CURRENT LITERATURE

This department carries selected abstracts of articles, published in current medical journals, dealing with leprosy and other mycobacterial diseases. Abstracts are supplied by members of the Editorial Board and Contributing Editors, or are reproduced, with permission, from other abstracting journals.

Leiker, D. L. Classification of leprosy. Leprosy Rev. **38** (1966) 7-15.

The three latest International Congresses of Leprology have recognized two polar types of leprosy, viz., lepromatous and tuberculoid, and one intermediate type designated borderline. These three categories reflect in some measure a spectrum of clinical, immunologic, bacteriologic and histologic characteristics. An indeterminate group, without characteristic lesions is also recognized. Although the basic concepts in this classification are now generally accepted, few workers are satisfied with its application in practice. The author has used another classification for private purposes, which in his opinion and that of some others is superior to the international classification. It includes the following concepts. Indeterminate leprosy is regarded as a stage in the development toward intermediate forms of the disease. It should not include secondary cases that have shown elevation of lesions, or macular lesions with tuberculoid features, e.g., clearly defined edge and marked hypopigmentation. The tuberculoid group is subdivided into a truly benign, high resistant tuberculoid subgroup and a disseminated, more progressive group called low-resistant tuberculoid. The latter often produces severe deformities. Low-resistant tuberculoid is, as usual, subdivided into macular, minor and major varieties. Disseminated maculoanesthetic lesions fit into the first category. Reactional tuberculoid cases fit into the latter two varieties, according to the degree of infiltration. The present borderline group comprises only a small proportion of the intermediate cases. The borderline group is subdivided into a group of patients with features at the tuberculoid side and a group with features at the lepromatous side. Borderline tuberculoid patients do not deteriorate toward lepromatous, whereas in borderline lepromatous patients the disease is progressive. In order to fit many patients with intermediate features but without much infiltration, immunologically in the borderline range, maculoid, minor and major varieties are recognized. Not all lepromatous patients are completely anergic Many show evidence of slight tissue defense. The lepromatous group is subdivided into a nondiffuse and diffuse subgroup. At the uttermost tuberculoid side of the spectrum a group of "vaccination lesions" or inoculation lesions, including part of the self-healing childhood lesions (Lara), is recognized. The pure, primary diffuse lepromatous patients (Lucio) are placed at the other end of the spectrum. It is doubted, however, that special subgroups are needed for these latter two categories. This classification scheme reflects the spectrum of leprosy more clearly. The basic, international classification is maintained, the use of controversial terms and of new, unfamiliar designations is avoided. Classification does not become more difficult because the subdivision is based on the degree of tuberculoid and lepromatous, as before. Errors in classification are less essential in a six-group classification as compared with a three-group classification when they are limited to a shift toward the next group. [From author's summary.]

Chowdhuri, S. K. and Ghosh, S. Clinical observations on "reaction" in tuberculoid leprosy: preliminary report. Bull. Calcutta School Trop. Med. **13** (1965) 52-53.

The authors studied 46 patients at the Leprosy Clinic of the Calcutta School of Tropical Medicine who suffered from reaction in tuberculoid leprosy. It showed dramatically by acute or subacute reactivation of existing lesions, with or without the

appearance of new lesions, not usually accompanied by fever but often with painful neuritis, and most commonly found from February to June each year. The duration of the condition was from 2 days to 3 weeks. The time elapsing between the appearance of the first lesion and the onset of the reaction was from 1 to 3 years in the majority of the patients. Males predominated greatly and the patients were aged from 17 to 51 years. Childbirth seemed to have some influence in females. Among 40 males, reaction developed in 18 after repeated attacks of influenza-like fever and in 3 after varicella. Most of the patients were afebrile, but 13 of them had swelling of the hands and feet. Out of the 46 patients, 21 were bacteriologically positive; most were slightly positive and became negative after 3 to 6 months without specific treatment. The results of the lepromin test were variable. The reason for the rise in the number of reactions during February to May is not clear. An influence of high atmospheric temperature and humidity has been suggested. Any condition lowering the body resistance may be a predisposing factor. DDS could not be incriminated in this group. The bacteriologic degree of positivity of patients with tuberculoid leprosy increased during reaction. [From abstract by J. R. Innes in *Trop. Dis. Bull.* **63** (1966) 166-167.]

Mallac, M. J. Onset and pattern of deformity in leprosy. Leprosy Rev. **37** (1966) 71-91.

A study of 700 cases of deformity of the extremities was carried out on a selected group of patients in Northern Burma. Deformity appeared on an average 2 years and 9 months after the start of the disease in the tuberculoid, 4½ years in the borderline, 5 years and 3 months in the indeterminate, and 9 years in the lepromatous type leprosy. Thus, in this study, the onset of deformity was three times as long in lepromatous as in tuberculoid cases, and, even when the march of disease was most rapid, there appeared to be a latent interval of nearly three years during which treatment could have prevented deformity. Men were affected more frequently, and at an earlier stage than women, by an average of some 2½ years. This was related to the fact that men are engaged in rough manual work at an earlier age, with greater risk of injury and secondary infection of anesthetic digits. Deformity of the extremities was not seen under the age of 5 and was rare before the age of 10. The younger the age group, the earlier seems the onset of deformity. Whether affecting hands or feet alone or in combination, deformity of the extremities was first seen between the ages of 11 and 20, and most often between 21 and 30. Thereafter its incidence declined steadily with age. As one in four or five patients with leprosy is likely to develop deformity, it is possible, on the basis of the present study, to predict the average delay to be expected with each clinical type, sex and different age groups. A yardstick of prognosis emerges which has its place in diagnosis, treatment and planning of rehabilitation programs, at both institutional and field levels. Deformity of the hands, feet or both followed an identical order of frequency: viz., borderline, tuberculoid, lepromatous and indeterminate. Thus deformity of the extremities was most common in the borderline and least common in the indeterminate cases. Contracture, mobile claw-hand, partial absorption of fingers and total absorption of fingers occurred in that order. The two predominant types of deformity were contracture and perforating ulcers. Bilateral involvement was much more common than unilateral involvement in a ratio of 3:1 in the hands and 2½:1 in the feet. Hands were 1½ times more involved than the feet. The first digits to be affected were by far the 5th or little finger and the 1st or big toe; next of clinical importance were the 2nd or index fingers and the 2nd toe. An average of 2 years occurred from hand to hand (whether from right to left or left to right), or 2½ years from foot to foot, and of 3 years from hand to foot and foot to hand. [From author's summary.]

Contreras D., F. Manifestaciones iniciales en la adolescencia y pubertad. [Initial manifestations in adolescence and puberty.] Rev. Leprol. (Fontilles) **6** (1964) 105-111.

The initial manifestations of leprosy were not recognized until systematic examination was made of the children of patients born in certain leprosaria, especially in the Philippines and later in Brazil and Argentina and still later in European countries, among which Spain was the first in discovering them, particularly among the children of patients in the Fontilles Sanatorium. The diagnosis of initial illness is of extraordinary importance since it makes possible easy cure before new foci of contagion develop. Although leprosy commences frequently in infancy, there are cases of infection among adults, and especially in adolescence and puberty, and even though the symptomatology is analogous to that of the disease in infancy, there are certain differences which should be recognized because of the great importance they have for diagnosis. In puberty and adolescence hyprochromia is less marked than in children; in contrast anhidrosis and alopecia are more evident. Among all these conditions the most constant is anesthesia, the symptom that permits a diagnosis in all cases without confirmation by positive bacteriology.—F. CONTRERAS D.

Terencio de las Aguas, J. Diagnóstico de la lepra y de sus formas clínicas. Diagnóstico diferencial con otras enfermedades. [Diagnosis of leprosy and of its clinical forms. Differential diagnosis from other diseases.] Rev. Leprol. (Fontilles) **6** (1964) 137-156.

The early diagnosis of leprosy is the basis for effective therapy and prophylaxis. It is easy in typical cases but, on the contrary, difficult in incipient cases when it is important to discover patients. The methods for arriving at a clinical diagnosis are analyzed carefully, including bacteriologic, histopathologic and serologic procedures. The methods for diagnosing the different clinical forms are weighed in detail. Finally the methods of differential diagnosis are described, taking into account the numerous dermatoses and other diseases that can be confused with leprosy, especially those that the author recognizes, out of long experience, as predisposing to diagnostic errors.—F. CONTRERAS D.

Terencio de las Aguas, J. Lepra visceral y endocrina. [Visceral and endocrine leprosy.] Rev. Leprol. (Fontilles) **4** (1965) 241-261.

