAIKAWA, K., ARAI, M. and SUZUKI, M. The studies on the chemotherapy of leprosy. (The effect of the hydrazide treatment for leprosy.) *La Lepro* 22 (1953) 262-269 (In Japanese; English abst. p. 262).

An experiment to investigate the effect of the hydrazide on leprosy was begun in May 1952 and continued for 10 months. Twenty untreated lepromatous cases were given the drug 1 mgm./kgm. by mouth for the first month, and then 5-6 mgm./kgm. Resorption of nodules and infiltrations was observed in 13 patients (65%) after 4 to 6 months, and bacilli of the skin and nasal mucous membrane had decreased a little after 5 months. We observed that neutrophils, erythrocytes and hemoglobin decreased a little, while lymphocytes and eosinophiles increased. The final result was that 13 cases improved, but 12 of them relapsed; 6 cases (30%) got worse; 1 case remained stationary. It is concluded that hydrazide is effective in lepromatous leprosy for 4 to 6 months, but that relapse occurs before long after that after about 2 months). —[From abstract.]

CAPURRO, E. T. and WILKINSON, F. La hidracida del ácido cianacético en el tratamiento de la lepra. [Cyanacetic acid hydrazide in the treatment of leprosy.] *Día Méd.* 26 (1953) 1666-1667.

Seven lepromatous cases in different stages of evolution of the disease were placed under cyanacetic acid hydrazide treatment, with an average dose of 300 mgm. daily. Slight symptoms of intolerance, such as nausea and vertigo, were observed only when the doses were over 10 mgm. per kgm. of body weight. There was distinct clinical and bacteriological benefit, and improvement of the general condition. The authors regard as an outstanding fact the decrease of bacilli due to the effect of this medication, besides their reduction to granules. No case became completely negative, although the longest time of treatment was 8 months (according to personal information). The fact that promin was given as alternate treatment affects the value of one of the observations. [This article contains such serious typographical errors that it was necessary to contact the authors in order to make this abstract.]

—G. BASOMBRI

GANS, O. Contribution au traitement de la lèpre. [Contribution to the treatment of leprosy.] *Ann. Derm. et Syph.* 80 (1953) 345-359.

Twenty-six leprosy patients with different forms of the disease were treated with intravenous injections of 1% or 2% methylene blue, given twice weekly to a total of 16-36 injections, beginning with 2 cc. and gradually increasing to 20 cc. This treatment was not well tolerated (fever, cutaneous eruptions, general malaise). Improvement was, in general, slight and did not persist after the treatment was stopped. In some cases the ill effects were so severe that the treatment had to be suspended. On the other hand, 32 cases were treated in the same manner with a combination of methylene blue and copper. This product was better tolerated than the pure methylene blue. Seventeen patients improved, with diminution or disappearance of the skin lesions and partial recovery of tactile and thermal sensation. Among the improved patients, some of those who received only one series of injections have relapsed. In 3 cases which received a further series of injections each year, there have been no relapses and the bacilli have completely disappeared. Work with animals has shown that the copper is fixed in greater quantity when it is in combination with methylene blue. In this treatment of leprosy the methylene blue serves, in the opinion of the author to fix the copper onto the bacilli, because of their affinity for the stain. He recalls works of others on this affinity. It has been

observed in some cases that bacilli from patients treated with methylene blue were no longer stainable with Ziehl-Neelsen, but were blue. —M. VIETTE

FLOCH, H. and SUREAU, P. La vitaminothérapie K dans la lèpre. [Vitamin K therapy in leprosy.] *Bull. Soc. Path. exot.* **46** (1953) 631-638.

With reservations because of the small number of patients treated (6) and the short time of treatment, the authors report beneficial effects of vitamin K on the general symptoms, pains and neuritis, rheumatic manifestations, and eye involvement in different cases. In one of them the skin manifestations apparently improved, but the effect of vitamin K in this respect was nil in the other patients, nor were there any changes in hypertrophic nerves. In lepra reactions the effect of the water-soluble vitamin K was inconsistent, sometimes very favorable and sometimes very slight, but this treatment should be included in the therapeutic arsenal for reactions beside other recognized treatments and especially vitamin PP. Vitamin K should be tried out in leprosy neuritis, but with more hope of modifying the subjective symptoms rather than the objective ones. —AUTHORS' ABSTRACT

FLOCH, H. and SUREAU, P. La prégnénolone dans les réactions et les iridocyclites lépreuses. [Pregnenolone in the reactions and the iridocyclites of leprosy.] *Bull. Soc. Path. exot.* **44** (1953) 638-644;

——— Traitement des réactions lépreuses et des atteintes oculaires aiguës de la lèpre par la Prévisone. [Treatment of lepra reactions and acute ocular affections in leprosy with previsone.] *Arch. Inst. Pasteur Guyane française et Terr. Inini*, Publ. No. 291, 1953 (Aug.).

The authors, recalling the first results recorded for cortisone and ACTH in leprosy, report the use of the steroid preparation pregnenolone acetate in two cases of reactional manifestations in leprosy patients. In the first case they obtained marked improvement of the general symptoms and the neuritic pains, an amelioration which was maintained thereafter. In the second case, an old lepromatous one with badly affected eyes, they had in some instances spectacular effects on the symptoms of eye reaction, but they were unable to arrest the progress of the iritis with tendency to glaucoma. They conclude that pregnenolone acetate should be tried in all cases of leprosy where cortisone and ACTH are indicated, and that it is preferable to those hormones. —AUTHORS' ABSTRACT

UMEKI, O. The therapeutic effects of salicylamide upon neuralgia and arthrodynia of leprosy patients. *La Lepro* **22** (1953) 259-261 (In Japanese; English abst. p. 259).

Thirty-six leprosy patients with neuralgia and arthrodynia were treated with salicylamide given orally. Twenty of them were improved by this treatment. Regarding daily dosage, 3 gm. is not enough; 6 to 8 gm. is required. In 16 patients (44%) there are side-effects of this drug, mostly consisting of stomach disturbances.—[From abstract.]

GAY PRIETO, J. Leproma gigante tratado con inyecciones intrafocales de cortisona. [Giant leprooma treated with intrafocal injections of cortisone.] *Actas Dermo-Sif.* **44** (1952-53) 558-559.

