

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.

[TANGANYIKA] Annual Report of the Medical Department, 1955. Vol. II. Dar Es Salaam: Government Printer 1956.

This report is the statistical part of the annual report of the director of medical services [cf *THE JOURNAL* **24** (1956) 486]. From the table of figures on leprosy treatment centers operated by the native authorities, and missions it would appear that there are provisions for inpatients in each of the 8 provinces and at Dar es Salaam—although there were only 19 cases in that city, and 19 in the Northern Province. The number of actual leprosia is not shown. The total of inpatients at the end of the year was 5,217, there having been 1,960 new admissions. Another 8,879 were registered for outpatient treatment, not counting those under treatment at general hospitals. A total of 11,018 were on sulfone therapy.

—H. W. W.

CHUNG-HOON, E. K. and HEDGCOCK, G. Racial aspects of leprosy and recent therapeutic advances. *Hawaii Med. J.* **16** (1956) 125-130.

New cases of leprosy diagnosed in Hawaii fell from 157 in 1946-1951 to 114 in 1951-1956; the total for the decade was 271. One-half of the total occurred in Hawaiians and part-Hawaiians (28.7%, and 20.3%, respectively), and one-fourth (24%) in Filipinos, nearly all of the latter born and reared in the Philippines. Japanese accounted for 11%, Caucasians for 7.8%, Samoans 3.7%, and Chinese 3%. The morbidity by racial groups (per 100,000 population per year) was 45.4 for Hawaiians, 17 for Filipinos, 10.6 for part-Hawaiians, 3.1 for Koreans, 2.5 for Chinese, 2.2 for Caucasians, and 1.6 for Japanese. In one-third of the cases the duration was 3 months or less; in one-fifth, 6 months; and in 15% each 12 months, 18 months, or longer. Slightly over one-half the cases (54.4%) were bacteriologically positive when diagnosed, and they were isolated; the others were treated as outpatients. The ratio of positive to negative cases was about 2:1 for part-Hawaiian and Samoan cases. The ratio of males to females was 2:1 except in the Filipino group, in which it was 20:1, males greatly predominating among their representation in Hawaii. Sulfone therapy, used only since 1946, has given total improvement of 92.5% of this group of cases; 4.6% were unchanged, and 2.9% worse. Promin, diasone, Promacetin and Promizole were used (the last very infrequently); DDS had been used only recently in a small group of cases. Of 239 sulfone-treated cases, 79 were managed as outpatients and 160 as inpatients. Of the latter group, 67 (42%) became bacteriologically negative after 6 months to 9 years of treatment, one-fourth of them by six months, and nearly two-thirds of them (about 60%) at the end of two years.

—H. L. ARNOLD, JR.

BHATTACHARYA, J. K. Health education in social aspects of diseases; with special reference to the control programme of venereal diseases, tuberculosis and leprosy. *Indian J. Med. Assoc.* **24** (1955) 303-305.

The author discusses briefly the effect of social factors upon the parent, his family, and the community, in two directions (a) the environmental e.g., social and economic status, (b) the personal, e.g., mental process and reactions manifested usually by fear, conflicts, feeling of guilt or shame. These factors are illustrated with respect to the three communicable diseases discussed. Regarding the control of leprosy, the author

believes that more importance should be given to the health educational program than to extensive sulfone therapy, thereby helping case finding, medical care, isolation and rehabilitation.

—N. MUKERJEE

✓ RAMOS E. SILVA, J. Tendances actuelles de la prophylaxie de la lèpre au Brésil. [Present trends in the prophylaxis of leprosy in Brazil.] *Brasil-Médico* 70 (1956) 225-230.

Complete compulsory segregation is now being less and less applied, not because it is ineffective but because so many infectious persons evade the measure and maintain the endemic. The dispensary is becoming the essential instrument of control. There is need of a dynamic organization for the detection and treatment of new cases, for the examination of contacts, etc. Sulfone treatment of the incipient forms of the disease may perhaps prevent their transformation into contagious ones, thus eliminating the future source of infection. In highly endemic countries repeated contact with infectious cases is inevitable. Susceptibility is more significant than the microbial factor in producing infection. To reduce the number of predisposed persons in the population would solve the problem control, and therefore the use of BCG is to be recommended. The leprosaria and sanatoria will have to lose their characters of coercion and be converted into centers of assistance which will be willingly sought by the patients. All of this will create a general impression of humanized antileprosy campaigns. The patient should be treated like one with any of the other infectious and contagious diseases, and leprosy itself should be considered on the same level with them.—[From the authors' conclusions.]

✓ FLOCH, H. Comment on doit concevoir la lutte antilépreuse moderne. Preeminence du traitement sur l'isolement. [How should we regard the modern antileprosy campaign. Superiority of treatment over isolation.] *Arch. Inst. Pasteur Guyane Française et Inini* 17 (1956) Publ. No. 409 (October).

Sulfone therapy has changed the whole aspect of antileprosy work, treatment (particularly with DDS) having replaced isolation in importance. The dispensary and sanitary treatment formations are now the main instrument of the campaign. There is need of hospital treatment of lepromatous cases *au debut*, and of patients with acute episodes which often are hard to manage, but afterward they would be transferred to the dispensary. In the "isolation sanitaria," everywhere in bad repute, the numbers of patients are decreasing and finally there will be only negatives and cripples. The true prophylaxis of the contagious forms is treatment of the tuberculoid and indeterminate cases to prevent their becoming lepromatous. Preventoria, for the "isolation" of healthy children, should be abolished. BCG for prophylaxis should be extended on a large scale in all endemic countries. Contacts of contagious cases may benefit from prophylactic treatment with DDS, provided it be sufficiently prolonged. Although other things will vary from country to country, the basic principle of prophylaxis everywhere is effective sulfone treatment of all leprosy patients.

—AUTHOR'S ABSTRACT

✓ BROWN, J. A. K. Susceptibility and resistance in leprosy. *Leprosy Rev.* 27 (1956) 147-151.

In this paper are considered the possible reasons why some contacts acquire the disease and others do not. An example is given of a boy, with no known contact, who showed early hypopigmented macules when he was 8 years old, and later developed lepromatous leprosy. His mother developed a tuberculoid lesion a year after his lesions first appeared. Did the boy infect his mother, or were both infected from the same unknown source, or did the mother's tuberculoid lesion infect the son? The author goes on to elaborate a hypothesis of susceptibility depending upon the presence or absence of a factor X. The susceptibility of the offspring will vary according to whether one, both or neither of the parents possess the X factor. Whether

a contact will develop the disease or not, and the form taken by the disease, will, according to this hypothesis, depend to a large extent on the amount, if any, of the X factor inherited.—[From abstract in *Trop. Dis. Bull.* **54** (1957) 52.]

✓ JOPLING, W. H. The clinical features of leprosy in the European. *Central African J. Med.* **2** (1956) 390-393.

This is a short guide to the diagnosis of leprosy, with examples of mistaken diagnoses. A European consulted 15 doctors in South Africa [a country where leprosy is not at all uncommon] before seeing one who made the correct diagnosis. Simple rules are given for diagnosing and differentiating the two main types of leprosy, lepromatous and tuberculoid; intermediate forms are passed over as showing characteristics of both main types.—[From abstract in *Trop. Dis. Bull.* **54** (1957) 440.]

✓ KHANOLKAR, V. R. and COCHRANE, R. G. The dimorphous macular lesion in leprosy. *Indian J. Med. Sci.* **10** (1956) 499-505.

Four cases of the dimorphous form of leprosy are described and illustrated by photographs of lesions and corresponding sections of biopsy material. Histological appearances characteristic of the 2 main types of leprosy appear in the same lesions. Bacilli were found in all 4 cases, and in 3 of them the lepromin reaction was slightly positive. It is considered that this form of the disease may be transformed into either the lepromatous or the tuberculoid type, but more frequently into the former than into the latter.—[Abstract from *Trop. Dis. Bull.* **53** (1956) 1434.]

✓ JOPLING, W. H. Borderline (dimorphous) leprosy maintaining a polyneuritic form for eight years; a case report. *Trans. Roy. Soc. Trop. Med. & Hyg.* **50** (1956) 478-480.

A patient with neurological symptoms for 8 years was wrongly diagnosed as suffering from syringomyelia. When in 1954 a diagnosis of leprosy was made he was treated with DDS. After 4 months' treatment there were pains in the limbs and erysipeloid skin lesions. Previous to this a biopsy of the auricular nerve showed foamy cells between the nerve fibrils, but no epithelioid or giant cells; there were large numbers of acid-fast bacilli. Later a biopsy of the skin showed "patches of infiltration by mononuclear cells (histiocytes) and epithelioid cells," a few acid-fast bacilli, but no foam cells or giant cells. A diagnosis of dimorphous or borderline leprosy was made.—[Abstract from *Trop. Dis. Bull.* **54** (1957) 53.]

✓ GAY PRIETO. *Lepra dimorfa.* [Dimorphous leprosy.] *Actas Dermo-Sifiliogr.* **47** (1955-1956) 226-229.

Presentation of a female patient aged 67 with dermatitis of pellagroid aspect which, a few months previously, had healed under isoniazid treatment but had relapsed, with the same manifestations. One biopsy specimen showed a diffuse reticulosis with tendency to grouping together in follicles (i.e., tuberculoid aspect), while another showed a frank tuberculoid structure of sarcoid appearance with a very few Hansen bacilli. Clinically the patient, who had alopecia of the eyebrows, showed on her neck two small achromic lesions sensitive to heat and pain and with a normal response to histamine. The author could not give the clinical diagnosis of tuberculoid leprosy indicated by the histology. The histopathologist who had examined the biopsy specimens (Puchol) discussed his findings and stated that he regarded the case as tuberculoid leprosy in reaction. —F. CONTRERAS

✓ SCHUJMAN, S. El problema de la transformación de lepra tuberculoides en lepromatosa; consideraciones sobre dos casos observados. [The problem of conversion of tuberculoid to lepromatous leprosy; observations of two cases.] *Leprológia* **1** (1956) 60-67.

The author points out that during his 25 years of experience, in which he has

dealt with over 500 patients with tuberculoid leprosy, he had not seen any case that was typical tuberculoid from the clinical, bacteriologic, and histologic points of view, and above all with frankly positive immunology, transform to a typical lepromatous case. Tuberculoid reaction cases with frankly positive immunology have, so far as lepromatous transformation is concerned, the same benign prognosis as the torpid tuberculoid cases. The essential factor is the immunological state; the number or severity of the lesions is not taken into account. Tuberculoid cases in reaction with weakly positive or negative immunology are the ones inclined to become lepromatous, but they are not necessarily condemned to do so. This transformation is influenced by various factors which debilitate the organism, and others that are not known, but the most important one in the author's opinion is insufficiency (or, above all, lack) of antileprosy treatment.—[From the author's summary, supplied by G. Basombrio.]