Leprosy is considered a generalized disease representing conflict between the leprosy bacillus and the histiocytic reticuloendothelial system in different tissues, with predominant cutaneous and neural manifestations, but with constant presence of visceroendocrinal changes in the lepromatous forms, which overcome the defensive role of the reticuloendothelial apparatus. The different visceral locations are considered, viz., liver, spleen, kidney, lymphatic system, bone marrow, blood and its dysproteinemia. The most frequent and important changes are in the liver and kidney and manifested by repeated reactions. Hepatic lesions are considered to be the most frequent (95% in lepromatous cases), some of them specific, brought about by direct action of the bacillus, and others nonspecific, resulting from amyloidosis, and fibrosclerosis of grave prognosis. The renal changes are considered the most important and the cause of death in 62.5 per cent of cases. Specific changes are described as rare, the most important being nonspecific, including amyloidosis and nephrosclerosis with inevitable evolution toward death, in part caused by repeated lepra reactions, which after several years lead to renal insufficiency. No specific treatment exists, even though corticosteroids improve the picture and retard the fatal outcome. The dysproteinemic picture is important, characterized by diminution in the albumin and increase in the globulin, above all in the gamma form in the case of hepatic lesions and the alpha 1 and 2 forms in cases with predominant renal changes. It is noted that specific lesions have not been found in the circulatory, digestive and respiratory systems. With respect to endocrine lesions, the author notes that he has not found specific changes in the hypophysis, thyroid, pancreas or ovaries, while changes were observed in the suprarenals and testes, with gynecomastia in 19.5 per cent of patients.—J. TERENCIO DE LAS AGUAS.

Terencio de las Aguas, J. Lesiones cutáneas en las diferentes formas clinicas de la lepra. [Cutaneous lesions in the different clinical forms of leprosy.] Rev. Leprol. (Fontilles) **6** (1965) 263-280.

Leprosy is a disease eminently cutaneous in localization. The author has studied its manifestations in its different clinical forms. In indeterminate leprosy the lesions are discrete and initial but numerous, and are cured without residual scarring. The importance of the white macule is noted as an early diagnostic indication. In lepromatous leprosy, which is profuse in its cutaneous manifestations, different lesions were studied, viz.: macules, lepromas, infiltrations, ulcerations, and lesions of other organs, including alopecia and changes in the nails in the skin, and trophic and reactional lesions (erythema nodosum in its polymorphous and necrotizing forms). In tuberculoid leprosy quiescent and reactional forms are differentiated. Finally lesions in the intermediary form are considered, the characteristics of which are similar to those of the reactional tuberculoid form.—J. TERENCIO DE LAS AGUAS.

Corcos, M. G. The clinical dynamics of pigment loss. Leprosy Rev. **37** (1966) 121-126.

The development of 71 hypopigmented flat skin lesions in Nigerian patients was studied. The patients were able to recognize three developmental types of lesion, which, on clinical examination, showed no statistically significant affinities in relation to the other features found. It is believed that in skins sensitive to it, pigmentary loss is brought about by extrabacillary proliferation of a subcellular, self-replicating agent initially carried by mycobacteria, rather than by mycobacteria themselves. [From author's summary.]

Jopling, W. H. and Morgan-Hughes, J. A. Pure neural tuberculoid leprosy. [Memoranda] Brit. Med. J. **ii** (1965) 799-800.

The authors deal with an example of pure neural tuberculoid leprosy in which a peripheral nerve thickening in the right ulnar nerve was studied electromyographically and a biopsy was made of the thickened radial nerve at the wrist. This showed extensive destruction of the nerve bundles. Granulomatous lesions of varying size replaced the destroyed regions. The centers of the granulomata were formed of a zone of small round-cell reaction and giant cells, mainly of the Langhans type and some foreign-body multinucleated giant cells. The lepromin test was strongly positive. A case was originally reported in 1956 by the first author of a patient with borderline (dimorphous) leprosy in whom the disease remained purely neural for 8 years, and the authors comment that though nerve thickening should always suggest leprosy, there are 2 neurologic diseases in which it may occur, viz., familial progressive hypertrophic interstitial neuritis and primary amyloidosis affecting the peripheral nervous system. [From abstract by J. R. Innes in *Trop. Dis. Bull.* **63** (1966) 166.]

Terencio de las Aguas, J. El sindrome neural hanseniano. [The neural syndrome in leprosy] Rev. Leprol. (Fontilles) **6** (1964) 113-135.

The affinity of leprosy for the peripheral nervous system, and for the cutaneous integument has been studied repeatedly. The nature of leprosy is shown on analyzing its localization in the nerves most affected and in studying its pathogenesis and pathologic anatomy. After analyzing the characteristics of the neuritis, the disturbances in sensation and trophic changes are considered, and their paralytic and mutilative consequences. The importance of the trophic lesions is emphasized, especially of the resultant perforations, in the frequent production of erysipelatoid lepra reactions, which constitute the principal obstacle to the cure and rehabilitation of leprosy patients. Certain disturbances are difficult to overcome because sulfone therapy is inefficacious in advanced trophic alterations. But it can be of great value in avoiding these when early treatment is prescribed, before the appearance of bone lesions or at the time they first develop.—F. CONTRERAS D.

Juliao, O. F. As manifestações neurológicas da lepra. [Neurologic manifestations of leprosy.] Rev. Med. (S. Paulo) **47** (1963) 63-74.

The neurologic picture of leprosy is composed of well-defined clinical manifestations, which result from impairment of the peripheral nervous system, especially in its cutaneous terminal ramifications. Isolated mononeuritis, disseminated mononeuritis or multineuritis (multiple and successive neuritis) and polyneuritis of sensorimotor or merely sensory expression, may be observed. Of the nerves that have a motor component, the ulnar, median and radial in the superior limbs are electively struck; the common peroneal and the tibial in the inferior limbs, and the facial among the cranial nerves. As regards the sensory impairment, the various types of topographic distribution of the disorders attest to extreme polymorphism, in site and extension, of the lesions of the cutaneous neural network. Thus, from the occurrence of a small anesthetic area limited to the territory of a single cutaneous nerve (sensory mononeuritis) to an anesthesia spread all over the tegument (sensory pan-neuritis or terminal ramifications) all invasion modalities of the peripheral sensory contingent may be recognized. Hypertrophy of the peripheral nerves, and motor, sensory, trophic and neurovegetative disturbances, make up the basic symptomatology of neural leprosy. Easily established when cutaneous lesions exist, the diagnosis may present serious difficulties in the purely neurologic cases, mainly when the symptomatology is mild, incomplete or atypical. In these cases the bacteriologic examination and the lepromin test do not contribute, usually, to the diagnostic elucidation; even the nerve biopsy may fail, as it often gives an inconclusive result (nonspecific alterations and simple inflammatory infiltrates of the indeterminate group). In that case, the high value of knowledge of cliniconeurologic order stands out; it will make it possible to settle doubts and establish the diagnosis. In this respect, the author recalls, as the most expressive manifestations of neural leprosy, the following: thickening of the peripheral nerves and their superficial branches; sensory disturbances, essentially characterized by impairment of the exteroceptive sensations, exhibiting a peripheral distribution; amyotrophic-paralytic disorders, depending above all on involvement of the ulnar, median and common peroneal nerves; facial paralysis, frequently of dissociated type, with predilection for the orbicularis oculi, corrugator and frontalis muscles, affecting them unilaterally or bilaterally; anhidrosis, alopecia and vasomotor disturbances (absence of the reflex erythema in the histamine test); plantar ulcerations and osseous changes (concentric and progressive atrophy), responsible for the mutilations of the extremities. The elements supplied by the history, e.g., the prevalence of leprosy and some complementary examinations (pilocarpine, histamine, acetylcholine or nicotine picrate tests) may contribute positively to exact interpretation of the clinical data.—N. DE SOUZA CAMPOS

Gokhale, R. B. and Panse, S. G. A study of spontaneous sweating of ring and little fingers in leprosy. Leprosy Rev. **37** (1966) 31-33.

The volar surface of human hands sweats spontaneously and perpetually. The rate of sweating is under the control of autonomic nerves, and therefore can be used in assessing the extent of involvement of autonomic innervation of the part supplied. The rate is easily measured by counting the number of sweat spots. The sweating rate of the volar aspects of ring and little fingers of healthy and leprosy subjects was studied by this method. A significant fall in the number of sweating pores was observed in leprosy. [From author's summary.]

Pereira, A. C. Jr. Sôbre um caso de hipoplasia medular eritrocítica no decurso da terapêutica de uma leprosa pela sulfona. [A case of medullary erythrocytic hypoplasia in the sulfone treatment of a leprosy patient.] Bol. Serv. Nac. Lepra **22** (1963) 39-48.

The author reports a case of medullary erythrocytic hypoplasia during treatment

with DDS. He notes the recognition of the hematologic syndrome with the hematologist's cooperation. He compares this anemia with that observed in leprosy cases and records his concern over long use of cortisone, without specific therapy.—N. DE SOUZA CAMPOS

Languillon, J., Gayraud, J. and Giraudeau, P. Traitement de la maladie de Hansen par un dérivé de la diphényl-thiourée: 4-butoxy-4'-dimethyl-aminothiocarbanilide (Ciba 1906)—administré par voie buccale et en suspension injectable. [Treatment of leprosy by a derivative of diphenyl-thiourea (Ciba 1906)—administered by mouth in injectable suspension.] Méd. Afrique Noire **12** (1965) 423-426.

At the Marchoux Institute at Bamako 14 patients of varying types who had not been previously treated for leprosy, were treated with thiambutosine (Ciba 1906), 2 gm. *per os* in doses of 1 gm., or a weekly injectable suspension of 2 gm. of the product in 10 ml. of an oily suspension. The results were favorable. There was a flattening of the diffuse and nodular lepromata and of the border of the leprides with a recoloration of hypochromic lesions. Bacteriologic signs of improvement were slower, but there was steady progress. Neuritic troubles did not seem to be influenced except in one patient with lepromatous neuritis of the lateral popliteal nerves. Reactions of the erythema nodosum leprosum type seemed a little less frequent than when sulfones were used. General tolerance was good. Because of the occurrence of a depot abscess which did not absorb well, the authors tended to substitute oral therapy in the latter stages of treatment. Thiambutosine can be used in all the forms of leprosy. Its clinical and bacteriologic activity is as good as that of the sulfones. Reactions that it provokes are less frequent and have a more benign evolution. [From abstract by J. R. Innes in *Trop. Dis. Bull.* **63** (1966) 413.]