This is a very short report of a lepromatous case with a giant leproma which developed on an anhydrotic patch and which was resistant to all kinds of treatment. It responded spectacularly, however, to local injections of cortisone (0.5 and 1 cc.). The author believes that this is a useful therapy for such cases. [A longer abstract of this report appeared among those of the Madrid congress, *THE JOURNAL* **21** (1953) 581.] —F. CONTRERAS

[Because it seemed unlikely that cortisone would have any such effect on an actual leproma, whereas it might well affect in this way a tuberculoid lesion, an

attempt has been made to ascertain if the nature of the lesion was determined histologically. No evidence has been seen that that had been done.—EDITOR.]

BARNEY, A. L'appoint de l'électrologie dans le traitement de la lèpre. [The application of electrotherapy in the treatment of leprosy.] *Bull. Soc. Path. exot.* **46** (1953) 533-550.

Sixty-two patients were given various kinds of electrical treatment, viz: infra-red rays locally, ultraviolet local or general, "medical" type of diathermy application, short waves applied locally or along the spinal column, galvanic currents, and sinusoidal currents (techniques given). The best results were obtained as follow: in perforating ulcers, by infra-red and diathermy (50% and 37% healed respectively); in ulcers, by diathermy, infra-red, and short waves (57%, 50% and 25% healed respectively); in painful nerves, by spinal short waves, diathermy and exponential currents (86%, 82% and 66% pains relieved respectively); in reducible claw hand and paralysis, by diathermy and short waves (83% and 63% improved respectively). The irreducible claw hands were improved by all the treatments with local or regional effects, and in the proportion of 40% with spinal short waves. In the anesthetics and paresthesias the most effective treatments were diathermy, short waves and exponential currents. In the absence of a complete electrotherapy installation, which necessitates the services of a specialist, the author suggests the use in leprosaria of treatments by infra-red, diathermy and short waves.

—M. VIETTE

CHAUSSINAND, R., CLIEZ, R., LEFEBRE, J., LOISEAU, A. N. and VIETTE, M. Essai de traitement des griffes cubitales dans la maladie de Hansen par les ultra-sons. [Ultrasonic treatment of claw hands in leprosy.] *Bull. Soc. Path. exot.* **46** (1953) 899-904.

The "griffes" due to compression of the nerve trunk following sclerosis of the supporting connective tissue is a serious complication in leprosy, one for which chemotherapy is often ineffective. Because of the fibrolytic action of ultrasonic vibrations, they were employed in 3 cases with clawing of the hands despite sulfone treatment. The patients received from 29-42 applications, 6-10 minutes each, of ultrasonic vibrations along the course of the ulnar nerve. One patient, a tuberculoid case with contractures that were difficult to reduce, marked amyotrophy, unexcitable ulnar in chronaxie, and no potential of motor unity in the neighborhood of the electromyogram needle, showed no clinical improvement and the electromyogram and the chronaxie measurement remained unchanged. The other 2 patients, of the indeterminate form, definitely improved clinically. In one of them the clawing of the 4th and 5th fingers completely disappeared and the amyotrophy, which greatly improved, was barely visible in the last interosseous space. In these 2 patients the electromyogram and the chronaxie determination confirmed the clinical improvement. It seems, therefore, that ultrasonic treatment can cause improvement of the clawing of the hands when the degeneration of the nerve trunk is not too advanced.

—AUTHORS' ABSTRACT

YOSHINAGA, T. Experiment of x-raying to the leproma of human body. *La Lepro* **22** (1953) 256-258 (in Japanese; English abst. p. 256).

For six months in 1952 the effects of x-rays upon comparatively fresh lepromas was observed. There were some changes in the dimensions of the lepromas and their histological structure. There was slight reduction of size. In the leproma tissue there were increase of giant cells, increase of the connective tissue, decrease of the round cells, and atrophy of the nuclei. There was no change of form of the bacilli in the lepra cells. Furthermore, the skin injury resulting from the x-ray treatment was so marked that an effective influence cannot be expected.—[From abstract.]

LUTTERBECK, E. F., HUMMON, I. F., WOLCOTT, R. R. and JOHANSEN, F. A. The effect of roentgen rays on lepromatous leprosy. *Radiology* **63** (1954) 1-10.

At the Carville leprosarium, 6 cases of lepromatous leprosy were selected for

treatment by ionizing radiation. Twenty-three different areas were treated with single doses of contact radiation, ranging from 1,000 to 6,000 r. Single massive doses, 1,000-6,000 r in air, were administered to nodules, and 1,000-3,000 r in air to plaques and macules. Clinical observations were made 3 weeks after treatment, when the radiation reaction was at its height, and at intervals up to 2 years later. Radiation erythema of various degrees was seen in all patients during the first few weeks, and central necrosis in 9 lesions that had received 2,000 r or more. In the lower dosage range there was usually slight hyperpigmentation. With higher dosages, depigmentation of the central portion of the lesion was associated with a halo of hyperpigmentation. Repeated skin scrapings from treated and untreated lesions showed no indication that *M. leprae* were decreased or changed morphologically. Six treated and control lesions were biopsied after one and two years. Although the treated lesions showed more atrophy, the lepromatous architecture and *M. leprae* were still evident in the surrounding tissue. The authors feel that ionizing radiation of at least 2,000 r is effective in causing flattening and atrophy of lepromatous skin lesions. Local radiation effects on skin lesions do not change the general course of the disease. Irradiated areas can be invaded by expanding adjacent lesions. Further studies seem desirable. The literature on radiation therapy in leprosy is reviewed, with 35 references. Illustrations.

—SR. HILARY ROSS

ALBERT LASIERRA, P. Tratamiento quirúrgico de las lesiones nerviosas periféricas en la lepra. [Surgical treatment of peripheral nerve lesions in leprosy.] Rev. Clín. española 51 (1953) 376-378.