[The statement in the first sentence of this abstract may perhaps be misleading unless full value is given to the qualifications stated. Actually, much of this paper is devoted to a detailed and well-illustrated description of a case—the second in the author's experience—of tuberculoid lepra reaction which, with weak Mitsuda reaction when first seen and afterwards, repeated clinical reactions, and insufficient treatment, became transformed to a typical lepromatous case. It would, naturally, be through a process of weakening of the immunological factor, with repeated clinical reactions—and only through such a process, so far as is known—that a tuberculoid case can change, through borderline, to lepromatous.—EDITOR]

✓ CARBONI, E. A. and FERNANDEZ, J. M. M. El mecanismo de la reacción leprosa y su tratamiento racional. [Mechanism of lepra reaction and its rational treatment.] *Leprológia* 1 (1956) 51-54.

The authors interpret tuberculoid lepra reaction as an allergic phenomenon, and lepromatous reaction as a par allergic one. According to this concept, rational therapy of this complication must be attempted by means of procedures that can interfere with these phenomena. This interference can be accomplished by: (1) inhibition (cortisone, ACTH, antihistamines); (2) specific or nonspecific desensitization (lepromin, tuberculin, BCG, etc.); (3) direct action upon the precipitating allergen or par allergen (sulfone, streptomycin, hydrazides, etc.); and (4) elimination of the disease. Each of these procedures is briefly discussed, with illustrative examples from personal experience.—[From the authors' summary, supplied by G. Basombrio.]

✓ UCHIDA, M. and SHIONUMA, E. On the relation between acute iridocyclitis and erythema nodosum in leprosy patients. *La Lepro* 25 (1956) 143-158 (in Japanese; English abstract p. 143).

Acute leprosy iridocyclitis has a close relationship with erythema nodosum leprosum, and increases when it occurs. Its seasonal frequency is in accord with that of ENL, namely, lowest in the winter with an increase in the spring. The frequency and seasonal occurrence of the two conditions in Nagashima Aisei-en showed no marked differences between the chaulmoogra and promin periods. The combination of the two conditions seems to have some allergic significance, as one of the diseases which have seasonal changes. Four eyes from 4 such patients, who complained of severe pains, were enucleated and examined histologically. The changes found, as Mitsuda has reported, were similar to those observed in erythema nodosum leprosum of the skin.—[From the English abstract.]

✓ GEHR, E. and STOLZE, E. The significance of thickened nerves in the diagnosis of leprosy. *Docum. Med. Geograph. et Trop.* 8 (1956) 351-356.

One of the authors had noticed in 1,069 healthy persons in Surinam a high proportion with thickening of nerves, and in 215 healthy contacts with leprosy the proportion was even higher. To clarify matters the ulnar nerves of 82 autopsies were studied and in 9 cases they were found enlarged, although the patients were not known

to have suffered from leprosy. The nerves were found to have "signs of a chronic, nonspecific, fibrotic neuritis, in two cases so far advanced that only a few normal nerve fibers were left." Ten further specimens of thickened nerves from persons not known to have had leprosy "showed either perineural and intrafascicular connective tissue proliferation or only a pāucicellular edema." In all, the ulnar nerve seemed thickened in 24 out of 278 persons without signs of leprosy. It is concluded that a diagnosis of leprosy on the evidence of thickened nerves is not warranted, although "most of the cases observed by us represent residual states of old processes that might very well coincide with skin lesions of various origins. Biopsies of nerve tissue would doubtless solve the problem in many cases but are rarely practicable."—[From abstract in *Trop. Dis. Bull.* 54 (1957) 298.]

FRITSCHI, E. P. The pattern of sensory loss in leprosy and its significance in the pathogenesis of leprotic neuritis. *Leprosy Rev.* 27 (1956) 151-161.

This report is of the patterns of sensory loss recorded in 304 hand charts of patients in Vellore, India. Tests were made for light touch and pain. There was complete anesthesia in 67% of lepromatous patients and in 50% of nonlepromatous. Of the incomplete cases, the commonest pattern was ulnar loss; the area which retained sensation most commonly was the middle of the median area. This suggests that the anesthesia is not due to peripheral nerve-fiber destruction but to the proximal nerve-trunk lesion at the site of predilection. Relating these findings to motor paralysis, in the ulnar nerve motor and sensory involvement are commonest; in the median nerve motor involvement is slightly more common than sensory involvement; in the radial nerve motor involvement is rare while sensory involvement is common. The possibility that the temperature of the nerve fiber, related to the superficial situation of the nerve trunks, may be a factor in determining the site of predilection of the nerve is discussed.—[Mostly from the author's summary.]

ZAMUDIO, V. L. Algunos problemas quinesiologicos de las manos de los enfermos hansenianos. [Kinesiological problems of the hands of leprosy patients.] *Dermatologia, Rev. Mexicana* 1 (1956) 23-50.

It is concluded, from the orthopedic point of view, that leprosy patients are the only persons with the specific lesions within the nerve trunks. The paralyzes, deformities, trophic changes and mutilations of leprosy can be treated or prevented according to the general outlines for patients with the same type of lesions produced by other causes, e.g., trauma, poliomyelitis, etc. The author analyzes the paralyzes, deformities and handicaps that leprosy leaves after the invasion of the main trunks of the upper extremities by the infection. A kinesiologic study of these paralyzes and deformities is done, with a discussion of their treatment with the techniques established for the management of patients with the same type of handicaps produced by other causes.—[From summary and conclusions.]

WOZONIG, H. Die Knochenveränderungen bei Lepra. [Bone changes in leprosy.] *Ztschr. Tropenmed. u. Parasitol.* 7 (1957) 464-471.

Bone lesions in 50 leprosy patients in the Haile Selassie leprosarium in Addis Ababa were studied by x-ray examination, to evaluate their diagnostic significance. Such lesions, usually confined to the hands and feet, develop in almost every case in the course of the disease by slow atrophy and resorption, the terminal phalanges of the fingers and toes being particularly involved. Usually beginning in the 4th to 6th year of the disease, the process takes decades, and it leads to gradual absorption, osteoporosis, decalcification, specific osteomyelitis, periostitis, cyst formation, arthropathies, luxations, spontaneous fractures, exostoses, synarthrosis, and pseudoarthrosis. These changes are nonspecific, resulting from trophic disturbances secondary to nerve involvement. Disturbances of blood supply and the development of anesthesia of the extremities lead to injuries and secondary infections. —E. KEIL

NIRANKARI, M. and CHADDAH, M. R. II. Leproma of the ciliary body. *J. All-India Ophthal. Soc.* **1** (1953) 66-67.

The authors report on a case of leprosy of the lepromatous (?) type with a nodule at the limbus of the right eye. Leprosy being rare in the plains of the Punjab, the patient was admitted to an eye hospital as a case of gumma of the ciliary body. Later investigations cleared up the diagnosis. —N. MUKERJEE

BONAR, B. E. and RABSON, A. S. Gynecologic aspects of leprosy. *Obst. & Gynec.* **9** (1957) 33-43.

This is a report of a 38 year old Mexican primipara at Carville who had had Lucio leprosy for approximately five years, who was found to have leprosy cervicitis, metritis, salpingitis and oophoritis. An extensive hysterectomy was performed with pelvic node dissection. Cultures of the cervical tissues were negative for tubercle bacilli and *Nocardia*. The authors then reviewed the Carville records for 16 years (1939-1955), in which period 42 major and 22 minor gynecologic operations had been performed. The sections and/or pathology protocols of these cases revealed no evidence of leprosy. The literature was reviewed, and several gynecological conditions are discussed. The most pronounced changes of gynecologic leprosy seem to occur in the ovary, followed by the cervix, myometrium, endometrium and tube in that order. If leprosy reactivations are frequent and severe enough chronic leprotic oophoritis may occur, but with modern therapy this entity is appearing later in the reproductive life of the patient. For this reason fecundity is influenced little in the female, but the menopause may be early. Gynecologic surgery has little or no detrimental effect in leprosy, and excellent surgical results are to be expected. —SR. HILARY ROSS

BARUH, S. H. Le test à l'histamine dans le diagnostic différentiel entre la lèpre anesthésique pure et la syringomyélie. [The histamine test in the differential diagnosis between pure anesthetic leprosy and syringomyelia.] *N. Istanbul Contr. Clin. Sci.* **3** (1955) 152-163.

To overcome the practical difficulties in the differential diagnosis between these conditions there was developed a test which involves the intradermal injection of 0.1 cc. of a 1-1.5 per mille histamine solution. Normally, this causes the so-called triple response of Lewis—primary erythema, papule, and secondary erythematous flare. The primary erythema and the papule are assumed to result from a direct capillary reaction to the histamine, not involving the nervous system. The secondary erythematous flare, however, results from arteriolar dilation based on an autonomic axon reflex. Since degeneration of the peripheral sensory fibrils is assumed to be associated with anesthetic leprosy, it may be believed that the axon reflex has been interrupted in this condition, wherefore the secondary erythematous flare cannot occur. In this respect anesthetic leprosy differs from syringomyelia, which is based on a medullary affection. The author applied the test to 40 patients, with the results described in all leprosy patients.—[From abstract in *Excerpta Med.* **11** (1957) 71.]

LUCENA, C. E., BENITEZ, R. and CRISCI, J. Tuberculosis de reinfección en una enferma lepromatosa. [Reinfection tuberculosis in a lepromatous patient.] *Leprologia* **1** (1956) 43-45.

The authors presented the case of a patient with lepromatous leprosy in whom reinfection tuberculosis developed, recalling that leprosy decreases the defenses of the organism against the Koch bacillus. A majority of the patient's lesions improved at the beginning of the tuberculosis infection. The Mitsuda reaction was always negative, and the Mantoux positive. The detection by bronchoscopy of a vegetative lesion in the left bronchus raised diagnostic doubts, but the authors believed that the tumor was of tuberculous etiology.—[From the authors' summary, supplied by G. Basombrio.]

- ✓ SCHALLER, K. F. and SERIE, CH. Neurofibromatosis Recklinghausen—Lepra lepromatosa. [Recklinghausen's neurofibromatosis-lepromatous leprosy] *Ztschr. Haut- u. Geschl.-Krankh.* **22** (1957) 10-12.