Leiker, D. L. and Carling, D. Low dosage of DDS. Leprosy Rev. **37** (1966) 27-29.

The maximum dosage of DDS in leprosy clinics supervised by the Government in Northern Nigeria was formerly 600 mgm., but was recently reduced to 400 mgm. In some clinics supervised by voluntary agencies, however, a maximum dosage of 800 mgm. has been administered. The authors have studied the effectiveness of low and high dosages. Assessment of biopsies and smears from a series of lepromatous patients on treatment with 200 mgm., 400 mgm. and 800 mgm. DDS once weekly, strongly suggested that the lower dosage is on the average at least as effective as the higher dosage. [From author's summary.]

Ellard, G. A. A preliminary study of the absorption, metabolism and excretion of injectable thiambutosine. Leprosy Rev. **37** (1966) 17-22.

Thiambutosine, also known as DPT, Ciba 1906 and SU 1906, is used orally on a wide scale in the treatment of leprosy. It has been shown, however, that only a small percentage of that administered is absorbed under usual conditions. About 75 per cent of the oral dose is excreted unchanged in the feces. The author has, therefore, studied the possibilities in use of preparations suitable for intramuscular injection. An aqueous suspension of injectable thiambutosine was absorbed extremely slowly and metabolites of thiambutosine could be demonstrated in the urine four months after injections of the drug had been discontinued. Absorption was accelerated when thiambutosine was injected in arachis oil, its half-life in the body being reduced to about 6-7 days. The total excretion of thiambutosine and its metabolites never exceeded 41 per cent of the injected dose and it is possible that the drug was incompletely absorbed from the site of injection. Thiambutosine or its metabolites could not be detected in the feces in significant amounts after intramuscular injection of the drug, and it was concluded that biliary excretion of these compounds is not important in man. [From author's summary]

Schulz, E. J., Egnal, M. L. and Doevendans, G. Treatment of leprosy with a combination of injectable thiambutosine (CIBA 1906), streptomycin and isoniazid. Leprosy Rev. **37** (1966) 47-48.

In previous trials at the Westfort Institution oral thiambutosine (diphenylthiourea, Ciba 1906) has been shown to be as effective as dapsone in the treatment of leprosy, and intramuscular injection is equally efficacious. The authors tried the effect of injectable thiambutosine in combination with the antituberculosis drugs streptomycin and isoniazid in 29 patients. The treatment was not found to be more effective than administration of dapsone alone. [From author's summary.]

Pettit, J. H. S., Marchette, N. J. and Rees, R. J. W. *Mycobacterium ulcerans* infection. Clinical and bacteriological study of the first cases recognized in South East Asia. Brit. J. Dermat. **78** (1966) 187-197.

Four cases of skin ulceration with deeply undermined edges have been studied in Malaya. It is believed that these are the first cases of *M. ulcerans* infection to be recognized in South East Asia. Details of bacteriologic studies and therapeutic success with a riminophenazine derivative (B.663) are reported. In all patients an acid-alcohol-fast mycobacterium was seen and in two cases produced pure cultures of *M. ulcerans*. All patients were markedly helped by B.663. It is suggested that these ulcers are probably not uncommon in humid tropical climates and that a better knowledge of the disease and its bacteriology will enable more cases to be diagnosed and treated.—AUTHOR'S SUMMARY

Tio, T. H. Neural involvement in leprosy treatment with intra-neural injections of prednisolone. Leprosy Rev. **37** (1966) 93-97.

Twelve patients with neural involvement were given intraneural injections of prednisolone. Trophic disturbance of the skin and its appendages was favorably influenced, even in patients who failed to respond to the sulfones. The duration of the acute phase could be shortened, and, as a result, loss of digits prevented. Muscular power of atrophic muscles could be improved and lagophthalmos successfully treated. Sudden and complete withdrawal seems to carry a risk of a rebound. Additional hyaluronidase appears to be of some benefit. Sebaceous glands seem to be restored to function earlier than sweat glands. [From author's summary]

Ojha, D., Tripathi, S. N. and Singh, G. Role of an indigenous drug (*Achyranthes aspera*) in the management of reactions in leprosy. Preliminary observations. Leprosy Rev. **37** (1966) 115-120.

An inexpensive indigenous plant drug *Achyranthes aspera* was found effective in the therapy of reactions in leprosy, particularly of subacute and mild type. No toxic manifestations were observed. If the drug is administered in conjunction with sulfone the chances of reaction become limited and the rate of improvement becomes faster. [From author's summary]

Ponomarenko, V. K. Essai d'utilisation de la vitamine E (tocopherola lacète) dans le traitement des amyotrophies lepreuses. [Attempt to utilize vitamin E (tocopherol) in the treatment of leprotic amyotrophic disorders.] Voprosy Leprol. i Dermatol. **17** (1963) 105-108.

Injections of vitamin E have been shown to be efficacious in 10 leprosy patients among 13 with marked atrophies of muscles.—N. DE SOUZA CAMPOS

Oliete Benimeli, J. Tratamiento quirúrgico de las deformidades y estigmas en los enfermos de lepra. [Surgical treatment of deformities and stigmata of leprosy.] Rev. Leprol. (Fontilles) **6** (1965) 223-240.

The important role of surgery in leprosy is emphasized in its different aspects, plastic and orthopedic surgery, and surgery in relation to function. The role of the first of these is noted in the correction of nasal deformities, wrinkles, lip and forehead lesions, alopecia of the eyebrows, facial paralysis with lagophthalmos, and auricular enlargement, in the head region, and gynecomastia in the trunk. The technics of orthopedic and functional surgery are described. These include treatment for cubital and median nerve paralysis in the arm and external popliteal paralysis, claw foot and hallus valgus in the leg. Extended consideration is given to treatment of dif-

ferent types of perforating lesions.—J. Terencio de las Aguas

Thangaraj, R. H. Reconstructive surgery in the treatment and prevention of ulcers in the foot. Leprosy Rev. **37** (1966) 35-37.

Mechanical factors in the ulceration and absorption of the foot in leprosy are described in detail. To reduce the incidence of ulceration it is essential to pay attention to all these factors. Drop foot and inversion due to paralysis are cited as special mechanical factors. Brand has described a standard procedure for rapid correction. The author devised the following modification. An incision is made from the medial condyle to the navicular bone, and the tibialis posterior tendon is cut at its insertion. This is withdrawn through another incision made medial to the tibia five inches above the medial epicondyle. A third curved incision is made anteriorly to the front of the ankle joint. The flap is reflected and the deep fascia incised longitudinally. The muscles are reflected and the interosseous space exposed. A window is prepared by removing the membrane for about two and a half inches in its full width. The tibialis posterior is passed to the anterior aspect through the window in the interosseous membrane. The tibialis anterior, extensor digitorum longus and the extensor hallucis longus are identified and freed from the surrounding tissues without interfering with their continuity. With the knee flexed to about sixty degrees and the foot in maximum dorsiflexion the tibialis posterior is passed through the extensor digitorum longus and the extensor hallucis longus by the Pulvertaft method and then into the tibialis anterior tendon. A continuous stainless steel wire is used to suture these tendons and the raw end of the tibialis posterior buried in the tibialis anterior. The assistant should hold the foot in maximum dorsiflexion while the tendons are being sutured. A below-the-knee plaster is applied to maintain the foot in that position. The plaster is removed after four weeks. The patient is taught exercises for the reeducation of the tibialis posterior for ten days without weight bearing and then weight bearing exercises are commenced and should be continued until the patient develops a normal gait. Although the range of movement achieved is poor as compared with that attained by the standard method, the procedure has certain advantages, including simultaneous correction of drop foot and drop toes and a lesser tendency than that observed after the standard method, to inversion and eversion deformities. There is no interference with bone, as in the standard operation. The revised operation does not itself prevent ulceration, but counteracts mechanical factors in such a way as to reduce recurrence of ulcers. [From author's summary]

Tilak, C. T. Anterior transportation of ulnar nerve in leprosy. Leprosy Rev. **37** (1966) 41-43.

Directive principles as laid down in a WHO circular on leprosy rehabilitation, published in 1960, with respect of emplacement of nerve in flexor muscle bed were strictly adhered to. The surgical importance of medial intermuscular septum, ulnar collateral and supratrochlear arteries and branches is stressed. In a case series reported no resection of nerve trunk was made and hence no "tunnelling" of flexor muscle mass. The role of nerve stripping is ambiguous; no trial was given to this surgical maneuver. Intraneural injections of Novocaine, Thondase, Dexa-methasone and Priscol were restricted to mononeuritic cases and severe nerve trunk pain. The pus was always sterile. One case of sutureless skin surgery with adhesive strips is reported. The cosmetic results are gratifying. In patients with paresis, atrophies and restriction in the mobility of joints, further development of these phenomena was discontinued. [From author's summary.]