The author, acting chief of the neurosurgery clinic of the University of Djakarta, has operated on 36 patients with neurological disorders. In 30 cases the ulnar nerve was affected, and in 6 cases the external popliteal sciatic. After describing the different degrees of paresis or paralysis and sequelae resulting from the involvement of these nerves, and the principal indications for decompression, the author deals with the surgical treatment. This consists, first, in perineurolysis, carefully isolating the nerve from the surrounding structures, then in endoneurolysis by multiple longitudinal incisions of the epineurium as far as palpation shows that the lesion extends. In many cases, on relieving pressure by incising the sheath, which is generally much thickened, there is spontaneous protrusion of caseous masses and granulation tissue. Sometimes these caseous masses form multiple small lateral excrescences along the whole length of the nerve, and it is necessary to incise them one by one and remove their contents with a small spoon. The bundles of nerve fibers are very edematous, and with great care they should be freed by longitudinal incisions from the hypertrophic interfascicular connective tissue that imprisons them. After these procedures an attempt should be made to transplant the nerve trunk to a zone less affected by the inflammatory process, in the hope of preventing new adhesions. With respect to the ulnar, this should be freed 10-12 cm. above its entry into the epitrochleo-olecranal canal and down to the origin of the first branches which innervate the muscles inserted on the internal condyle of the humerus. The anatomical corridor in which the nerve passes should then be incised in its entire length. Once entirely freed, the nerve is transplanted into the anterior aspect of the arm, where it is fixed to prevent its return to its anatomical position. As for the external popliteal sciatic nerve, transplanation is difficult and intervention may be limited to the operation described. The results have been excellent as far as relief of pain is concerned. The remote results depend much on the stage of the lesion. Pronounced muscular atrophies are generally irreversible, but even so, the recovery of the strength of the muscles affected is noteworthy. The pareses and atrophies of lesser degrees, and the trophic disturbances, generally subside.

—F. CONTRERAS

BLANC, M. and PROST, M. T. Le traitement actuel de la lèpre a la léproserie Saint-Michel de Nden. [The present treatment of leprosy in the leprosarium of St. Michel at Nden (French Cameroons)]. *J. Sci. Méd. Lille* **71** (1953) 129-139.

The paper is divided into 3 parts. The first part deals with treatment; chaulmoogra preparations are preferred for tuberculoid cases, and DDS for lepromatous. Secondly, as adjuvant treatment in neuropathic conditions of the lower limbs, infiltration of the lumbar sympathetic with 1% novocaine is recommended. This was used in 50 patients with considerable benefit. Lastly, under prophylaxis, the authors describe the use of a killed suspension of the "Chauviré" bacillus, which is injected intradermally to change negative Mitsuda reactors to positive, and give the results obtained in 10 subjects exposed to leprosy infection, 7 of whom were made reactive to lepromin. The authors are carrying out a further trial to compare the effects of this culture with those of BCG.—[From abstract in *Trop. Dis. Bull.* **50** (1953) 1056.]

KONO, M. On the absorption of sulfones to red blood cells. *La Lepro* **22** (1953) 243-249 (In Japanese; English abst. p. 243).

Experiments on the *in vitro* absorption of sulfones, especially of promin and promizole, by red blood cells gave the following results: Both of these drugs are absorbed to red blood cells, promizole more than promin, according to Freundlich's absorption isotherm. The absorption of these sulfones is inhibited by the presence of blood plasma. Both drugs combine well with serum albumin, but not at all with serum euglobulin. Measurement with Tiselius' electrophoresis showed that promizole is in stronger combination than promin.—[From abstract.]

CHATTERJEE, K. R. and BOSE, R. A simple method of estimation of thiosemicarbazone in tissue and body fluids. *Lep. India* **25** (1953) 199-208.

The authors, using Wollenbergh's method of estimation of thiosemicarbazone with some modifications, studied the absorption and excretion of the *p*-acetylaminobenzaldehyde product in patients undergoing treatment with it. The method consists essentially in extracting the drug with amyl alcohol, hydrolyzing it into its component parts (aromatic acetyl aminobenzaldehyde and thiosemicarbazone portions), separating the aromatic portion by extracting it with phosphoric acid, and finally estimating it after diazotization by a modified Bratton and Marshall method. It was found that 50 mgm. is the smallest dose by mouth which gives a detectable concentration in the blood and urine. With this dose the drug appears in blood and urine within one hour, and the highest concentration in blood is reached in about 4 hours. It disappears from the blood in 12 to 48 hours after a single dose, but with repeated administration it persists up to 96 hours. The concentration in urine is considerably higher than in blood, and the drug can be found there about 24 to 48 hours after it has disappeared from the blood. About 50% of the daily intake is excreted in urine, and about 10% in feces. Detectable amounts are found in sweat, saliva, tears and breast milk, and the concentration in these fluids is of the same order as in blood. Concentration in skin is about the same as in blood and other body fluids. —DHARMENDRA

MAYAMA, A. Electrophoretic studies on the protein distribution in the serum of leprosy patients. Role of the serum gamma-globulin on the tuberculostatic activity of the whole blood. *Rep. Res. Inst. Tuberc. & Lep. Tohoku Univ.* **5** (1954) 273-282.

Electrophoresis examinations of serum proteins were performed in 63 leprosy cases. There were almost no differences in the findings of healthy persons and of neuromacular patients, except for far-advanced cases. In lepromatous cases there were elevation of total serum proteins, decrease of albumin, and increase in gamma globulin. Consequently, the albumin/globulin ratios were less than 1.0. No relationship could be found between the electrophoresis findings and the clinical condition of the patients. In lepromatous cases with the complication called erythema nodosum

leprosum, however, more characteristic findings were obtained, viz., remarkable decrease in albumin, significant elevation in gamma globulin, and a rise in total serum proteins. No parallelism between the gamma globulin component and tuberculostatic activity of the blood has been found in leprosy patients.—[From author's summary.]

FUKUDA, T. (Demonstration of the cutaneous nerves with methylene blue staining in leprosy.) *Arch. japanische Chir.* **22** (1953) 526-528 (in Japanese; English abst. p. 525).