Report of 1 of the 3 cases of Recklinghausen's neurofibromatosis that within one year had been admitted to an Addis Ababa hospital as lepromatous leprosy. The 60-year-old patient showed the typical facies leontina, and more than 2,000 nodes were distributed all over his body. These nodes were flat or pedicled, soft or compact, of lentil to pigeon-egg size; they first appeared on the face, more than 20 years ago. Suggestive of leprosy were infiltration of the forehead, loss of the eyebrows, trophic disturbances of the lower extremities, and palpable thickenings of the cubital nerves; but the auricles were completely free from infiltrations, there were no disturbances of sensation, and bacilli were not found. The main symptoms of Recklinghausen's neurofibromatosis were present, including psychic disorders and changes of the nervous system. Gamma globulin values were normal, not increased as in lepromatous leprosy. Histological examination confirmed the diagnosis in all three cases. —E. KEIL

- ✓ DOULL, J. A. Progress in the therapy of leprosy. *Rel. Congr. Internaz. Difesa e Riabilit. Soc. "Lebbroso,"* Roma, 16-18 aprile, 1956, pp. 95-106.

There is urgent need for a more rapidly effective therapeutic agent than those now available. Basic is intensification of research on cultivation of the leprosy bacillus and of the search for an animal susceptible to the disease. If these things can be accomplished drugs can be screened *in vitro* and *in vivo* for *M. leprae*. In the meantime the less certain and possibly deceptive path of analogy must be followed, using tuberculosis or other mycobacterial diseases. The final proof of therapeutic value must come from controlled clinical trials. The program, the difficulties, and the results of the clinical evaluation studies of the Leonard Wood Memorial are reviewed. Dihydrostreptomycin and two sulfones (diasone and DDS) were found to be of about equal value in 48-weeks trials with lepromatous cases. None has a bactericidal effect. There was no advantage in various combinations used. The length of time required to determine the effectiveness of a drug is the greatest handicap; there is urgent need for some earlier sign of improvement. A plea is made for the provision by governments and philanthropic organizations of adequate funds for research work on leprosy, upon which depends the eventual elimination of the disease.—[From author's summary.]

- ✓ MONTESTRUC, E. Essais nouveaux de thérapeutique antilépreuse. [New trials in antileprosy therapy.] *Bull. Soc. Path. exot.* **49** (1956) 10-15.

Results are given of trials of Pasiniazide, antibiotic 5337 RP, Largactil (chlorpromazine), *Mycobacterium marianum*, and salicylate of soda. Pasiniazide (a combination of PAS and isoniazid) had no effect in lepromatous cases, although it seemed to speed up sterilization of the nasal mucosa when combined with DDS; but it rapidly benefited 2 tuberculoid patients who had been treated with sulfones for several months without result. With the antibiotic [Rouamycin (Spiramycin), from *Streptomyces amboficans*] there was rapid clinical improvement in one patient, but none in 3 others. Four patients who had made slight improvement with DDS were not benefited by the use of Largactil, and this drug had practically no effect in checking lepra reaction. The *M. marianum* antigen was abandoned after trial on 2 patients in whom it produced reactions difficult to control. Cortisone is of value in severe reactions, but the dosage has to be watched carefully lest there be a relapse of reaction. Salicylate of soda intravenously was found of some use in relieving lepra reaction.—[From abstract in *Trop. Dis. Bull.* **53** (1956) 1125.]

- ✓ COMBES, F. C. and REISCH, M. Urinary infections due to 4,4'-diaminodiphenyl sulphone therapy; report of three cases. *British J. Derm.* **69** (1957) 25-27.

Diaminodiphenyl sulfone [DDS] has been used effectively not only in tuber-

culosis and leprosy but also in many toxic bullous eruptions, especially dermatitis herpetiformis and pemphigus. Urinary infections developed in 3 patients who were treated with DDS (Dapsone) for dermatitis herpetiformis, pemphigus vulgaris, and leprosy, respectively. When the drug was discontinued and a suitable antibiotic was given, the patients recovered. To ascertain why the prolonged administration of Dapsone resulted in pyelonephritis rather than in intestinal disturbances such as sometimes accompany protracted administration of antibiotics, the absorption and excretion of the drug were studied. After therapeutic doses, it is found in all tissues and body fluids, the liver and kidney containing relatively high concentrations. Minor disturbances such as repeated attacks of erythema nodosum, arthralgia, and peripheral neuritis due to intolerance of sulfone therapy are common, but side-reactions involving the urinary tract, such as reported here, are not common. The authors recommend that patients with slight albuminuria be given lower than ordinary dosages. When administering Dapsone by mouth, it should be remembered that it is capable of provoking urinary infection by organisms resistant to it.—[From abstract in *J. American Med. Assoc.* 164 (1957) 106, supplied by Sr. Hilary Ross.]

- ✓ MUKERJEE, N. and SEN, N. R. Haematological effect of adding yeast & iron to DDS in the treatment of lepromatous cases. *Lep. India* 28 (1956) 121-123.

In this experiment three groups of lepromatous cases were treated, for various periods up to 2 years depending upon the patients' attendance, with three kinds of tablets, containing: (a) 50 mgm. of DDS alone, (b) the same dose of DDS with 0.5 gm. yeast, and (c) the same as (b) with the addition of 1.5 grain ferrous sulfate. It was concluded that the additives used, in the small doses employed, could not counteract the tendency of DDS to produce anemia. (In an editorial it is recalled that in a previous study in the same institution the same conclusion was reached with respect to nonlepromatous cases. There is no indication for the routine use of yeast and iron, it is stated, although in the presence of anemia hematinic drugs must be used in adequate dosage.) —H. W. W.

- ✓ GARRETT, A. S. Five years of mass Dapsone (DDS) treatment. *Leprosy Rev.* 27 (1956) 54-60.

In 1951, when DDS treatment had been in use for a year, the number under treatment in Onitsha Province, Nigeria, reached 10,600. Since then there has been a steady decrease, to 7,800 at the time of writing, and the severer forms are seldom seen except when new areas are opened up. Except for a few complicated by dermatitis, all nodular lepromatous cases have improved, and most of the severest cases whose treatment began in 1950 "are now mostly reaching the stage of negative smears." Combining isoniazid with the sulfone treatment does not much accelerate progress, but reactions seem less. Dermatitis with associated hepatitis occurred in about 2%, but nearly all could be desensitized by a sulphetrone mixture. Also in these patients thiacetazone may be used, but it loses its effect in about 2 years. Hepatitis, at first much feared, is largely the result of previous undernourishment. At first there were many severe lepromatous cases and reactions were severe and common; now new cases are earlier and reactions are less common and less severe. No definite case of DDS resistance was known, but it was suspected in a few. One lepromatous case, improved after 5 years of sulfone treatment, had shown a slight rise in bacteriology, but without clinical deterioration. A few tuberculoid patients had remained with active-looking lesions for 4 or more years. Relapses had occurred in about 7%, in: (a) those treated with hydnocarpus followed by a year or less of DDS, (b) some atypical tuberculoid cases given DDS for only 18 months, and (c) those attending irregularly. Parenteral vs oral methods are discussed, the author expressing preference for the latter. The real danger lies in the patient who can conceal his disease by treatment which is insufficient to render him uninfected.—[From abstract in *Trop. Dis. Bull.* 53 (1956) 1008.]

NARASIMHACHARI, R. A report on the treatment of 533 cases of leprosy with sulphones. *Indian J. Vener. Dis.* **20** (1954) 56-57.

The author treated 533 lepromatous cases during a period of about 2-½ years. Sulphetrone was given to 65 patients (parenterally to 60 and orally to 5), and DDS orally to 486. The results are given as follows: discharged 69, absconded 135, died 41, under treatment 296, and changed to hydnocarpus therapy 29. The author considers DDS superior to sulphetrone.

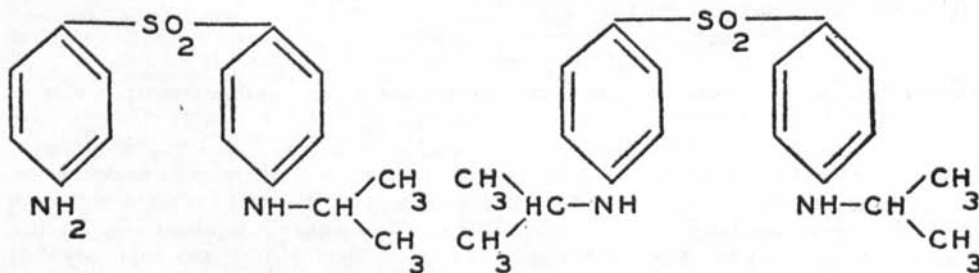
—N. MUKERJEE

DAVEY, T. F. Experience with "Avlosulfon" soluble. *Leprosy Rev.* **27** (1956) 6-18.

This substance, a 40% w/w aqueous solution of N:N'diethyl-4:4'diaminodiphenyl sulfone-a:a'disulfate, is freely soluble in water and breaks down rapidly in the body to release half its weight of DDS. Its injection caused a peak concentration in the blood within 2 hours, considerably higher than that attained with a corresponding dose of DDS given orally; but after 72 hours the level was only 0.1 mgm/%. Comparing the concentrations obtained in the blood and urine with this compound and with ordinary DDS, the discrepancy between total sulfone and that extractable by benzene with the former is very noticeable. The substance was tested in 24 patients, with results very similar to those obtained with DDS; and the frequency of ENL reactions was also very similar. The Avlosulfon soluble had been administered only twice weekly, and the blood level for the greater part of each week was below 0.3 mgm/%, in view of which the author thought that the rapid response of the patient might be due to the periodic hammer-like action of the brief phrases of high blood levels. Another possibility might be that water-soluble metabolites, active in low concentration, are readily synthesized from Avlosulfon soluble. The conclusion is that the results obtained with Avlosulfon soluble are very similar to those with DDS. —[From abstract in *Trop. Dis. Bull.* **53** (1956) 605.]

FLOCH, H., DEHEZ, F. and MAILLOUX, M. Sulfonothérapie retard antilépreuse hebdomadaire par la voie buccale. [Oral weekly retard sulfone therapy of leprosy.] *Arch. Inst. Pasteur Guyane Française et Inini* **17** (1956) Publ. No. 407 (September).

DDS can be given by mouth in retard sulfone therapy. Thus for a long time the children in the Marchoux School-Preventorium in Cayenne have been treated by a 400 mgm. oral dose, twice weekly. Sulfone determination of the blood and urine give satisfactory sulfone levels for 4 days afterwards. Increase of that massive dose is poorly tolerated, and the blood sulfone levels after the fourth day are hardly modified within the limits of possible dosage. The propylated sulfones, which are effective in oral treatment, are less toxic than DDS and are eliminated more slowly. Combinations seem interesting to study; the authors have tried, in children, weekly



dosage of 400 mgm. of each, DDS and dipropylated sulfone, and in adults 400+600 and also 300+700. Adequate sulfone blood levels have been found to and including the 7th day, the slowly-eliminated propylated sulfone serving to maintain the level during the last 3 or 4 days of the week. The 300:700 mixture is less toxic than 500 mgm. of

DDS and is well tolerated, and it can therefore be recommended. With patients receiving retard injection treatment, one dose of the mixture given three weeks after the injection will serve to maintain the blood level during the fourth week (mixed parenteral and oral treatment).