Reginato, L. E. A new technique for the correction of the hypertrophy of the auricular lobule. Rev. Lat.-Amer. Cir. Plást. **8** (1964) 261-266.

The author sums up his work by saying that lobuloplasties are not to be restricted to resection of hypertrophied lobules; this resection should not be exaggerated and a technic providing the resection of excess

skin, affected tissue and subcutaneous thickness should be adopted, aiming at hiding the scar and a more proportionate anatomic outline of the entire auricle.—N. DE SOUZA CAMPOS

Lennox, W. M. Physiotherapy and foot drop corrections. Leprosy Rev. **37** (1966) 99-102.

Leprosy neuritis affecting the lateral popliteal nerve is the most common cause of foot drop in tropical countries. The cardinal points in the physiotherapy of foot drop correction may be summarized by the following "do's and don'ts." (1) Don't operate until the patient has achieved perfect isolation of the muscle. (2) Don't start weight-bearing until dissociation is perfect. (3) Do look out for (a) trick movements that may have deceived the therapist, and (b) failure to integrate the new movement when weight-bearing is started. (4) Don't hesitate to delay introduction of the next phase, or to order reeducation again from the beginning if the patient exhibits "confusion." (5) Don't apply a timetable to the patient's progress. (6) Do see each patient regularly for at least a year from operation, and urge him to persist with dorsiflexion exercises. [From author's summary.]

Girling, J., Hameed, M. A. and Selvapandian, A. J. Experimental moulded soles and shoe lasts. Leprosy Rev. **37** (1966) 103-107.

For six years rigid-soled shoes have been recommended for the prevention of reulceration of the deformed and anesthetic feet of leprosy patients. But such shoes cause instability of the foot, especially on rough ground, which is possibly related with later tarsal disintegration. In addition to this instability, the weight and bulk of the shoe make it unpopular with patients. The authors developed a new design of shoe to prevent reulceration without these disadvantages. An accurately molded insole was constructed to help distribute the walking pressure and support the tarsal area of the foot. Dr. Brand found rubber latex and cork dust suitable for the purpose. The paper gives details of the procedure followed. The original must be consulted for these details. Nine figures are given, showing stages and special features of the construction of the molded shoe.—E. R. LONG

Tio, T. H. "Hyfrecator" sparking in the management of leprosy. Leprosy Rev. **37** (1966) 57-60.

A high frequency spark-gap diathermy instrument (Hyfrecator) was used in the treatment of skin lesions in leprosy. A favorable influence was noted in more than forty patients. A small number of illustrative cases are presented. [From author's summary.]

Chaussinand, R. Quelques remarques concernant la théorie de l'antagonism entre tuberculose et lèpre. [Remarks on the theory of antagonism between tuberculosis and leprosy.] Acta Trop. (Basel) **21** (1964) 82-87.

Citing his previous studies, the author calls attention to his finding that among 689 leprosy patients allergic to lepromin only three were found to show signs of progressive pulmonary tuberculosis positive for tubercle bacilli on culture and guinea pig inoculation. Clinical and bacteriologic signs of progressive tuberculosis among these disappeared rapidly after institution of therapeutic pneumothorax. In contrast, among 240 leprosy patients anergic to lepromin 24 cases of severe tuberculosis were found. Other surveys in sanatoria gave similar findings. The relative para-immunity between tuberculosis and leprosy can be studied in the course of BCG vaccination of the new-born in sectors of the country where leprosy is highly endemic and tuberculosis spread only slightly. If the theory of antagonism between the two diseases is valid, subjects negative to tuberculin and not vaccinated with BCG should furnish a relatively elevated proportion of cases of leprosy, particularly of the indeterminate or lepromatous type. Cases of leprosy, in turn, should appear more rarely and tend to be of the tuberculoid type among subjects reacting to tuberculin after the lapse of three years following vaccination supported by revac-

cination. It appears probable that relative resistance to leprosy infection will be more marked in an organism sensitized to lepromin as a result of impregnation by the Hansen bacillus (specific bacterial allergy) than in an organism impregnated only by virulent tubercle bacilli (bacterial para-allergy). In the latter case the subject will probably be found better protected against leprosy than a person vaccinated with BCG, i.e., a bovine type bacillus rendered avirulent artificially in the laboratory, which can maintain itself in the organism only a relatively short time. Some of the difficulties in interpretation as respects antagonism betwen tuberculosis and leprosy have been resolved by certain epidemiologic studies. In the course of tuberculin surveys among adult leprosy patients the author has found that the majority of leprous Europeans, infected in Indo-China, among whom the leprosy infection progressed rapidly to the lepromatous form, did not react to tuberculin. Confirmation of his theory of abortion of leprosy by tuberculosis can be obtained by studies, on the one hand, in regions where leprosy has been spread only recently, and, on the other, in countries where leprosy has declined. The tuberculin index will be found low in countries where leprosy has appeared recently or is very marked. It will be elevated to an ordinary degree where leprosy has disappeared recently. Studies by others in Surinam and New Guinea have borne out these predictions. The author himself noted in Portugal that autochthonous leprosy was in general inversely proportional to the mortality rate from pulmonary tuberculosis. The prevalence of leprosy was found to be high in rural provinces where the tuberculosis mortality was low. On the other hand, in Lisbon and Porto where the tuberculosis mortality was relatively high the prevalence of leprosy was low. From such facts the author has drawn the conclusion that, through the development of industry, commerce and means of communication, civilization spreads tuberculosis, which extends in the towns first and later in the country. Leprosy in turn disappears with civilization, while industry, commerce and means of communication are growing, declining first in the towns, but remaining endemic for some time in rural regions.—E. R. Long

Shepard, C. C. Temperature optimum of *Mycobacterium leprae* in mice. J. Bact. **90** (1965) 1271-1275.

Experimental support is given for the theory that the optimum growth temperature of *M. leprae* is below body temperature. Mice with experimental foot pad infections were kept at air temperatures ranging from 4 to 35°C. Optimum multiplication of *M. leprae* was obtained at an air temperature of 20°, corresponding to a foot pad temperature of 27-30°C. After a lag phase of 60 days, multiplication progressed logarithmically to a level above 10°. At 10, 15 and 25°C, the growth curve was similar but counts were somewhat lower; at 30°C the lag phase was increased to 200 days; at 4°C there was no perceptible multiplication of bacilli up to 300 days. Few of the mice survived 35°C and no bacillary increase was detected. The results were similar whether the inoculated bacilli had been previously maintained in animals at 20°C or obtained directly from human tissue. It was concluded that in the mouse foot pad, the optimum temperature for the growth of *M. leprae* is 30°C or less, and that at 25° or 36° multiplication is much slower. This accords with measurements in human beings with leprosy, in whom the worst affected skin sites were found to have a temperature of 25-33°C, while sites that averaged 35° or over escaped. The author confirms that intramuscular growth of *M. leprae* is frequent in mice. But growth has been even more frequent in connective tissue. The thermistor probe has not shown any important temperature difference between subcutaneous tissue and muscle of the foot; thigh muscle averaged 33-36°C. It is suggested that the low optimum temperature of *M. leprae* might have come about through natural selection because it is mainly those bacilli living in the cool nasal passages that cause contagion. [From abstract by D. S. Ridley in *Trop. Dis. Bull.* **63** (1966) 414.]

Cochrane, R. G. The diagnosis of leprosy with special reference to tissue defense. Leprosy Rev. **36** (1965) 189-206.

The author delivered this Stephen Rothman Memorial Lecture at the American Academy of Dermatology on 6 December 1964. He approaches the subject of the diagnosis of leprosy with special reference to tissue defense, and illustrated the lecture with 28 pictures of clinical or pathologic interest. The article becomes a standard one for all leprologists and those interested in leprosy, and will repay careful study in the original. The illustrations are outstandingly informative. [Abstract by J. R. Innes in *Trop. Dis. Bull.* **63** (1966) 283.]

Horton, R. J. and Povey, S. The distribution of first lesions in leprosy. Leprosy Rev. **37** (1966) 113-114.

In an effort to determine the portal of entry of *M. leprae* data were collected on the site of initial lesions in 252 cases of leprosy in the course of epidemiologic work in South India. On the basis of the view that primary infection occurs about 5 years before symptoms can be recognized, an age of onset of 9 years or less may be regarded as probably representing infection during infancy and 10-18 years as infection during childhood. The following table shows the distribution of first lesions encountered according to age.

Site of first lesion	Adults (> 18 years at onset) Expected	Observed	Children (10-18 years at onset) Expected	Observed	Infants (< 10 years at onset) Expected	Observed
Head	12	14	8	6	6.5	7
Arms & hands	25	42	16	24	7	7
Trunk, buttocks & thighs	66	39	43	38	17	18
Legs & feet	27	35	18	17	6.5	5
Totals	130		85		37	

Random distribution of lesions was found in children, but in maturity a more striking limitation was evident. In adults a deficiency of lesions was noted in the trunk, buttocks and thighs, i.e., the parts covered by clothing in this part of India. Infants are unclothed, a fact fitting with the random distribution of lesions noted. No difference in distribution of lesions was found in the hands. The figures support the hypothesis of entry through the skin, mediated by person to person contact and minor trauma.—E. R. Long

Sehgal, V. N. Nerve abscess in leprosy in Northern India. Leprosy Rev. **37** (1966) 109-112.