It has been generally accepted that nerve affection in *lepra nervorum* begins in the skin and then ascends along the nerve fibers, and that the farther the pathological changes ascend the more extensive the nerve disturbance becomes. Araki has come to doubt this "ascending theory." He believes that loss of sensation may be due either to a "terminal neuritis" in the dermis, especially in macules, or to neuritis of smaller subcutaneous nerve trunks where they penetrate the superficial fascia. In the latter type, affection of each subcutaneous nerve trunk represents one unit of sensory disturbance, and the extent of the anesthesia is determined by the combined affection of the units but not by affection of the major nerve trunk. Although Araki's opinion lacks the support of histological verification, and also of sufficiently prolonged observations, it nevertheless seems important from the clinical point of view. The author has studied the histological changes of cutaneous nerves in 5 cases of leprosy using a methylene blue vital staining technique, because it is simple and gives nice pictures, as Woollard and Weddell have shown. In serial paraffin sections of the skin injected with the dye before excision, the histological findings were almost the same in all of the cases: intraepidermal nerve endings, nerve fibers, subepidermal nerve plexus, nerve bundles, and deeper nerve plexus—in short, almost all of the nerve elements in the skin—showed more or less pathological changes, some degenerated and some regenerated. However, among changed nerve elements a few intact nerve fibers could be seen, some near hair follicles and others in deeper layers. In some preparations the changes were slight in the deeper tissue. In a case of progressive mixed leprosy, 7 years after beginning of the anesthesia, the author was able to apply this supravital technique to the deeper connective tissue and subcutaneous fatty tissue beneath the anesthetic skin. Neither the finer nerve fibers nor the larger nerve bundles were found pathological. (Deep sensations were normal in all of the five cases.) Most of the histological changes in the skin above these deep levels would be those of terminal neuritis. It could not be determined whether intact nerve fibers found among degenerated ones belonged to overlapping nerves or not. Some of the findings, however, do not seem to support Araki's postulation; further studies are needed. (In this paper the term "vital stain" or "supravital stain" is not used in its strict sense.)—[From the English summary.]

SUZUE, K. Pathology of leprosy with special reference to allergic diathesis. *La Lepro* **22** (1953) 178-185 (in Japanese; English abst. p. 178).

In 1943 the author found that many rheumatic nodules were present in the hearts of leprosy patients. Thereafter, he studied the matter of rheumatic nodules in the hearts of patients suffering from various diseases. Finding them especially in beriberi and malnutrition, he regarded them as caused by allergic factors. He concluded that such avitaminous or malnutrition states must be a cause of allergic changes, i.e., that the so-called allergic diathesis may be caused by avitaminosis or malnutrition, at least. Then, with 191 leprosy autopsies, he tried to confirm this hypothesis. The cases were divided into three periods: (1) patients fed ordinarily, without vitamin drugs; (2) patients on insufficient diet (wartime), and (3) patients receiving sufficient diet and drugs, including vitamins. *Heart* (84 cases): Rheumatic and rheumatoid nodules, 79.3%, 77.1% and 57.9% in Periods 1, 2 and 3, resp. Periarteritis and endoarteritis nodosa were also found. Such allergic changes of the

heart must be considered to be derived not only from leprosy itself but also from avitaminosis B₁, and malnutrition in the meaning of metallergy or parallergy. *Liver* (116 cases): The appearance of leprosy nodules was increased by malnutrition or B₁ deficiency: 76% in Period 1, 78.5% in Period 2, and 55.5% in Period 3. Allergic changes were accelerated in leprosy in B₁ avitaminosis and malnutrition. *Spleen* (111 cases): Lepromas occurred in 39.1%, 52.9%, and 33% in the three periods, resp. It must therefore be said that malnutrition or vitamin deficiency accelerated the leprosy changes in the spleen to the extent of 70%. Hyalinosis of small arteries was observed in the spleen abundantly in the cases of dystrophy and avitaminosis B₁. Sago spleen was observed in 9%, not due to complications but derived from leprosy itself and malnutrition. *Kidneys* (101 cases): Diffuse glomerulonephritis was found in 27.3%, 12.1%, and 26% in the three periods, resp. Amyloidosis was found in 8 cases (7.9%), but leproma very rarely—only once in the 101 cases.—[From abstract.]

MAUZE, J. and ARNAUD, G. Granulogramme de Benda et vitesse de sédimentation dans la lèpre. [The granulogram of Benda and the sedimentation rate in leprosy.] *Méd. Trop. (Marseille)* **13** (1953) 355-356.

Dividing polymorphonuclear leucocytes into 3 classes, normal, intermediate and pathological, the authors made counts in 48 leprosy patients. [The "granulogram" as described by Benda in 1945 is a formula for classifying polymorphonuclear leucocytes according to the changes in size and number of their granules.] They found the appearance of the neutrophils pathological in 29, intermediate in 15 and normal in 4. The pathologicals were 21 of the 35 lepromatous cases, 5 of the 7 tuberculoids, and 3 of the 6 indeterminates. The sedimentation rate was increased in 85.5%. All the increased sedimentation rate results corresponded with the pathological granulograms.—[From abstract in *Trop. Dis. Bull.* **50** (1953) 1143.]

OKADA, S. Pathological studies by means of biopsy on the changes in the livers of leprosy patients and murine leprosy rats. Report I. Tubercloid granuloma found in the livers of macular cases by puncture biopsy. *La Lepro* **22** (1953) 298-306 (in Japanese; English abst. p. 298).

By means of puncture biopsy of the livers of 5 macular [i.e., tubercloid] cases not complicated with tuberculosis or syphilis I found a typical tubercloid lesion in one specimen and atypical tubercloid lesions in the other 4 specimens. Considering all the evidence, I conclude that these lesions were leprosy. In addition to these lesions I found others which were regarded as various earlier stages of formation of the tubercloid granuloma, and followed the course of formation of that granuloma in the liver lobule.—[From abstract.]

OKADA, S. Pathological studies by means of biopsy on the changes in the livers of leprosy patients and murine leprosy rats. (2. Report) Process of development of the changes in the livers of experimental murine leprosy rats. *La Lepro* **23** (1954) 1-7 (in Japanese; English abst. p. 1).

The developmental process of the murine leprosy lesions in the livers of 30 experimental rats was studied in 113 liver biopsy specimens obtained by partial excision repeated at intervals of 7 to 14 days. The early development was modified variously by the resistance of the individual rat, and also by the location of the lesion, whether it was in the lobulus, beside the central vein, or in the interstitium. In relatively resistant rats the lepromatous picture develops by way of an incharacteristic and intermediate picture between lepromatous and tubercloid, or occasionally by the tubercloid picture. But this tubercloid condition is a prelepromatous stage, so that it is essentially different from the tubercloid lesion in macular cases of leprosy. The faculty of mobilizing monocytes to take up the bacilli is an important factor of resistance of the individual rat. The relation between the change in the liver and that in the site of inoculation in the skin has also been studied.—[From abstract.]