—AUTHORS' ABSTRACT

✓ ROY, A. T. Thiosemicarbazone. (In the treatment of leprosy, in DDS intolerant cases and in combination with DDS.) *Lep. India* **27** (1955) 187-193.

The author gave thiosemicarbazone to 9 previously-untreated lepromatous cases for an average period of 42 months, with good results. Eight lepromatous cases who were intolerant to DDS were also treated, for an average period of 14 months. They had fewer reactions and suffered for smaller numbers of days than they had previously with DDS. Eighteen lepromatous cases were put on a combined therapy with both drugs, the thiosemicarbazone being given orally in doses of 25 to 100 mgm. daily and the DDS parenterally in doses of 100 to 400 mgm. weekly. During a period of 18 months this combined therapy did not seem to produce better results than either drug alone.

—N. MUKERJEE

✓ TARABINI CASTELLANI, G. Hidracida isonicotínica en altas dosis con estreptomycin o aminoácidos azufrados en el tratamiento de la lepra. [Isonicotinic acid hydrazide in large doses with streptomycin or sulfonated amino acid in the treatment of leprosy.] *Fontilles* **4** (1956) 19-31.

The author discusses the tolerance for and clinical results obtained with isoniazid in high doses when combined with drugs with antitoxic activity—streptomycin and glutamic acid. Of 7 advanced and strongly positive lepromatous cases treated with the streptomycin combination, 4 became bacteriologically negative, 3 permanently and 1 temporarily; 2 others improved slightly, and 1 was resistant to the medication, probably because of acquired resistance to isoniazid. One indeterminate case, positive in the skin, became negative in 15 days with this treatment. In cases in which the isoniazid was associated with glutamic acid the results were worse, the interpretation being that the bacilli became quickly resistant to the isoniazid.

F. CONTRERAS

BOITEAU, P. and BATSIMAMANCA, A. R. L'Asiaticoside, extrait de "*Centella asiatica*" et ses emplois thérapeutiques dans la cicatrisation des plaies expérimentales et rebelles (lèpre, tuberculose cutanée et lupus). [Asiaticoside, an extract of *Centella asiatica*, and its therapeutic uses in the healing of experimental and resistant lesions (leprosy, cutaneous tuberculosis and lupus).] *Thérapie* **11** (1956) 125-149.

It seems that asiaticoside has no specific action on the Hansen bacillus, although it plays a part in the healing of leprosy ulcers and causes, as a result of the healing, rapid disappearance of the bacilli from the nasal mucosa and the lesions of lepromatous cases. It may be advantageous, therefore, to combine this drug with sulfones in treatment. Tuberculous skin lesions are also susceptible to asiaticoside treatment, although properly speaking this substance has no tuberculostatic effect.—[From abstract in *Bull. Inst. Pasteur* **54** (1956) 2737.]

✓ ARGUELLO PITT, L. and CONSIGLI, C. A. Nuestra experiencia con el B. C. G. en el tratamiento de la reacción leprosa. [Experience with BCG in the treatment of lepra reaction.] *Leprológia* **1** (1956) 32-38.

After discussing summarily the subjects of (a) relationship between tuberculosis and leprosy, (b) lepra reactions, and (c) BCG vaccination, the authors report an experiment with oral BCG done with 10 reaction patients of various clinical types. The BCG was given in doses of 0.2 gm. weekly, for periods varying from 3 to 24 months, during which time no evidence of intolerance appeared. It is concluded that, used in this way, BCG has a marked desensitizing effect in a large proportion of cases, especially of the lepromatous form. This effect is evidenced by lessening of the intensity

of the cutaneous eruptions, improvement of the general condition, decrease in temperature, and increase in weight.—[From the authors' summary, supplied by G. Basombrio.]

VACCARO, A. J., COMPA, F. V. and CARBONI, E. A. Tratamiento de la reacción leprosa lepromatosa con B.C.G. [Treatment of lepromatous lepra reaction with BCG.] *Leprológica* 1 (1956) 39-42.

Twenty-three lepromatous patients with occasional, rhythmic or persistent reactions, duration varying from some months to years, were treated by Arlindo de Assis' method of "concurrent" vaccination. This experiment was based on the hypothesis that the tuberculosis factor is present in most cases of lepromatous lepra reaction, which would indicate an attempt at desensitization with BCG. The results were as follows: good, 26%; fair, 17%; and nil, 56%. There is need of a long-term study comparing results in two groups of patients, anergic and hyperergic to tuberculin, with controls not given the BCG treatment.—[From the authors' summary, supplied by G. Basombrio.]

CONTRERAS, GUILLEN, TERCENIO and TARABINI. Nuevos tratamientos en las leproreacciones. [New treatments for lepra reactions.] *Fontilles* 4 (1956) 59-71.

Aureomycin, polyvinylpyrrolidone, gamma globulin, and succinic acid were tried in the treatment of lepra reactions. With aureomycin, the reactions disappeared in 3 out of 4 patients, and in the remaining one—who was refractory to any therapy, and had had reactions for 18 months—the results were satisfactory. Polyvinylpyrrolidone given to 10 patients gave excellent results in 50% and improvement of the neuritis, general condition and diuresis in all of them. Preparations of high molecular weight (30,000) seemed to be more efficacious than those of low m.w. (12,500), although the latter gave better results in patients with nephrosclerosis as shown in the drop of the urea level and increase in diuresis. One case showed no improvement at all. Placental gamma globulin was tried in 20 patients, of which one showed quick arrest of the reaction, 3 showed clinical improvement, while the remaining 16 showed no changes. Succinic acid was given to 6 patients with no evident improvement.—[From summary.]

RIEDEL, R. G. The treatment of lepra reaction with Periston N. *Clinical Excerpts (Bayers)* 6 (1955) 147.

The author treated 4 lepromatous cases in reaction, 1 of whom had extensive exfoliative dermatitis, with intravenous injections of Periston N in doses of 100 cc. given daily for 2 or 3 days. The author recognized that the cases were too few to permit definite judgement, but had gained the impression that Periston N has a good effect in acute lepra reactions. Fall in temperature, subsidence of nodules, regression of joint symptoms, and improvement of the general condition in two of the cases were quite definite. The effect was less marked and less persistent in chronic lepra reaction.—[From abstract in *Lep. India* 28 (1956) 61.]

SMAKA, R. S. and CAPP, A. B. Nova terapêutica e profilaxia da reação leprótica. [New therapy and prophylaxis of lepra reaction.] *Rev. paulista Med.* 49 (1956) 32-43.

Although many believe that lepra reaction of the nodosum or multiforme type is helpful to the patients, representing an allergic response of the organism to disease, the authors disagree. They find that in those circumstances the condition of the patients becomes progressively aggravated, with respect to both cutaneous and peripheral-nerve elements, and that the bad effects and the chronicity of the disease have a malign influence on the psyche of the patient. Specialists have long been worried, mainly because of the higher frequency of its appearance in the leprosaria. The authors believe that the treatment they advocate [not described in the conclusions] to be advantageous because of the rapidity of its action. "It represents another important ad-

vantage of Chlorpromazine (Thorazine) in relation to the large variety of drugs employed for the same indication. We remind again that we never withdraw the specific antileprotic medication in the subacute cases."—[From the conclusions, supplied by N. de Souza Campos.]

✓ SMAKA, R. S. and CAPP, A. B. Nova terapêutica da neuralgia leprótica. [A new treatment for leprotic neuralgia.] *Rev. paulista Med.* **49** (1956) 44-53.

Bechelli and Rotberg are quoted as saying that "the leprotic pains frequently appear as a component of the symptomatic picture of leprotic reaction and sometimes are mitigated by the general treatment," but that can be supplemented by various special measures—with extremely variable results. In their sanitarium the authors have used nearly all the many measures and medicaments listed, with poor results. "Based on the excellent and steady results invariably obtained with Amplicitil (Thorazine), considered as the best drug used by us, we point out the following advantages: (a) quickness of action on the pain; (b) perfect tolerance even in high doses; (c) possibility of synergy with specific medication; (d) ease of administration specially by oral route."—[From the conclusions, supplied by N. de Souza Campos.]

✓ GARRETT, A. S. Hyalase (hyaluronidase) injection for lepromatous nerve reactions. *Leprosy Rev.* **27** (1956) 61-63.

Patients with severe and frequently-repeated nerve reactions were given intraneural injections of 5-6 cc. of a solution containing 3 mgm. of Hyalase in 2 cc. of 2% procaine, 5 injections being given into each nerve at weekly intervals. At first patients with 2 affected nerves were chosen, the more affected nerve being injected and the less affected one being kept as a control; but it was not found possible to deny the patient the relief in the untreated nerve which he had experienced in the treated one. Most of the 24 patients showed uniform improvement, but in 6 there was failure or only partial success. The author believes that "this treatment holds out better hope for those suffering from nerve reactions than any treatment so far used." However, he does not use it if caseation is suspected "as the probable result would be a spread of the area destroyed by caseation."—[From abstract in *Trop. Dis. Bull.* **53** (1956) 1007.]

✓ WILKINSON, F. F. and COLOMBO, C. V. Nueva experiencia con hialuronidasa intraneural en lepra. [New experiment with intraneural hyaluronidase in leprosy.] *Leprológia* **1** (1956) 68-71.

This procedure has given good results in 69.5% of 126 cases with leprosy neuritis—cubital and external popliteal—with 30.5% of failures. The authors emphasize the usefulness of this treatment of painful neuritis, and its effects as a prophylactic measure when those nerves become involved; and perhaps its action in diffusing the drugs active against the disease.
—G. BASOMBRIO

✓ CHATTERJEE, K. R. and PODDAR, R. K. Radioactive tracer studies on uptake of diamino-diphenyl-sulphone by leprosy patients. *Proc. Soc. Exper. Biol. & Med.* **94** (1957) 122-125.