Two cases of nerve abscess in leprosy are described, which were studied in North India in an area where not many cases have been recorded previously. In these cases clinical features and biopsies characterized the cases as tuberculoid; this agreed with the general belief that nerve abscesses occur more frequently in this type of leprosy. In the two cases described the abscesses were incised and drained surgically. Acid-fast bacilli could be demonstrated in the pus. Acute symptoms and signs were relieved. The gross and histologic characters of the lesion and operative procedure are illustrated by photographs.—E. R. Long

Browne, S. G. Some observations on the morphological index in lepromatous leprosy. Leprosy Rev. **37** (1966) 23-25.

The Morphologic Index (which is an expression of the average proportion of solid rods found in multiple smears), has a considerable range in the untreated patient with lepromatous leprosy. The M.I. bears no relation to the height of the Bacterial Index, nor necesarily to the rate of fall of that index in the individual patient, nor to the time taken for all acid-fast material to disappear from the skin and nasal

mucosa. A small number of patients appeared to respond slowly, as judged by the rate of fall of the M.I., to standard therapeutic regimes.—AUTHOR'S SUMMARY

Roy, A. T. A patient with semi-membranous cyst in leprosy simulating nerve abscess. Leprosy Rev. **37** (1966) 45-46.

A case report of treatment of nerve abscess is presented. Nerve abscesses are rare outside India, but are often met in India. They are usually found in resistant or less resistant repeated reacting cases. Only a few cases have been found in Eastern Nigeria and in the Belgian Congo. Attention has been drawn to the rarity of the so-called nerve abscess in Africa. The contents of an abscess should be evacuated in time. Delayed operations have often revealed all the neurons caseated and divided and the continuity of the nerve preserved only by the nerve sheath. A case presented here was diagnosed clinically as a nerve abscess. The operative findings proved it to be a case of semimembranous cyst. This confirmed the view that nerve abscesses occur in a resistant type of leprosy cases only. [From author's summary.]

Coutelier, L. Microradiographie et microscopie de fluorescence dans l'étude des remaniements osseux dus à la lepre. Premiers résultats. [Microradiography and fluorescence microscopy in the study of bony changes in leprosy.] Ann. Soc. Belge de Méd. Trop. **45** (1965) 99-106.

Leprosy does not prevent normal osteogenesis and the examination of microradiography and fluorescence microscope sections shows that in certain cases it may even stimulate it. The destructive processes shown in ordinary skiagrams when examined under the microscope show that apparently there is no character specific for leprosy. The constructive changes due to periostitis are very obvious but are not specific. The variations in numbers and form of the osteocytes of certain osteones make up a special picture. They may however be simply the expression of a precocious alteration accompanying a chronic evolutive affection. We must therefore fall back on preliminary hypotheses based on still isolated facts which require confirmation. While final conclusions are not advisable the actual presence of these structural modifications should encourage us to carry out more extensive and intensive investigations especially by using recent research technics such as microradiography and fluorescence microscopy.—AUTHOR'S SUMMARY

Molamed, A. J. El sindrome purpúrico en la reacción leprosa. [The purpuric syndrome in lepra reaction.] Rev. argentina. Leprol. **2/3** (1965) 122-125.

The capillaritis, arteriolitis and phlebitis as part of the lepra reaction display clinical pictures in which the pathology and causative agents are in accord with those of Schönlein's purpura. The selectivity of the vascular phenomena mentioned, at the leproma level, is justified by the alteration that determines the penetration of the leproma into the vascular wall. Thus a locus minoris resistentiae is set up in the altered vessels of the leproma, which in turn are converted into an allergic "shock organ" for the bacillary antigens of the leproma and their corresponding antibodies circulating in the bloodstream. The exogenous and endogenous factors liable to cause toxic and allergic vascular alterations are likewise capable of aggravating the damage to the altered vessels of the leproma, determining sequentially exudates and hemorrhage at that level. Although these phenomena may by themselves provoke necrobiosis and suppuration of the leproma, in cases of more severe inflammation (allergic vasculitis) there would seem to be evidence of a phenomenon of Arthus in the peri-, juxta-, and intravascular leproma. Very likely this allergic phenomenon is facilitated by hemorrhage and the irruption of wandering antibodies into the antigenic zone of the leproma. The etiologic treatment consists in suppressing all toxins and allergens (drugs, foods, septic foci, stress factors) liable to cause vascular impairment.—AUTHOR'S SUMMARY

Kawaguchi, Y. [The relation between the host susceptibility and the disease type in mouse leprosy.] La Lepro **34** (1965) 181-198. [In Japanese. English summary.]

Thirteen strains of inbred mice were tested for susceptibility to murine leprosy. Considerable differences were found and strains C57BL/6 and C3H, which showed the greatest contrast, were selected for experimental studies. After subcutaneous inoculation the former developed a benign form of infection in which the leproma developed early, and was small and hard and sometimes self-healing; with the latter strain the infection was malignant, progressive and fatal, although the leproma was slower to develop; it was also soft and diffuse. In benign infections visceral lesions were slight, whereas in the malignant type they were so severe that the end result of subcutaneous inoculation was comparable with that of intraperitoneal inoculation. However, after intraperitoneal inoculation there was little difference in the severity of the visceral lesions from the 2 strains. Experiments on hybrids indicated that susceptibility to subcutaneous infection was a hereditary characteristic. When animals with a benign infection were superinfected after the primary lesions had developed, the secondary lesion was suppressed, which suggested that regression was due to the development of immunity. This did not occur to any significant extent with malignant infections. BCG vaccination predisposed to the development of the benign form of infection, or produced conversion from the malignant to the benign form. These results indicate several parallels between murine and human leprosy. [Abstract by D. S. Ridley in *Trop. Dis. Bull.* **63** (1966) 287-288.]

Mukherji, A. and Sircar, A. K. Experimental human leprosy in the footpad of mice. Leprosy Rev. **37** (1966) 39-40.

M. lepraemurium, *M. leprae*, and *M. phlei* were injected into mouse foot pads in doses of 10^5 x 0.03 per foot pad. None of the mycobacteria could be recovered from the foot pads of mice or histologic lesions found in the livers and spleen of mice receiving injections of *M. leprae* and *M. phlei* in the foot pads. [From author's summary.]

Olitzki, A. L. and Gershon, Z. Maintenance of cytopathic activity of *Mycobacterium leprae* in Eagle's medium supplemented by mycobacterial extracts. Israel J. Med. Sci. **1** (1965) 1004-1008.

An attempt to cultivate *M. leprae* on Eagle's medium enriched with mycobacterial extracts resulted in the medium becoming turbid within 30 days of inoculation. The turbidity depended on the dilution of the inoculum and was taken as evidence of the viability of the organisms *in vitro*. Both the original inoculum and the supernatant of the inoculated media were found to be cytopathic to murine monocytes, which indicated that there was a toxin bound to the bacterial bodies in addition to a soluble toxin. The toxic changes in the cells are illustrated. [Abstract by D. S. Ridley in *Trop. Dis. Bull.* **63** (1966) 411.]

Estrada-Parra, S. and Salazar Mallén, M. Estudios inmunológicos en la lepra humana. [Immunologic studies in leprosy in human beings.] Salud Pública México **7** (1965) 437-440.

The authors consider the problem of antibodies which were demonstrated to the polysaccharide fraction of *M. leprae* in the serum of patients with lepromatous leprosy, but not verified in 3 patients with tuberculoid leprosy. In lepromatous patients there is a circulating antigen in the form of bacilli or of bacillary remains. By a fluorescence technic it is possible to demonstrate the difference between *M. lepraemurium* and *M. leprae* in the lymph. The authors consider it probable that the antigenic-antibody complexes constitute a tissue aggression factor in lepromatous leprosy and can produce, as a result of their presence, inflammatory phenomena, exudative phenomena (increase of the capillary permeability) and humoral phenomena (the appearance of C-reactive protein). Since patients with tuberculoid leprosy neither have circulating *M. leprae* nor precipitins in their sera, it may be assumed

that tissue damage in lepromatous leprosy is due to the antigen-antibody mixtures. [From abstract by J. R. Innes in *Trop. Dis. Bull.* **63** (1966) 411-412.]

Brown, J. A. K. and Stone, M. M. B.C.G. vaccination of children against leprosy: first results of a trial in Uganda. (With an appendix on use of information on the prevalence of leprosy at intake to estimate incidence of leprosy in the course of the trial, by I. Sutherland.) Brit. Med. J. **i** (1966) 7-14.