OKADA, S. Pathological studies by means of biopsy on the changes in the livers of leprosy patients and murine leprosy rats. (3-5 Report.) *La Lepro* **23** (1954) 8-14 (in Japanese; English abstract, p. 8).

The facts revealed by means of puncture biopsy of the liver are as follows: When the tuberculoid macules of the skin disappear or transform into leucoderma, the tuberculoid lesions in livers also decline and transform into slight infiltrations of small round cells. The changes in the liver of neural leprosy patients are slighter than those of macular [i.e., tuberculoid] cases. The histological process of improvement of the lesions in livers of lepromatous cases has been clarified. In cases changed from lepromatous to secondary neural type by treatment, leprosy vacuoles still remain but there are only rare granular leprosy bacilli, or none at all. The tuberculoid condition may sometimes appear. In cases with erythema nodosum leprosum eruptions, the liver lepromas for the most part are not different from those of the cases without the E.N.L. However, lesions of which the histological picture corresponds to that of the erythematous ones of the skin may appear on rare occasions, although the number of such lesions is small and the infiltration of polynuclear leucocytes in them is slighter than that in the skin lesion.—[From abstract.]

TISSEUIL, J. L'infection tuberculeuse pas plus que la vaccination par le BCG ne crée ni para-immunité ni para-allergie à l'égard de la lèpre. [Neither tuberculosis infection nor BCG vaccination produces either para-immunity or para-allergy to leprosy.] *Rev. Coloniale Méd. et Chir.* **25** (1953) 132-134.

The author opposes strongly the hypothesis that BCG vaccination protects against leprosy, not on the basis of any experiments of his own, but because the delayed reaction in the Mitsuda test is of a totally different nature from the allergic reaction in the tuberculin test, and is therefore considered not of allergic nature. Were there para-allergy between leprosy and tuberculosis, then BCG would produce an early allergic response with the lepromin test, as it does with the tuberculin test. The author believes that a delayed positive lepromin reaction after BCG indicates that the subject had previous sensitivity to lepromin, or has a tuberculoid leprosy lesion. "Experience in penal settlements and immigration services proves that tuberculous premunition does not confer protection against leprosy."—[From abstract in *Trop. Dis. Bull.* **50** (1953) 1055.]

DE SOUZA CAMPOS, N. Lesão tuberculóide secundária à lepromino-reação. [Tuberculoid lesion secondary to the lepromin reaction.] *Rev. brasileira Leprol.* **21** (1953) 143-146.

This is a report of a tuberculoid lesion of sarcoid aspect that appeared at the point of injection of the Mitsuda antigen, in a patient with circinate (minor) tuberculoid leprosy. Although the clinical lesions were already healed, he was nevertheless subjected to this test as a prerequisite to a conditional discharge. Clinically, the lesion that was produced had features unusual for a Mitsuda reaction. The histological picture, besides the typical tuberculoid structure of the Mitsuda lesion, showed a well-defined nodular structure, and also some central areas of necrosis of the caseous type. The rarity of caseation in skin lesions, besides the rarity of reproduction of the tuberculoid lesion, secondary to the Mitsuda reaction, are the reasons for presenting this case.

—AUTHOR'S ABSTRACT

GATE, J., ROUSSET, J. and COUDERT, J. Résultats comparés des différentes méthodes de sérologie de la syphilis chez 17 lépreux. [Comparative results of the different methods of syphilis serology in 17 leprosy patients.] *Bull. Soc. française Derm. et Syph.* **60** (1953) 89.

The Bordet-Wassermann, Kahn, Meinicke, VDRL and Kline serological reactions for syphilis and the Nelson [treponema immobilization] test were made in 17 leprosy

cases. All the reactions were negative in 12 cases, 5 of which were lepromatous, and positive in one case, a lepromatous one. In the other 4 cases there was discordance among the classical serological reactions, but the Nelson test was always negative. In these 4 cases it was impossible to obtain evidence of either congenital or acquired syphilis. The authors are against the classical notion of the habitual positivity of leprosy patients to serological tests for syphilis, and they stress the value of the Nelson test.

—M. VIETTE

FLOCH, H. and SUREAU, P. La réaction universelle de Kahn dans la lèpre. [The Kahn universal test in leprosy.] *Bull. Soc. Path. exot.* **46** (1953) 992-1001.

The results obtained by Kahn with the "universal serologic test" would be very interesting if confirmed, since one could with it differentiate clearly between syphilis, yaws and lepromatous leprosy, each of these diseases giving a characteristic response. The authors have applied this test in 21 cases of leprosy of various forms and various stages of evolution. They never obtained in lepromatous leprosy the characteristic diagram described by Kahn, and by Pinto and Zeo (only after treatment, as a general rule, according to the latter authors). They admit, as do Ross and Gemar, that lepromatous leprosy can provoke an increase of the precipitation, and that this diminishes after sufficiently prolonged sulfone treatment. This is also true for reactional tuberculoid leprosy. The test is time-consuming, and of doubtful practical value.

—AUTHORS' ABSTRACT

GARCIA PEREZ, A. Proteínas séricas en los enfermos de lepra. III. Resultados de la reacción de Takata-Ara. [Serum proteins in patients of leprosy. III. Results of the Takata-Ara test.] *Actas Dermo-Sif.* **44** (1952-53) 127-129.

The author studied the Takata-Ara reaction in 50 leprosy patients. The overall positivity was 38%, and discounting the cases with manifest liver disturbance he concluded that the positives probably due to leprosy are 29.5%. The reaction was positive in all patients with lesions of the liver. Three of 4 patients with lepra reaction were positive. In tuberculoid cases positive results are few, occurring only in the reactional form. In the lepromatous cases the rate is 28%, increasing in patients with advanced lesions and in those with little treatment. The positivity is considered to be directly related to the leprosy infection, although in some cases it may be related to subclinical liver or kidney lesions.