The uptake of sulfone by 22 adult male leprosy patients (8 lepromatous and 14 nonlepromatous) was investigated, employing DDS tagged with S-35, obtained from England. The blood volume of each patient was determined by the Evans blue and thiocyanate techniques. The tagged DDS had an initial activity of 1 μ c/mgm. For oral administration, a single dose of 4 μ c was given as a powder. For parenteral use, 2-7 μ c were injected subcutaneously as a 5% suspension of DDS in 0.1% agar solution. Blood was taken at 1, 2, 4, 6, 10 and 24 hours after administration, and then every 24 hours for several days until the drug could no longer be detected. With each patient the urine was pooled for 24 hours on 10 consecutive days. Bone marrow was obtained by sternum puncture. After oral administration: (a) the blood level increased rapidly

during the first few hours, reaching a maximum of about 8% of the dose at 6 hours, then gradually decreasing at an average rate of 62% per day to a negligible level in about 5 days; (b) on an average, 78% of the drug was excreted through the kidneys within about a week, the average rate of excretion being 42% per day; (c) the concentrations of the drug in the bone marrow and the healthy skin were similar to that in the blood; (d) the drug was preferentially localized in diseased skin tissue, where concentration was about 10 times greater than that in healthy tissues. Subcutaneous injection also revealed similar preferential localization in affected regions.

—SR. HILARY ROSS

KÁRÓ, L. and GÖZSY, B. Experiments on the mechanism of action of Triton A-20 and 1,4-dimethyl-7-isopropyl-bicyclo-decapentane. *American Rev. Tuberc. & Pulmon. Dis.* **75** (1957) 684-687.

Triton A20 and 1,4-dimethyl-7-isopropyl-bicyclo-decapentane (BD.I) have been reported to have therapeutic activity against experimental tuberculosis with no, or very little, activity *in vitro*. Nevertheless, it has not been shown that they act exclusively on the host. The matter was studied with fixed and mobile cells of the reticuloendothelial system. Also studied was the activity of these compounds, when used alone or combined with dihydrostreptomycin, on experimental tuberculosis of normal and BCG-immunized guinea-pigs and on experimental murine leprosy. In murine leprosy (two experiments, with rats and mice) the Triton used alone had no therapeutic action, and it did not increase the slight therapeutic action of promin. Experiments suggest that there are several ways to stimulate the defence processes, and that this stimulation is a selective one dependent upon physiologic characteristics of the specific cells. While the decapentane derivative (a liposoluble compound) exhibits a systemic stimulation on the reticuloendothelial system, the same action of the nonionic detergent (a water-soluble compound) on the reticuloendothelial system is more specific for the macrophages and weakly stimulatory for the capillary endothelial phagocytosis. The presence of histamine (as a mediator) is either not necessary, or its activation by the test compounds is not the only way of causing stimulation. Monocytes do not contain histamine, and capillary endothelial phagocytosis can be induced even in histamine-depleted animals. Evidence is presented that the surface-active property of a compound is not a requirement for the stimulation of the cellular defenses, since the same effects can be achieved with the decapentane derivative. While it still cannot be disclaimed that Triton acts on tubercle bacilli *in vivo*, its action on the host is more probable. Because it showed no antituberculosis activity in BCG-immunized and challenged guinea-pig, it can be supposed that the immune principle had been brought to a maximal level by the immunization, and that that level cannot be further increased by treatment with compounds acting on the host. It is interesting to note that, while both compounds stimulate the macrophages to an increased specific activity, neither shows therapeutic action in murine leprosy. It would appear that the cellular defenses against these two diseases are influenced by different factors and functions of the macrophages and/or the environment (extracellular factors). The present experiments have given further evidence that the outcome of experimental tuberculosis can be influenced more favorably by simultaneous action on the host and the parasite than on the parasite alone.

—SR. HILARY ROSS

TAKEDA, K. On the spreading reaction of hyaluronidase; investigation of skin disposition with hyaluronidase. (5th report.) *La Lepro* **25** (1956) 149-157 (in Japanese; English abstract p. 149).

The intracutaneous hyaluronidase spreading reaction (H-SR) was studied in 357 patients of Oshima Seisho-en (250 males and 107 females; 247 lepromatous, 82 neural, and 28 macular). In general, the H-SR is less in the patients than in normals, particularly in L cases; in N cases the function is well conserved, and in M cases it is intermediate. In childhood and adolescence the value is the lowest, gradually

increasing, and this is a specific phenomenon in leprosy patients. But the fact that the area of H-SR is smaller in the male (210.3 mm²) than in female (301.1 mm²) accords with the normal. The acme of erythema nodosum leprosum and the intensity of H-SR were in inverse proportion. In vascular spider manifestations, hypoesthetic lesions, and leprosy macular areas, there is no difference from normal. Blood sedimentation rate, autonomic nerve functions, resistance of capillaries and decrease of acidophil leucocytes have no significance. To summarize, H-SR in leprosy patients seems to be labile and to have many phases.—[From the English abstract.]

LOGINOV, V. K. K voprosu o narusheniakh obmena steroidnykh gormonov u bol'nykh leproi. [The metabolism of the steroid hormones in leprosy.] *Probl. Endokrin. (Moscow)* **6** (1955) 60-63.

The investigation of 151 patients with all forms of leprosy in active as well as in the quiescent phase of the disease and of 15 healthy people serving as controls, revealed a significant reduction of the androgens (17-ketosteroids) and oestrogens in urine of the patients. Particularly significant changes were found in patients with the progressive forms of lepromatous leprosy, and in the active phase of the disease. The author thinks that it is justifiable to include the hormones in the comprehensive treatment of leprosy according to the individual needs of the patient.—[Abstract from *Excerpta Med.* **11** (1957) 168.]

POZZO, G. and FELICITAS HOFMANN, M. Il quadro siero proteico nella lepra. Osservazioni su 21 casi di lepra lepromatosa, su 12 casi di lepra tubercoloide e su 8 casi di lepra indeterminata. [The serum protein picture in leprosy. Observations on 21 lepromatous, 12 tuberculoid and 8 indeterminate cases.] *Giorn. italiano Derm. e Sifilol.* **96** (1955) 403-429.

The authors conducted a study of the proteins in 54 sera of leprosy patients, partly shipped from Brazil but mostly from the Dermatologic Clinic of the University of Genoa. The tests applied included: refractometric, for whole proteins; paper electrophoresis; globulin fractionation; and various reactions of "colloidal lability." The patients were typed as in the tabulation below. The authors conclude that the analysis of serum proteins could be added to the four criteria of classification laid down by the Havana congress. The modifications of the gamma globulin especially could account for the "mesenchymal defense" of Aegeer and Long (*American J. Med. Sci.* **218** (1949) 324). The analysis of the globulin fractions and the colloidal lability reactions can supply data on the characters and evolution of the disease. —M. TERNI

	No. cases	Total proteins	Alb/glob ratio	Fractions modified	Lability reactions
(1) Lepromatous	13	Increased	Inverted	Increased euglob (γ ₂); relative decrease, alb.	Positive
(2) Neuritic	21	Increased (less than (1))	Inverted	Increased euglob (γ ₂); (less than (1))	Often positive
(3) Tuberculoid (a) reactional (b) torpid	12	Increased		Increase of α & γ Like (3a), but less	Negative
(4) Indeterminate	8	Varied	Normal or inverted		Varied

MAYAMA, A. The effect of alcohol-fractionated serum proteins of leprosy patients and rats infected with murine leprosy on the growth of tubercle bacilli. *La Lepro* **25** (1956) 173-180 (in Japanese; English abstract p. 173).

The fact that the blood of leprosy patients, and of white rats and hamsters infected with murine leprosy, has antibacterial effects, especially tuberculostatic activity, introduces an important problem in the study of the immunologic relationships between leprosy and tuberculosis. To investigate the tuberculostatic activity

there were used (1) a pooled serum (42 cc.) from leprosy patients, and (2) a pooled lot (14 cc.) from 8 white rats which 3 months previously had been inoculated subcutaneously with the Hawaiian strain of rat leprosy. The protein component of these sera were separated by Cohn's alcohol-precipitation technique (Method 6), ultracentrifugation being applied at low temperature (-5°C). To detect tuberculostatic activity, the fractions were added 25%, 33%, and 50% to modified Lockemann's liquid medium and a strain of the human tubercle bacillus was cultured therein at 37°C for 2 weeks. The strongest activity was exhibited by fraction II [precipitated pH 7.0, ethanol concentration 19%, -5°C, 39.000-43.500 gm. (human leprosy), and 41.100-43.500 gm. murine leprosy], followed by fraction III [obtained pH 6.8, ethanol concentration 25%, -5°C, 65.00-70.500 gm. (human leprosy), and 66.600-70.500 gm. (murine leprosy)] No tuberculostatic activity was exhibited by fraction IV [precipitated pH 5.8, ethanol concentration 40%, -5°C, 102.500-109.200 gm. (human leprosy), and 105.300-109.200 gm. (murine leprosy)]. Paper electrophoresis analysis of the isolated fractions indicated 6% β_1 and β_2 globulin, and 76% γ globulin in human fraction II; 10% β_1 and 6% β_2 and 62% γ globulin in human fraction III; 41% β and 55% γ globulin in murine fraction II; and 64% β and 28% γ globulin in murine fraction III. That is, every fraction is known to be a combination of β and γ globulins.—[From the English abstract.]

MATOLTSY, A. G. and HERBST, F. S. M. A study of human epidermal proteins. *J. Invest. Dermat.* **26** (1956) 339-342.

For a study of epidermal proteins, the epidermis of human abdominal autopsy skin was separated from the dermis, homogenized, and extracted with various solvents. The components of the extracts, in turn, were identified by paper electrophoresis. These investigations led to a simple fractionation method for the identification of epidermal proteins which is schematically shown. By this fractionation method, in addition to epidermal keratin, two different "soluble proteins" were identified. These are considered to be the "main soluble protein constituents" of human abdominal epidermis.—[Abstract from *Biol. Abst.* **31** (1957) #459, supplied by J. H. Hanks.]

FORGACS, P., McDONALD, C. K. and SKELTON, M. O. The B.C.G. lesion in sarcoidosis. *Lancet* **1** (1957) 188-190.

Nine sarcoid patients were injected intracutaneously with BCG, (1) to see if that attenuated tubercle bacillus would survive, for evidence regarding the widely-held belief that most cases of sarcoid represent a peculiar form of reaction to the tubercle bacillus, and (2) to reexamine Lemming's claim that the histologic pattern at the site of such an injection is peculiar to the disease and may give aid in diagnosis. The dose was 0.1 cc of a suspension containing 0.5 mgm/cc, and after 6 weeks the injection sites were excised and subjected to bacteriologic and histologic examinations. There was a delayed response to the BCG in 7 of the cases, and an immediate reaction in the other two. [It is not stated in the abstract here condensed whether or not the tuberculin reaction was negative in all cases.] The bacillus was found to have survived, apparently unaffected. The histologic pattern was that of a chronic inflammation with histiocytes and lymphocytes predominating, none of the specimens showing the characteristic cell arrangement of the sarcoid follicle.—[From abstract in the *J. American Med. Assoc.* **164** (1957) 217.]