A controlled trial of BCG vaccine in the prevention of leprosy began in the Teso district of Eastern Uganda in September 1960. By September 1962, 17,397 children, more than 80% of whom were under the age of 10 years, had been included. All were relatives or contacts of patients known to have leprosy. Those children with negative reactions to an initial Heaf tuberculin test, or with Grade I or Grade II positive reactions, were allocated alternately to an unvaccinated group (8,152 children) and a group vaccinated with BCG (8,149 children). Those with Grade III or Grade IV reactions (1,096 children) were all left unvaccinated, as were children who already showed skin lesions due to leprosy. In the course of the first follow-up of all the participants, between May 1963 and May 1964, more than 94% of the children were seen and examined for leprosy. A total of 116 patients had developed leprosy during this period of about 2 years since intake. The incidence in the unvaccinated children was 11.0 per 1,000 and in the vaccinated cildren 2.2 per 1,000. Among those positive in Grade III or IV and left unvaccinated the incidence was 8.3 per 1,000. The reduction in the incidence of leprosy in the vaccinated group did not appear to depend on the grade of initial tuberculin sensitivity or on the age of the child. The results so far have established that BCG vaccination has conferred substantial protection against early forms of leprosy in Uganda for a period of some 2 years. However, these early forms may resolve spontaneously, and surveillance of the trial population for some years will be important. About 8% of patients suffering from leprosy in Eastern Uganda have the lepromatous form, and it would be unwise to conclude that the present results will necessarily apply in other parts of the world, where the proportion of patients with lepromatous leprosy may be as high as 70%. The appendix by I. Sutherland gives information on the method used to estimate the expected incidence of leprosy during the course of the trial. [Abstract by J. R. Innes in *Trop. Dis. Bull.* **63** (1966) 413-414.]

Matthews, L. J. and Trautman, J. R. Clinical and serological profiles in leprosy. Lancet **ii** (1965) 915-918.

The clinical similarity of the reactive phenomena of leprosy and of collagen diseases is supported by the finding in nontuberculoid leprosy of raised gamma globulin and false positive tests for syphilis, and by reports of positive rheumatoid latex fixation, thyroglobulin antibodies, lupus cells and serum cryoproteins. Further serologic tests were carried out in 75 patients with active leprosy (65 of the lepromatous and 10 with the dimorphous form), in 10 with inactive leprosy, and in 20 healthy control patients. Twenty-six of the patients with lepromatous leprosy, however, were receiving corticosteroids. Of 39 patients with lepromatous leprosy not receiving steroids 38 had demonstrable cryoproteins in their serum, and 55% of those patients treated with steroids. Circulating thyroglobulin antibody was present in 38% of the lepromatous patients and rheumatoid factor in 58%. Somewhat lower percentages were obtained in the patients with dimorphous leprosy, and all results were negative in inactive leprosy and in the control subjects. The effect of erythema nodosum on the results was difficult to assess. The albumin:globulin ratios and the results of electrophoretic analyses are also reported. After extraction of the cryoprotein fraction from the serum, the tests for rheumatic factor and thyroglobulin antibody are reported to become negative. The authors believe that leprosy should be considered as a collagen disease. Therapeutic trials of antimetabolites and alkylating agents are being undertaken. [Abstract by D. S. Ridley in *Trop. Dis Bull.* **63** (1966) 284-285.]

Fernández, J. M. M. Influencia del factor inmuno-alérgico en la patología de la lepra. [Influence of the immunoallergic factor in the pathology of leprosy.] Proc. 7th Internat. Congr. Trop. Med. & Malaria, Rio de Janeiro, September 1963, pp. 56-57.

Although it is true that the different pathogenic mycobacteria produce specific changes in respective susceptible species, all of them provoke certain pathologic and immunologic alterations with characteristics in common. The rabbit, for example, reacts to inoculation with tubercle bacilli in two stages. The first is characterized by a diffuse, early accumulation of large mononuclears with vaculated cytoplasm, which enclose numerous bacilli of normal aspect, living in a state of perfect symbiosis with the cell. Soon a nodular stage succeeds this, in which mature epithelioid cells are observed, grouped in masses or tubercles. This picture is accompanied by the bacillary destruction, cellular or caseous death, and sensitivity to tuberculin. The extent and duration of each phase will depend on the degree of virulence of the bacillus, on the one hand, and the digestive capacity of the phagocytes, as well as the allergic sensitivity, on the other. In the rat the stage of symbiosis is prolonged. In Johne's disease in the cow, the process never passes this stage. In lepromatous leprosy the stage of symbiosis persists indefinitely, while in tuberculoid disease the nodular stage with its attributes is observed, i.e., epithelioid foci, bacillary destruction and positive lepromin reaction.—N. DE SOUZA CAMPOS

Almeida, J. O. Serological behaviour of lepromatous sera in relation to complement fixation tests for syphilis, Chagas' disease and brucellosis. Rev. brasileira Leprol. **32** (1964) 15-22.

Leprous antibodies were titrated in 2,433 lepromatous patients and the sera grouped according to their titers and then tested with cardiolipin, *T. cruzi* antigen and *B. abortus* suspension. The quantitative complement fixation method was employed for all serologic investigations. Results were as follows: in 509 sera of titers less than 20, 17 (3.34%) reacted with cardiolipin and 30 (5.98%) with *T. cruzi* antigen; in 912 sera of the second group (titers from 21 to 200), 39 (4.28%) reacted for syphilis and 89 (9.75%), for Chagas' disease; in the third group of 623 sera (titers from 201 to 2,000), 30 sera (4.81%) reacted with cardiolipin and 84 (13.84%) with *T. cruzi* antigen; in the last group of 389 sera (titers higher than 2,000), 23 (5.91%) reacted with cardiolipin and 62 (15.93%) with *T. cruzi* antigen. A correlation was observed between the level of antileprosy antibodies and the rate of positive complement fixation tests with cardiolipin and with *T. cruzi* antigen, but not between reactions for syphilis and for Chagas' disease. However, four sera reacted with *B. abortus* in the group of 265 "chagasic sera"; this incidence was significantly higher than that observed among nonreactors with *T. cruzi* antigen (7 reactions among 2,168 sera).—N. SOUZA CAMPOS

Rollier, R., Rollier, M. and Berreda, M. Apparition d'une syphilis primaire chez un malade porteur d'une lèpre lêpromateuse, avec séro-rêaction specifique positive et test de Nelson négatif depuis trois ans. [Appearance of primary syphilis in a patient with lepromatous leprosy with specific positive serum reaction and Nelson test negative after three years.] Bull. franc. Dermat. Syphilig. **72** (1965) 364-366.

An observation is reported of a case of recent lepromatous leprosy with positive serology for syphilis: Kolmer (cardiolipin and Reiter) 3+; Kline 2+; U.D.R.L. 3+ (32) and negative Nelson test. The patient was treated for leprosy by Disalone but received no antisyphilitic therapy. During this period the serology remained unchanged. After about three years, when the leprosy had practically cleared, a syphilitic chancre was observed. Treponemas were found on search The serology was then: Kolmer 3+; Kline 3+; U.D.R.L. 3+ (64 and 32). This observation appears to demonstrate the validity of syphilis reactions frankly and falsely positive to cardiolipid antigens and to Reiter substance in lepromatous leprosy.—N. BOURCART

Basu, R. N. and Ganguly, S. R. A study of lepromin in healthy contacts. Leprosy Rev. **37** (1966) 49-50.

Some 30 paramedical workers and staff workers of Chilakalapalle Control Unit (originating from different parts of India), who came for leprosy training, took part in an experiment to study the results of the lepromin test in healthy contacts. It was found that all subjects reacted positively and in some the late reaction was pronounced and an ulcer developed on this site of inoculation. It is well known that most healthy contacts of leprosy suffer from repeated subclinical infection and by means of it acquire immunity against leprosy. The contact of the above subjects with a leprosy patient from time to time had apparently allowed a small number of leprosy bacilli to enter the body and so stimulate limitation of the infection. The experiences seem to have stimulated the defense mechanism so that it reached its peak at the age of 20 years. The resistance seems more evident in those who work in the field of leprosy for some years, perhaps because they come into more intimate contact with leprosy patients in such a way that a greater degree of immunity can evolve. It follows that carrying out lepromin testing in endemic areas will assist in detecting those who have not acquired immunity against leprosy and enable precautions to be taken against any dangerous degree of contact. [*From* authors' summary.]

Beiguelman, B. and Quagliato, R. Sôbre a reação de Mitsuda. [The Mitsuda reaction.] Rev. brasileira Leprol. **32** (1964) 39-46.

The problem of correlation between the macroscopic and histologic responses to lepromin injection is discussed. It was concluded that the results obtained by studying the lepromin reaction among leprous samples cannot be applied to healthy people. It is emphasized that there is no demonstration of sensitizing agents covering histologically lepromin-negative subjects into positive ones. It is also unlikely that macroscopically positive late lepromin reactions can be provoked among subjects not hypersensitized by *M. tuberculosis* and /or *M. leprae* or some other similar agent. The assumption that lepromin reaction 3+ observed among healthy samples should invariably correspond to histologically positive lepromin reaction is interpreted as a possible source of bias in the assessment of individual resistance.—N. DE SOUZA CAMPOS

Bagalawis, A., Oh, E. and Whang, M. Result of marianum antigen in the treatment of leprosy. Leprosy Rev. **37** (1966) 51-55.

A controlled study of leprosy patients was carried out by stationary and mobile clinics using the antigenotherapy of marianum antigen (M.A.). Among 6,605 registered by three of seven doctors, 2,869 were selected for the report. Of these, 2,502 were treated with M.A. up to 7½ years in standard dosage, 287 with only DDS and 83 received M.A. plus DDS for comparison. Both M.A. and DDS therapies were well tolerated. In this study the group on M.A. showed slightly better clinical improvement than the group on DDS. The clinical effect of M.A. is seen in the following results: 4.2% did not benefit; 30.2% remained stationary; and 65.6% continued to improve in general condition and in specific lesions such as infiltration, nodules, ulcers, maculae and nerve enlargement. The lepromatous type showed a higher proportion of improvement than the tuberculoid type. To the patients who became arrested after 2½ years on M. A. a maintenance dose was given for the next three or four years. No relapse occurred. No evidence was obtained that clinical improvement may be related to age or sex. In the lepromatous type 83.4% among the patients who were bacteriologically positive were converted to negative. Patients with leprosy reaction or ocular complications received about half the standard dosage of M.A. or DDS with symptomatic treatment, usually with beneficial effect. [*From* authors' summary.]