—F. CONTRERAS

AONO, G. A hemolytic reaction of erythrocytes sensitized with tuberculin and component extracted from leprosy nodules. *Tohoku J. Exper. Med.* **57** (1953) 311-315.

Referring to the tests in leprosy, first made by Levine *et al.* [THE JOURNAL **21** (1952) 201-212], it is said that Koji in Japan had made the same experiment and reported lower titers in leprosy than in tuberculosis. Mayama and Fukuda had made a test with hen's erythrocytes and found higher titers in lepromatous than other cases, as well as in advanced cases. The author, using beef cells sensitized with tuberculin, also got lower reactions with leprosy sera than tuberculosis sera, contrary to Levine, with no differences of percentages between lepromatous and other cases, nor any significant relationship with the clinical condition. In short, tuberculin was more specific in this reaction to tuberculosis than to leprosy. Having had success in testing for typhoid antibodies with cells sensitized with extracts of the typhoid bacillus, he then made several extracts from lepromas, by a complicated process, and attempted to sensitize beef red cells with them. Five sera from lepromatous cases and 5 from cases of the neuromacular forms were used in the hemolysis test, all with negative results. The author believes, however, that if more leproma material could be obtained a specific hemolytic test might be devised.

—H. W. W.

HONDA, H., OSHIMA, T. and SAKAMOTO, K. Seroreaction of leprosy with cardiolipin-cephalin-antigen. (Part 4) On agglutination. *La Lepro* **23** (1954) 18-22 (in Japanese; English abst. p. 18).

We suggested in our last report [*THE JOURNAL* **22** (1954) 362] that the complement-binding reaction was not a satisfactory method for diagnosis, especially since it lacked satisfactory specificity for lepra nervosa. In this report we describe an agglutination reaction with a new antigen composed of 0.1% cardiolipin 0.05, 1% cephalin 0.15 (ratio 1:30), and 1% kaolin. The results with this method showed higher specificity in lepra nervosa. —[From abstract.]

CHAUSSINAND, R. and TOUMANOFF, C. Les réactions cellulaires et la phagocytose chez les cobayes inoculés par voie intrapéritonéale avec des bacilles de Hansen vivants ou morts. [Cellular reactions and phagocytosis in guinea-pigs inoculated intraperitoneally with live or killed Hansen bacilli.] *Ann. Inst. Pasteur* **85** (1953) 713-723.

The cellular reaction caused by the intraperitoneal inoculation of Hansen bacilli was studied in guinea-pigs in an attempt to elucidate the ways in which these bacilli are destroyed. Each animal received 1.0, 1.5, or 2.0 cc. of a suspension of bacilli obtained by grinding a leproma in physiological solution, 1 gm. to 20 cc. Three suspensions were used: one of living bacilli, one of bacilli killed by boiling, and one a Mitsuda antigen made by adding 0.5% phenol to the killed suspension. Smears of the exudates were made every second day for from 50 to 195 days. A leucocyte count was made on each smear, and the phagocytic index (the percentage of cells of each type containing bacilli) was determined. During the first hours after the inoculation a polynucleosis (up to 94%) was constantly observed, followed by a reaction of the mono-lymphocyte type, macrophages sometimes predominating, lymphocytes at other times. Also observed were irregular periods of polynucleosis. The cellular reaction is almost the same with both the live and the killed suspensions, although with the killed bacilli the polynucleosis of the onset and the subsequent mononucleosis are sometimes less marked. The free bacilli disappear rapidly from the peritoneal exudate (2 to 7 days), especially in animals inoculated with killed bacilli. The phagocytosis is first by the polymorphonuclears, then by the mononuclears. Phagocytosis by the microphages ceases after from 24 to 48 hours, but it can still be observed in the macrophages after 3 months. The phagocytic activity of the microphages and macrophages is strongest against the living bacilli. Leucocytic *autophagie* is often seen within 7 hours, at times only at 48 hours, after the inoculation. There is no appreciable destruction of the bacilli in the polymorphonuclears, and it is slow in the mononuclears. It is concluded that the natural immunity of the guinea-pig to the leprosy germ is due to phagocytosis. The destruction of the bacilli is probably accomplished in certain organs. —M. VIETTE

MARIE-SUZANNE, (SOEUR), NOEL, R. and SOHIER, R. Etude comparative des lésions histologiques provoquées, chez le rat blanc, par inoculation du bacille de Hansen et de 25 souches de bacilles acido-résistants isolés à partir de lépromes humains. [Comparative study of the histologic lesions in white rats induced by inoculation of Hansen bacilli and 25 strains of acid-fast bacilli isolated from human lepromas.] *Ann. Inst. Pasteur* **84** (1953) 1042-1045.

Of 146 white rats inoculated with *M. leprae*, all but 5 showed a tuberculoid structure at the point of inoculation; in 2 of the others the lesions were diagnosed as mixed tuberculosis and lepromatous, and in the other 3 they were abscesses. In the further experiment each of the 25 culture strains employed was inoculated into 3 rats in a suspension containing about 1 mgm. of bacilli per 3 cc. of saline. Each animal was given bilateral subcutaneous injections of 0.1 cc. in the groin and, in addition, intratesticular injections for the males. Specimens were taken 1, 3, and

6 months after inoculation. The histological findings were made the basis of a classification of the different strains: 10 provoked only a slight banal granuloma that did not persist; 13 caused lesions, localized at the point of inoculation, which persisted longer but were much retrogressed at the end of 6 months; only 1 strain (A.R.L., from Florence) produced lesions comparable to those caused by the Hansen bacillus and the senior author's "Chauviré" bacillus; the inoculation granuloma persisted for 8 months, with central necrotic area and presence of numerous polymorphonuclears.

—M. VIETTE

MARIE-SUZANNE, SR., NOEL, R. and SOHIER, R. Etude des lésions obtenues après injection du *Mycobacterium marianum* sur les rats blancs préalablement inoculés avec une suspension autoclavée du même germe. [Study of the lesions produced after injection of *Mycobacterium marianum* in white rats previously inoculated with an autoclaved suspension of the same germ.] Rev. Lyonn. Méd. 2 (1953) 401-404.