RICHTER, R. Das isopathische Phänomen in klinisch normaler Haut bei Leprakranken. [The isopathic phenomenon in the clinically normal skin of leprosy patients.] *Arch. klin. u. exper. Dermat.* **202** (1956) 307-316.

This is a limited but intensive study of the isopathic phenomenon of Sagher *et al.* [see editorial in this issue], involving 42 biopsy specimens from 3 cases. These were 2 lepromatous, duration 1 and 2 years, resp.; and 1 indeterminate, a 37-year-old male, duration 3 years, biopsies of the hypochromic lesions showing only nonspecific infiltrations. Nasal smears of the lepromatous cases were continuously 3+ positive,

those of the indeterminate case negative. All were negative to lepromin, and the reactions to tuberculin were insignificant. Three excitants were used: tuberculin [which Sagher uses regularly], milk [used in one of Sagher's experiments] and india ink diluted 1/10 [an innovation of the author's]; multiple injections of each were made, all into normal-looking skin areas. One site of each substance was excised from each case after 10 and 20 days and 1 and 2 months, and also after 3 months in two of the cases. There being interest in the effectiveness of the different substances in eliciting the phenomenon, and also in the influence of the time factor, the following tabulation of the histologic findings has been made from the author's more complicated table.

	Case 1 (lepromatous)			Case 2 (lepromatous)			Case 2 (indeterminate)		
	Tb'ln	Milk	I. ink	Tb'ln	Milk	I. ink	Tb'ln	Milk	I. ink
10 days	2+	NS	1+	2+	3+	2+	2+	2+	2+
20 days	2+	1+	1+	2+	3+	2+	2+	2+	2+
1 month	2+	2+	3+	2+	3+	2+	2+	NS	3+
2 months	2+	2+	3+	2+	3+	2+	2+	NS	3+
3 months	2+	3+	3+	NS	NS	NS

NOTE: The grading of Sagher *et al.*, not used by the author, is employed here: 3+ = leproma-like infiltrate, 2+ = prelepromatous, and 1+ = foamy-cell nests; NS = nonspecific inflammatory. The author frequently recorded two findings, e. g., foamy-cell nests and prelepromatous, but only the higher grade is shown in this tabulation.

Few bacilli were found in the sections, when any; repeatedly only a few acid-fast granules were seen, and often nothing. In the indeterminate case 14 specimens were negative; 1 was recorded as showing a very few granules. While confirming the findings of Sagher and associates, the author has also shown that a bland inorganic substance may be used as the excitant, and apparently that the findings may vary with time. The occurrence of the isopathic changes in the indeterminate case as yet free from lepromatous symptoms is regarded as of possible diagnostic importance in bacillus-poor cases. The similarity of this phenomenon to the reaction to the Kveim test in sarcoidosis is pointed out. It is regarded as related to a certain allergic disposition for infectious reactions, although there was no parallelism with the lepromin or tuberculin reactions.—[In part from abstracts supplied by F. Sagher and E. Keil.]

FROMER, J. The pathogenesis of reticulo-endothelial foam cells; effect of polyvinylpyrrolidone on the liver of the mouse. *American J. Path.* **32** (1956) 433-453.

This is a study of the fate of that portion of the PVP plasma expander that is taken up as colloidal particles by the cells of the reticuloendothelial system. Mice were used with reference to foamy changes in the Kupfer cells of the liver (route or routes of injection not stated). The three PVP preparations ranged from about 20,000 to 125,000 av.m.w.; the clinical one (Macrose, Scheneley) was around 40,000. The effects varied directly with the molecular weights of the PVP and with the total dosage. The Kupfer cells became swollen, with finely granular cytoplasm containing vacuoles of various sizes, and condensed hyperchromatic nuclei. When the changes were most marked foamy cells were numerous, often aggregated, and the vacuolization was pronounced. The vacuoles always appeared empty. The fundamental change is "the formation of watery vacuoles" of a large range of sizes; confluence of small vacuoles may occur, if the number is large enough. The water apparently enters from outside because of the hydrophilic nature of the PVP. This is probably of the larger molecule sizes: it may be free or, more likely, in combination with a protein carrier; there may possibly be a fusion or massing of PVP particles within the macrophages. All of it dissolved out in the histologic preparation, and there is no histochemical method of demonstrating it.

—H. W. W.

WOLMAN, M. and WOLMAN, B. Effect of polysaccharides on the formation of granulation tissue. *A.M.A. Arch. Path.* **62** (1956) 74-84.

The high-polymer polysaccharides, levan and dextran, having been found to exert an inhibitory effect on acute inflammation, their effects on repair and formation of granulation tissue (chronic inflammation) were investigated. The substances used were native levan and native dextran (average molecular weights greater than 10^7), and degraded, clinical products of those substances (av.m.w. 70,000-80,000); administration was intraperitoneal. The observations were mostly of healing of snip incisions on the shoulders of young albino mice. The high-polymer substances affected markedly the granulation tissue and slowed the healing process, while with the low-polymer homologs the effect was much less. However, there was in all instances—this being the point of immediate interest—a marked foamy condition of the histiocytes resembling that found in lipid-laden cells, the appearance being often “similar to the cells of leproma.” After treating sections by the PAS (periodic acid-Schiff) method, the vacuoles in the smaller histiocytes were stained, but usually those in the larger ones were not. In the specimens from the animals treated with the high polymers the ground substance was very rich in polysaccharides, staining heavily with PAS and giving the appearance of cartilage. The polysaccharides here were either of a different form from the compounds injected, or were bound by the tissue proteins, for they were not dissolved by the aqueous fixative (formalin). In animals injected intraperitoneally with talcum, the results were comparable—fewer adhesions than in the controls, less organization of the talcum deposits, and a foamy condition of many of the histiocytes. The total picture is said to show a striking resemblance to the effects of adrenocortical hormones.

—H. W. W.

[The two abstracts immediately preceding are included as of interest in connection with the creation of foamy cells by various agents in the skin of lepromatous patients, as discussed in other items in this issue—the article by Waaler, the preceding abstract of one by Richter, and the leading editorial.—EDITOR.]

SUGAI, K. and FUKUSHI, K. Histopathological studies of human leprosy. (Report 2.) Discussion on foamy cells appearing in pulmonary diseases and a criticism on lepra cells. *La Lepro* **25** (1956) 158-171 (in Japanese; English abstract p. 158).

Mitsuda found the Virchow lepra cell to contain lipid in its hydropic degeneration, and he derived it from the leprosy bacillus because of histochemical similarities. Up to now, the lepra cell and the bacilli have been held to have a certain symbiosis. When the antileprosy drugs caused degeneration of the bacilli in the lepra cells, and made it difficult to find bacilli in our autopsy materials, there resulted confusion with foamy cells which appear in certain other lesions. It therefore became necessary again to examine the character of the foamy cell. The histologic roles and origins of lipids of the foamy cells in pulmonary diseases such as pneumonia, pulmonary tuberculosis, and lung cancer were examined histochemically to criticize lepra cells. Cells which may become foamy derive from the mesoderm, especially the reticuloendothelial system (RES), as its phagocytes. For activation of the RES a bacterium is not always necessary, and they can appear in tissue disturbances of malignant tumors, besides inflammation. The specific character of the activated reticuloendothelial system is nothing but phagocytosis. Lipids isolated pathologically, by injury of tissues, are taken up by the phagocytic cells; and the protoplasm of the latter accumulates fatty substances to form foamy cells. This may occur in the formation of lepra cells. Namely, pathologic fatty substances, as tissue debris of the severely disturbed skin and peripheral nerves, are phagocytosed, together with a number of bacilli, and by accumulation the foamy cells are produced. At least, the large amount of lipid observed in the lymph nodes could not be explained by the lipid supplied by the leprosy bacilli. The idea that a large dose of pathologic lipid produced by the disturbed tissue is phagocytosed in reticuloendothelial

cells is a more logical explanation of the formation of foamy cells.—[From the English abstract.]

GAST GALVIS, A. Lesiones histopatológicas en el hígado de leprosos. [Histopathological lesions of the liver in leprosy.] *An. Soc. Biol. Bogotá* **6** (1955) 248-254.

The most interesting findings in 53 liver examinations were: amyloidosis in 30.6% of the 35 lepromatous cases, and the demonstration of tuberculoid granulomas in 6 of 7 tuberculoid cases, 4 being positive for bacilli.—[From abstract in *Excerpta Med.* **10** (1956) 365.]

LOPEZ MARTINEZ, B. and DEL REY CALERO, J. Nuevos métodos de coloración del bacilo de Hansen con fuchinas tensio-activas. [Methods of staining Hansen bacilli with tensio-active fuchsins.] *Actas Dermo-Sifiliogr.* **47** (1955-1956) 465-468.

The authors comment on the hypotheses which explain the phenomenon of acid-fastness, and also refer to different reagents employed to obtain a better staining of the cells, with special reference to those designed to improve the staining of the Koch bacillus. The method of Desbordes, Gayotjeannin and Fournier was adopted, with certain variations, for the Hansen bacillus. With the same times as in the Ziehl method, but in the cold, the difference lies in employing 15 cc. of the commonly-used fuchsin to which are added 2 drops of propylene glycol, with vigorous shaking for 3 minutes. The coloration of the bacilli is always more firmly fixed and persistent. The bodies of the Hansen bacilli, instead of appearing as small rods of uniform thickness as they are after the usual technique, consist of a series of granulations which are regarded as degenerative forms by Henderson and others, or as part of a vital cycle by Manalang, or as active elements of one of its phases by Fernandez, or as spores according to Malfatti, but are considered by Hofmann as of no special significance. The authors are inclined to the theory of Lleras Acosta, who thought that the bacillary structure is normally granular and assumes the aspect of a rod because of the enveloping membrane, and when this is attacked by the reagents the bacillus appears finer, with a body structure formed by the said granulations, which as some investigators believe may indeed be the active element of the vital cycle.

—F. CONTRERAS

PAUL JAYRAJ, A. Periodic acid in the staining of acid-fast bacilli in tissue section. *J. Anat. Soc. India* **4** (1955) 41.

This method is applicable for both *M. leprae* and *M. tuberculosis*. Remove the paraffin, wash in absolute alcohol, flood with a fresh solution of periodic acid (1%) for 5 minutes, wash in running water, stain with carbol-fuchsin, wash, and decolorize in acid-alcohol. The periodic acid increases the acid-fastness of both the tubercle and leprosy bacilli.—[From abstract in *Lep. India* **28** (1956) 61.]