Almeida, N. C. and Silva C. Pesquisas da antitireoglobulina em sôros de leprosos. [Examinations for antithyreoglobulin in sera of leprosy patients.] Bol. Serv. Nac. Lepra **22** (1963) 25-38.

With the purpose of contributing to a better understanding of leprosy immunopathology, the authors investigated the presence of antithyroid antibodies in the serum of 23 lepromatous and 14 tuberculoid cases, employing a modification of Derrien's technic, which is based on the agglutination of polystirene latex particles sensitized with thyreoglobulin. They found as high titers of positivity as 82.5% among the lepromatous and 45.0% among the tuberculoid cases. These titers were not altered by leprosy reactions. The authors review the literature.—N. DE SOUZA CAMPOS

Bonomo, L., Tursi, A., Trimigliozzi, G. and Dammacco, F. L. E. cells and antinuclear factors in leprosy. Brit. Med. J. **ii** (1965) 689-690.

In view of the possible role of autoimmune mechanisms in leprosy a search was made for antinuclear factor (ANF) and lupus erythematosus (LE) cells in 55 unselected patients with lepromatous leprosy. By means of the indirect fluorescent technic, ANF was found in 16 (29%) of the sera at a dilution of 1:2 and upward. LE cells were found in 4 out of 10 patients with ANF, although one of them is thought to have had lupus erythematosus in addition to leprosy. [Abstract by D. S. Ridley, *Trop. Dis. Bull.* **63** (1966) 45.]

Hayashi, Y. [Observation of intrafamilial leprosy infection, particularly infection from the infected child to the uninfected parent.] La Lepro **34** (1965) 161-168. [In Japanese. English summary.]

Between 1927 and 1961 4,528 patients with leprosy were admitted to a leprosarium in Japan and in this period there were 15 instances of healthy parents contracting the infection from their children. In all but one case the child had the lepromatous form of the disease. Eleven mothers were infected, but only 4 fathers. Leprosy appeared in the parents about 10 years after it was noticed in the children. In 7 of the 11 infected mothers the disease was of the macular tuberculoid form, whereas 3 of the fathers developed lepromatous leprosy and only one had the tuberculoid type. It is suggested that this may indicate that females are less susceptible to leprosy than males. Of the 15 infected children only 3 were girls. The fact that more mothers than fathers contracted the disease is attributed to closer contact with the children. [Abstract by F. I. C. Apted in *Trop. Dis. Bull.* **63** (1966) 165.]

Le Coulant, Texier, Maleville and Guillaume. Étude clinique et épidémiologique des 47 cas de lèpre suivis à la clinique dermatologique de Bordeaux depuis 1947. [Clinical and epidemiologic study carried out in 47 leprosy patients at the Bordeaux Dermatologic Clinic since 1947.] J. Med. Bordeaux **142** (1965) 1435-1444.

The 47 patients with leprosy, mostly male, were studied at the Bordeaux Dermatological Clinic from 1947 to 1963; 25 of them were from metropolitan France and 22 from overseas. Lepromatous leprosy was found to be more frequent in patients living in France. The disease was acquired mainly in the former French overseas territories, though there were 3 patients of Spanish origin. At present the 47 patients do not constitute an alarming problem. Nevertheless, the figure for a city of Western Europe is astonishing. During the Middle Ages leprosy was confined to the present St. Nicholas quarter and, being indigenous, disappeared at the end of the 16th century as in all France. There were indeed at the end of the century a certain number of patients of exotic origin and some more were found at the end of the last war. This recrudescence of leprosy runs parallel with that of some other tropical diseases, associated with the increase in immigration and the improvement in transport. Among those coming from endemic leprosy countries are students, and nationals of Spain, Africa, Asia, or Antilles. The present patients originated mostly from former French North Africa, French Africa and Madagascar, Antilles and Latin America, and the Far East. The few Spanish patients came from Cordoba and Jaen. [*From* abstract by J. R. Innes in *Trop. Dis. Bull.* **63** (1966) 164-165.]

Altmann, M. Datos epidemiológicos de la endemia leprosa en Corrientes. [Epidemiologic data on the leprosy endemic in the province of Corrientes (Argentina).] Rev. argentina Leprol. **2/3** (1965) 138-143.

After brief reference to the historic antecedents of the leprosy endemic in the Province of Corrientes (Argentina), the author points out the epidemiologic trends of the cases registered during the last 15 years and their characteristics in relation to age, sex, nationality and clinical form. He also notes the increasing prevalence, which reaches 2.09% at the present day. The available data come from the Official Register of the Direction of the Lucha Dermatológica (leprosy control). [*From* author's summary.]

Manzi, R. O. and Marzetti, A. A. Anteproyecto de un programa de prevención de deformidades y rehabilitación física de enfermos de lepra en la República Argentina. [Preliminary plans of a program of prevention of deformities and physical rehabilitation of leprosy patients in Argentina.] Rev. argentina Leprol. **2/3** (1965) 132-137.

Some special characteristics of importance in planning a rehabilitation program for leprosy patients are set forth. The Argentine organizations in the campaign against leprosy are enumerated, and the nature of the endemic is indicated. The objectives of the program are described according to their priorities: training of staff, prevention of incapacities, surgical and nonsurgical treatment, supply of apparatus and protheses, and investigation. Within the projected organization a vertical type is recognized, establishing the levels in accordance with the requirements and resources of the already existing assistance services. The participation of private institutions coordinately with the proposed rehabilitation program is to be noted. [*From* authors' summary.]

Mercadante, F. F. Tabla de calificación de tareas para equipos móviles de la Campaña Sanitaria Antileprosa. [A table for the qualification of the work of the field staffs of the Leprosy Program.] Rev. argentina Leprol. **2/3** (1965) 126-131.

A table of qualification of the work, intended to evaluate by points the activities of the field staffs of the Leprosy Program, is proposed by the author. This evaluation in numbers can be employed for budget purposes and the programing of the field actions. AUTHOR'S SUMMARY.

Sanchez Caballero, H. J. B.C.G. y lepra. Valor del BCG en los convivientes. [BCG in leprosy. Its value in contacts.] Rev. argentina Leprol. **2/3** (1965) 115-121.

Not all authors agree on the exact value of BCG in leprosy. The Calmette vaccination is able to make the Mitsuda reaction positive in a high percentage of cases, but it is possible that the positive lepromin reaction so induced will differ from the naturally positive reaction in somewhat more than the fact that the first one is reversible. In some white lepromatous patients BCG is able to induce the appearance of strong lepromatization, as was communicated by Jonquiéres and Masanti. Also the appearance of leprotic injuries can be seen after BCG treatment of healthy contacts. It seems that BCG will accelerate the immunologic process, sometimes breaking the unstable balance existing between latent infection and apparent illness while decreasing the threshold of reaction of the skin. On this basis clinical illness becomes evident. Up to date it is impossible to foresee what will occur in each BCG-vaccinated case. Of 8,406 contacts controlled in the Dispensario Central de Dermatología, 7,274 were not vaccinated and 1,132 were given BCG by mouth (0.10 to 0.20 gm. a week for 4 weeks, i.e., a total of 400 to 800 mgm. of BCG). Of those not vaccinated 66 became ill; of these 43 were tuberculoid, 14 lepromatous, 8 indeterminate and 1 dimorphous in type. Of those receiving BCG, 18 became ill, 12 tuberculoid (3 of them with infantile nodular variety), 3 lepromatous, 1 indeterminate, 1 dimorphous and 1 pure neural. The percentage of illness among contacts not given BCG was 0.90%, as against 1.59% in the BCG group. Thus it seems that BCG inoculation helps the ex-

teriorization of latent leprosy. As to the types of leprosy observed in each group, 18.18% of those not given BCG were lepromatous and 59.09% tuberculoid. In the BCG group 11.11% became lepromatous and 66.66% tuberculoid. In view of these results the author asks if it will continue to be useful to give BCG to the contacts of leprosy patients. E. D. L. JONQUIERES.

Browne, S. G. Leprophobia. West African Med. J. **14** (1965) 175-180.

During the past 4½ years, among 1,412 persons who presented themselves at the diagnostic clinic of the Leprosy Research Unit at Uzuakoli, Eastern Nigeria, were 83 Nigerian and 5 non-African patients who were victims of leprophobia, without physical signs to account for their fears. Some had subjective symptoms which they attributed to leprosy, while twice as many had no symptoms at all. Their fears were often associated with previous contact with a leprosy patient, or with the suspicions of relations or neighbors. The author comments that there is a deep primitive fear of leprosy, reinforced by religious fear. In this series there was an apparent absence of guilt and shame, but leprophobia is often associated with the violation of some taboo, or with a sexual misdemeanor. Some persons become "leprosy-conscious" through popularization of medical topics in the lay literature. The list of conditions actually present included 7 mycoses, 4 scars, 2 chronic ulcers, 1 mossy-foot, 1 congenital dislocation of the hip, 1 neurodermatitis, 1 traumatic flexion of a finger, 1 atopic dermatitis, 1 infective wart. [Abstract by J. R. Innes, *Trop. Dis. Bull.* **63** (1966) 283.]