Twenty-one rats were given, in the neck region, 3 intradermal injections of 0.1 ml. of an antigen made from a culture of *M. marianum* grown on Sauton's medium, killed by heating at 120°C for 25 minutes. The 3 injections were made at intervals of 31 and 19 days. In another 13 rats scarification was made on 3 occasions in the same region with a killed suspension of the culture in glycerine, the intervals being 40 and 19 days. Seventy-four days after the last of these treatments the 34 rats and 5 controls were inoculated subcutaneously in each groin with 0.1 ml. of a saline suspension of *M. marianum* from a Petragani culture, 1 mgm. in 2 ml. All the animals were sacrificed after 83 days. The controls had an inflammatory reaction at the site of inoculation, with hypertrophy of the lumbar lymph nodes. The rats treated with antigen intradermally showed only splenomegaly. Those which had had scarifications showed no lesion. Histologically, in the controls the skin had lesions consisting of a very extensive layer of lymphocytes, with very numerous histiocytes containing bacilli. In the lumbar lymph nodes were found epithelioid or histiocytic nodules containing very numerous bacilli. In the antigen-treated rats the lesions were much less marked. In general they were composed of histiocytes containing numerous altered bacilli, without lymphocytic reaction. In 2 rats treated by scarification the lesions contained lymphocytes surrounded by histiocytes containing bacilli. Finally, in 6 rats treated intradermally and in 1 treated by scarification the lesions had the tuberculoid aspect, with or without bacilli. [This article is an extension of one section of a paper read at the Madrid congress, to be found in the *Memoria*, pp. 833.

—M. VIETTE

BLANC, M., PROST, M. T. and MARIE-SUZANNE, SR. Influence de l'injection d'une suspension d'un mycobactérium isolé d'un cas de lèpre (souche Chauviré) sur la réaction de Mitsuda. [Influence of the injection of suspension of a mycobacterium isolated from a leprosy patient (Chauviré strain) on the Mitsuda reaction.] Bull. Soc. Path. exot. 46 (1953) 1009-1015.

Three injections of 0.1 cc. of the "Chauviré" antigen were given at monthly intervals to 339 persons, of whom 333 were leprosy cases. Two Mitsuda tests were performed, one a month before the first injection, the other two months after the last injection. The antigen was a suspension in saline of the Chauviré mycobacterium cultured on Sauton medium and killed at 120°C. Of the 6 nonleprosy subjects, 2 were Mitsuda-positive before and after the injections, the other 4 were originally negative but became positive. The following results were obtained in the leprosy cases: Of the 195 indeterminate cases, 116 were negative before but positive after the treatment, 70 gave the same results before and after, 9 were positive before but negative after. Of the 65 tuberculoid cases, the positive reaction became negative in 3 instances. Of the 73 lepromatous cases, 8 were positive before and after, 31

were negative before and after, 32 negative became positive, and 2 positives became negative. The authors point out that a large proportion of the cases were Mitsuda-positive after the injections of this antigen, and that the positive Mitsuda reaction is classically a test of resistance of the organism to the Hansen bacillus. [They do not explain the fact that some cases that were positive before the injections gave negative reactions afterward.]

—M. VIETTE

KRAJCINOVIC, M. and KRAJCINOVIC, M. Demonstration of acid-fast bacteria by reacting chromogenic amines with their capsular lipids. *Stain Tech.* **29** (1954) 265-268.

This report, from the University of Zagreb in Yugoslavia, published after the death of the senior author, is preceded by an abstract which is reproduced here without alteration: Coupling a chromogenic amine to carboxyl groups of the lipids in the capsules of acid-fast bacteria was accomplished by reaction with benzidine, diazotization and using sodium beta naphthylate as the chromogen. By these means, acid-fast bacteria can be differentiated from nonacid-fast, and the intensity of the staining correlates well with the amount of lipid found in their capsules. By comparing the intensity of staining before and after treatment with 5% HCl, it is possible to demonstrate that some acidic capsular components are combined with calcium. Similarly, by comparing the intensity of staining before and after treatment with petroleum ether, the presence of oxyfatty acids (insoluble therein) can be demonstrated.

—AUTHORS' ABSTRACT

NINELL, F. and NORDEN, A. *Mycobacterium balnei*. A new acid-fast bacillus occurring in swimming pools and capable of producing skin lesions in humans. *Acta Tuberc. Scandinavica* **33** (1954) Suppl. 84 pp. (in English).

M. balnei was the causative organism of an epidemic of skin ulcerations which occurred in the Swedish town of Orebro in 1949-1950. The lesions, located on the elbows, gradually grew from papular to bean-sized; they were soft and spongy, and usually after some weeks they ulcerated; healing sometimes took as long as 1-2 years. Clinically the lesions were suggestive of tuberculosis cutis verrucosa; leprosy and syphilis could be excluded. Bacteriological studies and animal inoculations suggested that the acid-fast organism found was of an unknown type. Histologically the lesions (31 cases) were a granulomatous inflammation; Langhans giant cells were not uncommon, but acid-fast bacilli were rare. While the picture presents some peculiar features, it cannot by itself be distinguished from tuberculosis and sarcoidosis. Cultures were obtained from 3 cases at 31° C, not at 37°. Optimal pH for growth is slightly below 7.0. A temperature of 58°C for 10 minutes is not tolerated. The cytochemical test with neutral red is negative. *In vitro* growth is inhibited by streptomycin and tyrothricin but not by PAS, isoniazid or thiosemicarbazone. *M. balnei* is pathogenic to a number of rodents (notably mice, golden hamsters and rabbits), producing necrotizing inflammation with abundant bacilli. A dose of 0.0001 mg. injected intraperitoneally was sufficient to produce the disease. Chickens and tortoises were not affected. Three tuberculin-positive human volunteers who received intracutaneous injections of autoclaved bacilli showed transient 48-hour reactions like the positive tuberculin reaction. Two of these persons were inoculated with living bacilli by superficial scarification, resulting in lesions like those of the swimming-pool infection. These experiments fulfilled the Henle-Koch postulates. BCG-vaccinated persons, tested simultaneously with old tuberculin and a PPD of *M. balnei*, showed a slightly lower number of reactors to the latter than the former in the doses used. It is possible that *M. balnei* or similar organisms may be involved when an unexpected positive tuberculin reaction is encountered. Cultures from the water and the walls of the swimming pool gave typical growths of *M. balnei*. The taxonomy of acid-fast organisms not belonging to the true tubercle bacilli has not yet been brought to a level that permits true classification. No description has been found of any other

organism showing the characteristics of this one. Some tests indicate that it belongs to the so-called saprophytic group, but it is definitely pathogenic to mice.