FERNANDEZ, J. M. M., FORTE, A. and CAMOIRANO, J. Relaciones inmunoalérgicas entre lepra y tuberculosis. I. Reacciones provocadas por antígenos tuberculosos tipo lepromina en cobayos normales, calmetizados y tuberculosos, y en individuos tuberculinos positivos y negativos. [Immunoallergic relationship between leprosy and tuberculosis. I. Reactions provoked by lepromin-type tuberculosis antigens in normal, BCG-vaccinated, and tuberculous guinea-pigs and in tuberculin positive and negative individuals. *Leprologia* **1** (1956) 19-31.]

Two antigens of tuberculosis materials were prepared by methods used in making lepromin: (1) a suspension of heat-killed Koch bacilli, human type, analogous to bacillary lepromin (and called Tb); and (2) a Mitsuda-Hayashi type suspension of tuberculous guinea-pig lymph nodes, analogous to integral lepromin although not similarly rich in bacilli (Ti). These were used for skin testing guinea-pigs: normal, BCG-vaccinated, tuberculosis-infected, and previously injected with the same antigens. Tests were also made on tuberculin negative and positive human subjects. In the animals previously exposed to tuberculosis there were observed both early erythematous-

dematous reactions, similar to the Fernandez reaction, and late nodular reactions like the Mitsuda reaction but appearing somewhat sooner, between the second and third weeks. The normal guinea-pigs showed no early reactions, but some gave weakly positive late ones. On repeated injection, however, both reactions were positive (induced positivity). Tuberculin-negative humans were negative for the early reaction, but 70% of them gave the late one; in tuberculin-positive subjects both reactions were positive. The early reactions usually coincided with the results of the Mantoux test (1/10), whereas the late reaction was positive in 70% of the Mantoux-negative cases. The two reactions coincided in animals and human subjects infected with or sensitized by *M. tuberculosis*, but disagreed in more than 50% of normals. The early effect provoked by these antigens is regarded as a hypersensitivity reaction, similar to the tuberculin and Fernandez reactions. As for the late one, in spite of its similarity to the Mitsuda reaction in leprosy it cannot be said without further studies to be of prognostic significance.—[From the authors' summary.]

CHAMBON, L. and DESTOMBES, P. Allergie à la tuberculine et à la lépromine et vaccination B.C.G. chez les lépreux. [Allergy to tuberculin and to lepromin and BCG vaccination in persons with leprosy.] *Bull. Soc. Path. exot.* **49** (1956) 414-418.

After testing 492 untreated leprosy patients (189 lepromatous, 162 tuberculoid, 46 reacting tuberculoid, and 95 indeterminate) for their reactions to tuberculin and lepromin, the authors conclude that leprosy does not seem to affect the frequency of allergy to tuberculin, positive Mantoux reactions being practically the same in leprosy subjects as in controls. Both reactions were positive in about one-third of the patients, most of them being tuberculoid. In contrast, three-quarters of those allergic to tuberculin but not to lepromin were lepromatous. It appeared, therefore, that allergy to tuberculin is not always sufficient to cause allergy to lepromin. After vaccination with BCG, conversions to positive lepromin reactivity are always most frequent among those originally allergic to tuberculin.—[From abstract in *Trop. Dis. Bull.* **54** (1957) 176.]

KAWAGUCHI, Y. The immunological correlation of tuberculosis to leprosy. Part 3. Effects of vaccination with killed bacillus on the development of murine leprosy and tuberculosis in mice. *La Lepro* **25** (1956) 119-123 (in Japanese; English abstract p. 119).

Resistance of mice to murine leprosy was not increased by vaccination with simple phenol-killed tubercle bacilli. The development of lepromas progressed more slowly in mice vaccinated with a liquid-paraffin vaccine of tubercle bacilli or of murine leprosy bacilli killed by phenol than in the controls, but the degree of resistance was of a lower order than that induced by vaccination with living BCG. No effects on tuberculosis infection were seen in a group of mice injected with liquid-paraffin vaccine of killed murine leprosy bacilli.—[From the English abstract.]

KAWAGUCHI, Y. The immunological correlation of tuberculosis to leprosy. Part 4. General conclusion. *La Lepro* **25** (1956) 124-126 (in Japanese; English abstract p. 124).

BCG vaccination induces reactivity to lepromin, which can be considered as indicating a certain degree of immunity to leprosy; and consequently certain workers have used BCG vaccination for prophylaxis. These facts led the author to make studies of the immunological relationship between leprosy and tuberculosis. Animal experiments were carried out to investigate the influence of tuberculosis infection on the development of murine leprosy, and vice versa. As described in the previous reports, the existence of certain degrees of cross-immunity between tuberculosis and murine leprosy could be observed. In these experiments phenol-killed vaccine, liquid-paraffin vaccine, and BCG were tested as regards their ability to give resistance to the infection. Of these, BCG seemed to exhibit a certain degree of prophylactic effect against murine leprosy.—[From the English abstract.]

- ✓ ARTOM, M. La lepromin-reazione in individui sani. [Lepromin reaction in healthy individuals.] *Arch. italiano Derm. Sifilogr. e Vener.* **28** (1956) 3-7.

The author studied the Mitsuda reaction in healthy people near Verona, in northern Italy, where leprosy is not endemic. A first group was composed of the family of a man who came, ill with leprosy, to Verona from Brazil. The 8 members of the family were all lepromin positive, 4 of them 4+, the others 3+. Of 34 people of a second group who lived in the same house-block as the patient, all were also positive although less strongly so—none 4+; 6, 3+; 7, 2+ 19, 1+; 2, 1±. In contrast, of 32 inhabitants of another area, with no contact with leprosy, 1 was 3+ positive (formerly he had suffered from tuberculous pleuritis), and 9 were 1±; the other 22 were all negative. The author suggests that the positive reactions among this third group can be related to tuberculosis infections, as many positive reactions are not related to leprosy infection. —M. TERNI

[Here is reported (a) a group of 8 household contacts, all positive and with an average of 3.50+ positivity; (b) a group of 34 appear to be community associates, all but 2 positive (excluding the plus-minus cases), with an average of 1.53+ positivity; and (c) a third, distant group of 32 of whom only 10 were positive in any degree and with a group positivity of only 0.38+. Here would seem to be a lead that ought to be followed up with more extensive studies where conditions would permit, although more information is needed about this one. Not stated are, for example, the type and degree of advancement of the disease in the patient, and the length of time he had been there; the living condition of the other people in his "house-block," and the meaning of that term (tenement house, perhaps?); whether or not the third (relatively nonreactive) group was comparable with the second one as regards living conditions and age distribution; and what type of lepromin was used and what reaction was read. Be all that as it may, it would be interesting to know what results would be obtained with the sera of these groups if tested in the manner described by Burrell and Rheins in an article in this issue.—EDITOR.]

- ✓ FLOCH, H. Utilisation de lépromines diluées. (V) Discussions. [The use of diluted lepromin. V. Discussions.] *Arch. Inst. Pasteur Guyane Française et Inini* **17** (1956) Publ. No. 406 (September).

After the discussions at the Société de Pathologie Exotique, the author recalls the difficulties encountered by all leprologists working in endemic countries in the preparation of lepromin, because of the scarcity of lepromas. Chaussinand recommends the use of a "standardized" lepromin that can be diluted, and accuses the integral lepromin of provoking false reactions. The author refuted these statements; the Mitsuda reaction always has the value which leprologists have ascribed to it. The skin tissue elements of lepromin play an important role in the lepromin reaction; hence it is wrong to try to eliminate them at any price. The 1:150 and 1:750 dilutions of lepromin are very interesting, as has been confirmed by Diniz and Neto. Treating "standardized" lepromin with ultrasonic tends to destroy the bacilli which we seek to economize, and it modifies the response of the classical lepromin reaction induced by the Mitsuda-Hayashi-Wade integral lepromin, which in leprology remains our basic "control." The 1:750 dilution of normal 1:20 lepromin gives a uniform distribution of the bacterial bodies; one therefore cannot pretend that the distribution may influence the intensity of the positivity of the reactions. —AUTHOR'S ABSTRACT

- ✓ YANAGISAWA, K., ASAMI, N. and ISHIWARA, S. Studies on the lepromin test. (The fourth report.) Some failed attempts to sensitize guinea-pigs with leprosy bacilli. *La Lepro* **25** (1956) 192-197 (in Japanese; English abstract p. 192).

No kind of experimental animal so far tested can be infected with the human leprosy bacillus. Furthermore, every former attempt to sensitize animals to respond to leprosy bacilli or their extracts with a definite skin reactivity have also ended

without bringing about any successful results. [Sic!] The authors attempted to sensitize guinea-pigs with leprosy nodule tissue or leprosy bacilli isolated from it by the Dharmendra technique. These materials were injected intramuscularly, incorporated into liquid paraffin or into a water-in-oil emulsion of the Freund type. Despite three repeated trials of the experiment, the objective was not attained. The possible cause for this failure is discussed.—[From the English abstract.]

[The authors of this report, who would seem to have missed the literature on the subject, will doubtless be interested in the two articles by Olmos Castro and Arcuri in this issue. EDITOR.]

YANAGISAWA, K., ASAMI, N. and ISHIWARA, S. Studies on the lepromin test. (The fifth report.) Potency test of lepromin antigen using guinea-pigs sensitized with tubercle bacilli. *La Lepro* 25 (1956) 198-202 (in Japanese; English abstract p. 198).

Although guinea-pigs cannot be sensitized to lepromin by leprosy bacilli [see above], they can be sensitized to both lepromin and tuberculin by the injection of tubercle bacilli. Using guinea-pigs sensitized with heat-killed tubercle bacilli suspended in paraffin oil, the authors studied the relation between size of skin reaction and antigen dilution. Both the Mitsuda and Dharmendra antigens showed a good proportional relation between antigen dilution and size of skin reaction, particularly the Dharmendra antigen did so even in a very limited range of dilution such as 1:1 to 1:2.25, when the reading was made in 24 hours after the antigen injection. Next, several samples of the Mitsuda and Dharmendra antigens were tested for their relative antigenic potencies, taking one of them temporarily as the antigen of standard potency and expressing the results as the Ratio: size of reaction due to the test sample/size of reaction caused by the standard. Considerable differences were found in the potencies of these samples. In addition, the yield of the Dharmendra antigen was found to vary greatly according to the leprosy nodule used as the starting material.—[From the English abstract.]

IONESCU-MIHAIESTI, C., ANGELESCU, I. BOTEZ, V., VOLOSCEANU, D., OPRESCU, C. C. and VULCAN, P. Cercetari serologice in lepra. [Serological studies in leprosy.] *Com. Ac. R. P. R.* 4 (1955) 323-329.