Montestruc, E. Cours complementaire de leprologie. [Complementary course in leprology.] Arch. l'Inst. Pasteur (Martinique). (Special number devoted to leprosy.) **17** (1964) 11-56.

Clinical and epidemiologic experience of 3 years in a region of endemic leprosy.—This experience has been favored by several circumstances, including (1) stability as respects time and practice, the same observer being able to follow several generations of patients; (2) observation during two periods in the history of leprosy (chaulmoogra and modern antibacterial chemotherapy); (3) geographic (island) nature of the country, impeding migration; (4) marked leprous endemicity, antedating rational antileprosy prophylaxis (250 new cases annually); and (5) advanced social evolution, promoting epidemiologic inquiry not easily realizable elsewhere.

From the clinical point of view the author draws attention to the following: (1) the chaulmoogra period was not negative for leprology; it was highly instructive, because it allowed a natural evolution of the disease and permitted gathering of information of great interest, particularly with respect to host-parasite relations, i.e., natural antileprosy immunity; (2) modern antibacterial therapy led to results that appeared spectacular at first, but later showed stability in the lepromatous type of the disease and its unquestionable relation to lepra reactions; (3) the progress of leprologic technics has permitted a better understanding of the mechanism of leprosy infection, a study of orientation of the infection with respect to types of leprosy, and an explanation of the irreversibility of the neuritic lesions of tuberculoid leprosy in the light of the intense phagocytic power of the cells of the epithelioid nodule, leading to necrosis and destruction of nerve tissue.

From the epidemiologic point of view, research favored by the high social level of the Martinique population has permitted determination of the role of the following factors: (1) *A familial factor.*—Epidemiologic and immunologic studies of members of leprotic families indicate the existence of a hereditary familial factor lessening resistance to leprosy infection. (2) *A racial factor.*—Similar observations compared with data elsewhere show unquestionable differences among diverse peoples in natural resistance to the leprosy organism. (3) *A climatic factor.*—Clinical forms vary with the climate, and the hypothesis of Brand relative to the relation of the leprosy bacillus to the ambient temperature appears to explain the differences. (4) *An alimentary factor.*—Undernourishment, lowering resistance to infection in general, can favor the development of leprosy, but it is difficult to

discover the specific elements concerned. (5) *A sex factor.*—Thirty years of observation have confirmed the existence of a sex factor, i.e., a lower resistance in the male than the female, but a diminished resistance in the female during puberty, pregnancy and parturition.

Social and prophylactic problems.—Case-finding is the most important element in prophylaxis, identifying and finally eliminating sources of contagion. It should include all of a population, be periodic in character, and vary with the region concerned. Isolation, including obligatory residence in specialized leprosaria, is considered by many leprologists as disadvantageous in carrying out prophylactic measures (Seminar at Belo-Horizonte, Brazil, June 1958), but the isolation of contagious forms constitutes an effective prophylactic procedure. Such isolation should not be coercive, and should ensure conditions as agreeable as possible. Special facilities should be provided for invalids. Treatment should be active, well tolerated, and easy to apply. The question of clearing lesions and cessation of treatment is of prime importance and, in the light of criteria set up in seminars in Tokyo (1958) and Brazzaville (1959), should be correlated with immunologic criteria. Finally, surveillance of arrested cases should not cease. The protection of healthy subjects should include two essential measures, viz., medical observation of contacts, and recognition of the enhancement of resistance by chemo- and biologic (BCG) prophylaxis.

Administrative and social action.—Health legislation is indispensable in each state and should ensure prophylactic action and material assistance supporting each patient and his family during the period of contagion; and providing help for invalids and incurables. Private welfare organizations, supplementing official social action, are important and should be encouraged. Popular health education plays an important role. Leprology is a medical specialty requiring specialized personnel, concerned with case-finding, health centers, dispensaries, mobile units, isolation and treatment hospitals, leprosy villages, and facilities for incurables.

Treatment of leprosy.—The chaulmoogra period was succeeded, from 1940 on, by modern antibacterial therapy, based first on studies at the Pasteur Institute in Paris, where J. Trefouël and his associates developed the sulfones and N. Rist applied them experimentally in mycobacterial infections, and secondly on Faget's studies in Carville, La., which demonstrated a spectacular action in leprosy. Since then the leprosy arsenal has been enriched by new drugs, including the thiosemicarbazones, derivatives of thiourea (Ciba 1906), cycloserine, sulfonamides, etc. Attention is called to the need, in mass therapy, for spaced drug administration, and procedures permitting sufficient, prolonged blood levels (e.g., intramuscular sulfones every 15 days and oral sulfamethoxypyrazine every 8 days). Progressive doses are indispensable, elevated doses at the outset leading to risk of losing immunobiologic equilibrium. Electron microscope studies by Japanese investigators, differentiating dead and living bacilli, have demonstrated the rapid action of Ciba 1906; this drug might prove the initial medicament of choice, followed by a multiple drug regimen in which the sulfones would take the major part. It is important to anticipate lepra reactions, which should be treated energetically and rationally, corticosteroids being indicated in grave cases, where life is in danger. Adjuvant therapy (e.g., vitamin B_1) should supplement specific treatment, as should the treatment of intercurrent infections, such as malaria and intestinal parasitism. Physio- and electrotherapy should be added to medical treatment, and plastic and rehabilitative surgery, which has made great progress in recent years.

Immunology of leprosy.—Culture of the leprosy bacillus has not yet been realized and a susceptible animal is still to be found, so that immunologic studies in leprosy run into great difficulties. But the evident antigenic relationship between *M. leprae* and *M. tuberculosis* enables us to raise the veil to some extent on antileprosy immunity. Analogy with antituberculosis immunity makes it possible to believe (1) that the human organism has a natural or acquired resistance to leprosy infection, and (2) that in the present state of knowl-

edge it is not possible to define the factor responsible, which might be humoral, cellular or allergic in nature. It could be the result of a combination of factors, the interaction of which at a given moment might determine the receptivity of a particular organism. This resistance of the organism toward the leprosy bacillus is made evident by the Mitsuda or late lepromin reaction, which calls to mind the Koch phenomenon in tuberculosis. Allergic hypersensitivity is signalized by the Fernández (early lepromin) reaction, which resembles the tuberculin reaction. It is above all the Mitsuda reaction which is used practically in leprosy. It is due to the presence in lepromin of bacillary bodies, and it is more regular in its results than the Fernández reaction, probably because of the variable quantity and quality of toxins in different lots. Attempts have been made to purify raw lepromins, eliminating their cellular fragments, which can provoke undesirable reactions, but numerous studies on the subject appear to indicate that it is a mistake to eliminate the tissue elements at any price, for they play an undoubted role in the lepromin reaction. On the other hand it is essential that the bacillary concentration in raw lepromin (prepared according to the Mitsuda-Hayashi technic, as modified by Wade, using nylon instead of a gauze filter) be standardized.

Practical conclusions that can be drawn from our present knowledge of the immunology of leprosy are as follows: (1) *Classification of different forms of leprosy.* —In the absence of a histopathologic examination, the lepromin reaction, in conjunction with clinical and bacteriologic characteristics, permits determination of the type of leprosy in certain cases. (2) *Evolution of the disease and arrest under treatment.*—The result of the Mitsuda test is of capital importance in noting the evolution of the disease under treatment, and should be added to the clinical criteria. (3) *Protection of healthy subjects.* —In this respect the result is equally important. In a region of endemic leprosy every subject negative in the lepromin-reaction is susceptible to leprotic infection. It is indispensable to attain a state of resistance to infection, either by chemoprophylaxis, which protects during its administration, but does not confer true immunity, or by biologic prophylaxis, i.e., by BCG vaccination, which leads to immunity only several weeks after its administration. To secure effective protection the two methods should be employed. The advent of the immune state will be made evident by the conversion of the lepromin reaction from negative to positive, and disappearance of the positive state will indicate that the subject is again susceptible. This present knowledge of the immunology of leprosy is of importance in practice. — E. Montestruc

Arnold, H. L. Paradoxes and misconceptions in leprosy. J. American Med. Assoc. **196** (1966) 647-650.

Adapted from chairman's address before Section on Dermatology, 114th annual convention of American Medical Association, New York, 22 June 1965. A review of debated questions, pointing out that Biblical "leprosy' was not leprosy in the modern sense, indicating the difference between Arabian (filariasis) and Greek (leprosy) elephantiasis, and discussing other features of leprosy. Separate sections include the parts played by Hansen and Neisser in identifying the bacillus of leprosy, some of the epidemiologic and social relations of leprosy and syphilis, the geographic distribution of leprosy, the relative susceptibility of children and adults, factors of resistance in relation to contagion, the neural element in leprosy, the Mitsuda and other immunologic tests, BCG prophylaxis, deformities in leprosy, the most severe types of leprosy, the inefficacy of chaulmoogra oil and relatively slow action of the sulfones, and finally some paragraphs on terminology, noting the now general disapproval of the word "leper," but logic in retaining the word "leprosy" rather than using some pathologically less distinctive intended equivalent such as Hansen's Disease.—E. R. Long