—SR. HILARY ROSS

CHAUSSINAND, R., VIETTE, M., DEZEST, G. and KRUG, O. Evolution de l'infection à bacilles de Stefansky chez le rat traité par l'hydrazide de l'acide isonicotinique. [The course of the Stefansky infection in the rat treated with isonicotinic acid hydrazide.] *Ann. Inst. Pasteur* **85** (1953) 398-402.

An earlier report gave the results produced by the action of isonicotinic acid hydrazide (INH) in rats inoculated with the Stefansky bacillus: after 6½ to 7 months treatment by mouth with 0.75 to 1 mgm. per day, 6 days a week, none of the treated animals showed palpable lesions, whereas the controls did. However, in autopsies of the treated rats a few bacilli were encountered; it was impossible to tell whether they were alive or dead. The experiment has been continued, and the results are reported here. Beginning the ninth month after the inoculation, there was noted the appearance of lesions at the point of inoculation. Autopsies revealed a more or less marked dissemination of bacilli in the lymphatic system, whereas the liver and spleen were usually not affected. The lesions, however, were less extensive than in the controls. The drug, therefore, does not prevent the disease as other authors have thought, but it clearly retards its evolution. The dose of 10 mgm./kgm. per day, the maximum oral dose tolerated by the rat, is more efficacious than the 7.5 mgm. dose. It has been noted that the rats treated 17 days after the inoculation showed less extensive and less severe lesions than the rats treated from the day following the inoculation. Lastly, the progressive appearance of lesions, despite the continuation of the treatment, after a latency of several months poses the problem of acquired resistance to the drug by the Stefansky bacillus. —AUTHORS' ABSTRACT

NISHIMURA, S., KONO, M. and MASUDA, T. On the effect of isonicotinic acid hydrazide upon murine leprosy. *La Lepro* **22** (1953) 250-256 (in Japanese; English abst. p. 250).

The administration of 1 mgm. per day, six days a week, was continued for five months. In result, leprosy ulcers healed and lepromas resorbed. Lepromas enveloped with thick connective tissue cannot easily be resorbed, but they became harder and smaller. Histological examination revealed marked proliferation of connective tissue in the local lesion of the skin and in regional lymph nodes. There were no appreciable lesions in the internal organs. The bacilli showed increasing morphological changes and granulation, but they were still viable after totals of 50, 90 and 134 mgm., as ascertained by transfer inoculations. Among the untreated control animals there were seen instances of healing of ulcers, but in no case was there complete resorption of the leproma, and bacilli and lesions were found in the viscera. The disease did not develop in animals which received treatment from the day after inoculation, but those that received very heavy inoculations showed only slight differences from the untreated control animals. To summarize, INH is quite effective upon murine leprosy, more so than on human leprosy. On the other hand, promin and tibione are favorable in human leprosy, but not in murine leprosy. It follows that chemical agents useful in human leprosy are different from those favorable in murine leprosy. Therefore, animal experiments with leprosy treatment cannot be applied in the search for a new drug, but to the explanation of the bacteriostatic mechanism of the drugs against the murine leprosy bacilli.—[From abstract.]

NISHIMURA, S. and MASUDA, T. Studies on the development of resistance of murine leprosy bacilli toward isonicotinic acid hydrazide. *La Lepro* **23** (1954) 22-28 (in Japanese; English abst. p. 22).

In this study resistance was measured in infected rats by the inhibitory effect of a standard dose of isonicotinic acid hydrazide (Hycosid, Takada) on increasing

doses of bacilli. In Exp. 1 rats were inoculated with Fukuoka strain, and in Exp. 2 with the Kumamoto strain. Following development of the lesions, 51 mgm. INH was administered over 60 days in Exp. 1, and 91 mgm. over 110 days in Exp. 2. A suspension was made from the small leproma remaining after treatment and inoculated into another group of rats. To this group INH was not administered over a period of 98 days in Exp. 1, and 164 days in Exp. 2. In both experiments, suspensions of increasing dilution (20 , 200 , 10^3 , 10^4 , 10^5) were made from the above-described lepromas, and 0.5 cc. of each suspension was inoculated subcutaneously in each group of rats. Sixty male rats weighing 100 ± 10 gm. were divided into groups of 6. One-half of each group were left untreated, as controls. The dosage was 4 mgm./kgm. INH per day, 6 consecutive days a week for 150 days. In Exp. 1, in which the 51 mgm. INH-treated strain was inoculated, it was found that there was little difference between the treated and control groups in the lepromas which developed. This strain had developed resistance toward INH. In Exp. 2, in which the 91 mgm. INH-treated strain was inoculated, development of the lepromas was controlled considerably in the treated groups; this strain had developed a lesser degree of resistance compared with the INH-sensitive strain. However, the fact that the 91 mgm.-treated strain developed a lesser degree of resistance than the 51 mgm.-treated strain may be due to the longer period without treatment, or to a difference in strain.—[From abstract.]

CRUICKSHANK, J. C. Isoniazid in the treatment of rat leprosy. *Lancet* **2** (1954) 528-529.

This brief note reports further observation of the animals surviving at the time of the previous report [*THE JOURNAL* **22** (1954) 373]. At that time, 46 weeks after inoculation, all the untreated control rats were dead while those treated for 20 weeks from the outset (Group C) were still all alive; different numbers of the two groups treated otherwise had died. Ultimately, all of the rats in the treated groups died, with typical lesions of rat leprosy. The average survival time of the Group C rats was 70.7 weeks, against only 34.6 weeks for the untreated controls. The drug therefore prolonged life greatly, but as given did not effect permanent cure. This is said to be in accord with the findings of Bushby and Barnett [*THE JOURNAL* **21** (1953) 467-468; 572]. [Actually, the experiments were not similar. Cruickshank treated for only 20 weeks and then waited to see if the infection had been eradicated. Bushby and Barnett gave the treatment continuously, and found that after a certain time the infection progressed in spite of the drug, and the animals died.]—H. W. W.