Sera of leprosy patients constantly and intensely agglutinate human erythrocytes of the O-alpha-beta group, and also sheep erythrocytes previously treated with the isolated polysaccharide complex of tubercle bacilli. This hemagglutination is very intense, even with sera of patients totally free from tuberculosis. It is most intense with sera of lepromatous cases. The complement fixation reaction carried out with two tuberculosis antigens (the methylic antigen and the antigenic complex from the H37 tubercle bacillus), gave titers of variable positivity, depending on the type of tuberculosis antigen used. This reaction does not permit of very distinct conclusions. It appears that the more specific antigen (the H37 complex) gives appreciably the fewer positive results, which can be regarded as the manifestation of a possible coexistent tuberculous infection. The sera of leprosy patients without syphilis give positive reactions with the antigens used for the serodiagnosis of syphilis.—[From abstract in *Excerpta Med.* 11 (1957) 13.]

TARABINI CASTELLANI, G. Hemoagglutinación de Paul Bunnell en hansenianos y su relación con la de Middlebrook y Dubos. [The Bunnell hemagglutination test in leprosy patients and its relationship to the Middlebrook-Dubos test.] *Fon-tilles* 4 (1956) 47-54.

Of 88 sera of leprosy patients (70 lepromatous, 4 tuberculoid and 14 indeterminate) 44.43% were positive, generally weakly so, to the Bunnell test for heterophil antibodies against sheep's red cells. In the lepromatous cases the rate was 50%, but only 29% in the indeterminates; none of the tuberculoids was positive. There

was a certain uniformity, although not constant, with the results of the Middlebrook-Dubos hemagglutination test reported by González and Chávez at the first Mexican Congress of Medicine in 1947.

—F. CONTRERAS

CROW, H. E., KING, C. T., SMITH, R., CORPE, R. F. and STERGUS, I. A limited clinical, pathological, and epidemiological study of acid-fast bacilli in the sputum. *American Rev. Tuberc. & Pulmon. Dis.* **75** (1957) 199-222.

This report is of a study, during a 5-½ year period, of 69 patients in a hospital in Georgia with pulmonary disease whose sputum contained atypical acid-fast bacilli. The organisms were of three different strains, but 64 of them were of the same type and all were avirulent for the guinea-pig. The incidence was low in Negroes. The frequency of previous respiratory diseases was high. The number of reactors to first-strength OT was less than anticipated. The sputum conversion rate and the roentgenographic response to chemotherapy were poor. The results with surgery were fairly satisfactory in 13 patients. Resected specimens of 7 patients revealed pathologic findings indistinguishable from tuberculosis. All were positive for acid-fast bacilli on direct microscopy, and 6 of the 7 gave cultures of atypical mycobacteria. The sputum of 24 patients became negative on culture for 3 months or longer by all methods of treatment. There were 10 deaths in the series, 7 from progressive pulmonary disease simulating tuberculosis. Epidemiological studies showed a low frequency of family history for tuberculosis. Tuberculin skin tests and roentgenograms of household contacts gave much fewer positive finds than in contacts of tuberculosis patients.

—SR. HILARY ROSS

SUZUKI, T. The influence of antituberculosis drugs upon the oxygen consumption of mycobacteria. *Sci. Rep. Res. Inst. Tohoku Univ. Ser. C.* **6** (1955) 89-95.

Three hours' observation after addition of streptomycin, PAS, TB-1 and INH showed more or less inhibition of the respiration of BCG, but INH showed the strongest inhibitory power; but this was least at the most viable stage of BCG. Mycobacterial strains with relatively great respiration (tubercle bacilli of birds and cold-blooded animals and nonpathogens) showed no respiratory inhibition. The standard Warburg manometric techniques were used.—[Abstract from *Leprosy Rev.* **28** (1957) 79.]

HARADA, N. Studies on *Mycobacterium ulcerans*. (1) Electron microscopy of ultra-thin sections of *Mycobacterium ulcerans*. *La Lepro* **25** (1956) 127-135 (in Japanese; English abstract p. 127).

In ultra-thin sections of *M. ulcerans* examined with the electron microscope, two types of bacillary bodies were observed. These were (a) the homogenous, solid type, and (b) the type which has various internal structures. Many intermediate forms between the two were observed, and they could be divided decidedly. The bacillus body is enveloped by a cell wall. Within the body there are large electron-dense granules (50-100 $\mu\mu$), smaller granules (about 20 $\mu\mu$), electron-transparent vacuolar structures, and reticular, tubular and ramifying string-like structures. The internal structure of *M. ulcerans* is very similar to those of the murine and human leprosy bacilli, and the tubercle bacilli.—[From the English abstract.]

HIRANO, N. and SUSHIDA, K. Chemotherapy of murine leprosy; the effects of isonicotinoyl-3-methoxy-4-hydroxy benzal hydrazone. *Yokohama Med. Bull.* **7** (1956) 57-63.

The results obtained from the four experiments reported may be summarized as follows: (1) When mice inoculated with *M. leprae murium* and showing marked lesions receive the drug under investigation for two or three months, parenterally or orally, the local lesions become healed completely. When the treatment is continued for several weeks, the bacilli completely disappear or are markedly reduced in numbers.

(2) When the treatment is discontinued after the healing of the ulcer, relapse may occur. Resumed treatment is less effective against this ulcer (further experiments under way). (3) At the termination of treatment, the tissue at the site of inoculation was removed, suspended, and inoculated subcutaneously into mice. Although this experiment was repeated five times, only in one instance did leprous lesions appear seven months later. It is difficult to determine whether the bacilli in the tissue are dead or alive after the treatment. (4) Isonicotinoyl-3-methoxy-4-hydroxybenzal hydrazone exerted a marked effect in the suppression of the leprous infection.—[From authors' summary, supplied by K. Kitamura.]

KUSAKA, T. Studies on the deviation in the lipid contents of various organs and tissues of leprosy rats. *La Lepro* 25 (1956) 181-187 (in Japanese; English abstract p. 181).

In a biochemical study of murine leprosy, the amounts of fatty substances in various organs were determined to investigate the disturbance of metabolism of infected rats. The animals were white rats of both sexes, 10 inoculated with the murine leprosy bacillus 4 months previously and 10 normal controls of similar weight. The quantities of free and total cholesterol, cerebroside, lecithin, sphingomyelin, cephalin, free fatty acids and neutral fats, in the N. ischiadicus, neck nodes, muscles of the upper leg, subcutaneous fatty tissue, liver, lung, kidney and spleen, were measured and compared with the normals. Total cholesterol and total phosphatide (especially sphingomyelin) increase in the peripheral tissues, but do not change in the visceral organs. Cerebroside increases in every tissue. Neutral fat decreases in every tissue. Thus the changes of fatty substances are more marked in the peripheral tissues than in the internal organs. These results indicate that murine leprosy is a general disease accompanied by disturbances of metabolisms in various organs, details of which should be investigated.—[From the English abstract.]

NISHIMURA, S., KONO, M., KODAMA, M., YANAGISAWA, K., NOJIMA, T., MORIYA, M., TAKAHASHI, T., OSHIMA, S., ITO, M. and SUZUKI, M. Studies on the immunity by BCG in murine leprosy. *La Lepro* 25 (1956) 69-82 (in Japanese; English abstract p. 69).

Experiments were carried out to examine the possibility of preventing leprosy by means of BCG injection, murine leprosy being employed for the purpose, with a total of 140 rats. (1) Prophylaxis: Four groups of 20 female rats each were injected with BCG and, 3 months later, challenged with subcutaneous inoculations of the Kumamoto strain of the bacillus, in 10^{-2} and 10^{-4} concentrations. Onset of the infection was inhibited most strongly in the group that had received 10 mgm. of BCG intraperitoneally; there was rather strong inhibition of the weaker inoculum, whereas the infection from the stronger inoculum was not different from that in the control group. BCG was more effective when given intraperitoneally than subcutaneously. (2) Inhibition of onset: Twenty rats were inoculated with 0.5 cc of the 10^{-2} suspension, and another 20 with 0.5 cc. of the 10^{-4} suspension. On the next day one-half of each group received a subcutaneous injection of 10 mgm. of BCG. The animals given the 10^{-2} inoculum and BCG showed no material difference from those not given BCG (controls), whereas BCG caused definite inhibition in the rats inoculated with the weaker suspension. BCG inhibited the onset to some extent. (3) Therapy: In this experiment there were used 20 rats which had already developed, 3 months after subcutaneous inoculation, pea-sized or larger lepromas. Ten of them then received 10 mgm. of BCG subcutaneously, 10 times every week. There was no evident benefit. It is concluded that BCG injection is useful for prophylaxis, and for the inhibition of onset, but has no therapeutic effect in murine leprosy.—[From abstract.]

MAYAMA, A. An electrophoretic survey of serum fractions of golden hamsters, inoculated with murine leprosy bacilli. A surmise on the relationship between serum

gamma globulin and antibodies. Sci. Rep. Res. Inst. Tohoku Univ. Series C, **6** (1955) 225-232.

Using golden hamsters infected with murine leprosy bacilli subcutaneously, an electrophoresis study has been made of the protein distribution in the serum. Sera of neither normal nor infected hamsters contain alpha globulin as a rule, and complete separation of it by means of electrophoresis was difficult. In infected hamsters the serum protein fraction levels were influenced in a period of months after infection, and by the condition or intensity of infection. There were no significant relationships between the serum gamma globulin and the tuberculostatic activity of the whole blood in infected hamsters, or in leprosy patients.—[From the author's summary.]

GRUNBERG, E., TITSWORTH, E. and THOMAS, M. Lack of lasting protective effect of isoniazid in *M. lepraemurium* infection of rats. Proc. Soc. Exper. Biol. & Med. **89** (1955) 34-36.

Isoniazid delayed the development of the leproma and extended the survival time of white rats infected with *M. leprae murium*. Both phenomena were directly proportional to the increase of dose as well as to the extension of the duration of therapy. Viability of the bacilli was affected, but under the experimental conditions used the organisms were not completely eradicated.—[From summary in *Trop. Dis. Bull.* **52** (1955) 985.]

FUKUDA, D. Hemagglutination test by Middlebrook-Dubos method in rat leprosy. Sci. Rep. Res. Inst. Tohoku Univ. Series C, **6** (1955) 221-224.

The hemagglutination test of Middlebrook and Dubos using tuberculin was employed in 38 cases of experimental rat leprosy. Five animals (13%) showed positive reactions, with agglutination titers ranging from 1:4 to 1:16. However, there was no significant relationship between the agglutination titers and the size of the lepromas produced. Uninfected rats were all negative. The test is not practically available for the diagnosis of rat leprosy.—[From the author's conclusions.]