

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.

Clinical Course

Varma, A. K. and Prasad, B. G. Some observations on the age at onset of leprosy. *Leprosy Rev.* 38 (1967) 235-238.

The age of onset in leprosy has not received the attention it deserves, and still remains disputed. There is a wide variability of results among the various authors. The present study, made in Lucknow, was carried out on outpatients, i.e., new patients coming from the city itself or nearby adjoining areas. The lepromatous rate in Northern India has been reported to vary from 20-25% or even 30%. Three tables and one frequency polygon give details of the distribution of age at onset by sex and type, and in different areas by different workers. The authors suggest that the availability of infectious contacts probably determines the age of onset in a community. There is ample evidence to suggest that adult infection is by no means as rare as it is often thought to be.—N. D. FRASER

Bosq, F. J. P., Cordero, A. A. and Perez Maldonado, C. Lepra tipo tuberculoide, variedad nodular en el adulto. [Tuberculoid leprosy, nodular variety in the adult.] *Leprológia* 11 (1966) 39-41.

This variety of benign tuberculoid leprosy, first reported by Lara and De Vera and by Souza Campos, is generally believed to be restricted to children. Two cases in adults are reported; each was in a female, one 83 and the other 33 years old. It is concluded that this type of tuberculoid leprosy is a manifestation of primary infection in adults with an immunoallergic background identical with that seen in some children.—E. D. L. JONQUIÈRES

Giordano, A. F. and Piñero, O. Errores diagnósticos en la enfermedad de Hansen. [Diagnostic errors in Hansen's disease.] *Rev. Sanid. Mil. Argentina* 64 (1965) 129-131.

This is a report of two cases of leprosy erroneously diagnosed in a first examination. The first was lepromatous leprosy, diagnosed as syphilis because of a positive test for syphilis. The second was a reactional tuberculoid case supposed at first to be a dermatophytosis because of the finding of dermatophytes in superficial scales.—E. D. L. JONQUIÈRES

Warren, A. G. Measurement of skin clearance in leprosy patients. *Far East Med. J.* 3 (1967) 106-108.

The records of Chinese patients with typical lepromatous leprosy, histologically proven, were examined at Hay Ling Chau Leprosarium, Hong Kong. Only those whose pretreatment bacterial index (BI) exceeded 4.0, estimated by Cochrane's method, and who were treated with DDS (dapson, diaminodiphenyl sulfone) alone, were included. It was found that only 22 of 800 case notes examined fulfilled these criteria. In the 22 patients the BI fell at an average of 1.0 per year until it reached approximately 1.5. Thereafter it was impossible to predict the rate of fall, and the time required to reach negativity.—M. F. R. WATERS

Merklen, F.-P., Cottenot, F. and Moulías, R. Début acro-oedémateux avec multi-nevrite dans une lèpre tuberculoide. [Onset with edema of the extremities and

multineuritis in a patient with tuberculoïd leprosy.] *Bull. Soc. franc. Dermatol. et Syphilig.* 73 (1966) 854-855.

Edematous onset is well known in lepromatous leprosy and in localized regions in the manifestations of reactional episodes in this form. In contrast, in tuberculoïd leprosy edematous reactions are infrequent, and a diffuse edematous onset is somewhat unusual. A case report is presented of a 26 year old female Martinique creole, in France less than 2 years, who developed an edematous infiltration of the face and extremities a month after a second accouchement, with paresthesias and other evidence of polyneuritis. A diagnosis of leprosy was established grossly and confirmed histologically. Treatment with Sultirene was followed by rapid regression of cutaneous lesions and some paretic symptoms, but slow recession only of the edema and deficit in thermo-analgesic sensation.—E. R. LONG

Rollier, M. R. and Rollier, M. Érythème noueux lépreux et orchite tuberculeuse. [Erythema nodosum leprosum and tuberculous orchitis.] *Bull. Soc. franc. Dermatol. et Syphilig.* 74 (1967) 317-318.

A case report is presented illustrating the authors' thesis of a precipitating role of intercurrent disease in ENL (cf. *THE JOURNAL* 35 (1967) 531). A 12 year old patient whose father was under treatment for lepromatous leprosy, had been ill for 3 years with leprosy of the same type, and under treatment with ethionamide because of intolerance to DDS. While under this treatment he developed ENL with a variety of acute manifestations. One month after hospitalization for this condition he developed an enlargement of the testis, which proved to be tuberculous with secondary pyogenic infection. Under specific treatment for tuberculosis the mass subsided rapidly. The ENL subsided contemporaneously.—E. R. LONG

Mercau, A. R., Serial, A., Depaoli, E. A., Martinez Prieto, P. R., Cattaneo, R. N. and Laterza, A. M. Fenómeno de Lucio.

[Lucio's phenomenon.] *Leprológia* 11 (1966) 30-33.

The Lucio phenomenon is an acute necrotizing disorder that takes place in a special lepromatous form of leprosy, diffusely infiltrative and devoid of lepromata. The case is reported of a patient with nodular lepromatous leprosy, with histoid lepromas. After nine months of DDS therapy he developed erythema nodosum leprosum. The reactional elements evolved to a necrotizing lesion, which histologically was that of the Lucio phenomenon. It is concluded that the Lucio phenomenon may take place exceptionally in nodular lepromatous leprosy, and is not always specific for the diffuse lepromatous leprosy known as leprosy of Lucio.—E. D. L. JONQUIÈRES

Bosq, F. J. P. and Woscoff, A. Lepra de Lucio y Latapi (Lepra bonita). [Leprosy of Lucio and Latapi (Lepra bonita).] *Leprológia* 11 (1966) 34-38.

Case report. This type of leprosy is not frequent in Argentina. Not more than 10 cases have been seen or reported in that country; the first record of Lucio's leprosy was that of Fiol and Jonquières in 1951. In Mexico this kind of leprosy is seen in 17 to 25% of the cases between 10 and 15 years old, according to Latapí.—E. D. L. JONQUIÈRES

Karat, A. B. A., Karat, S., Job, C. K. and Furness, M. A. Acute exudative arthritis in leprosy. Rheumatoid-arthritis-like syndrome in association with erythema nodosum leprosum. *British Med. J.* 3 (1967) 770-772.

In the past two years at the Schieffelin Leprosy Research Sanatorium the authors have seen 10 patients with lepromatous leprosy who developed acute painful exudative polyarthritis, clinically similar to acute rheumatoid arthritis, occurring during the course of erythema nodosum leprosum. The polyarthritis cleared up completely when the erythema nodosum subsided, leaving no clinical or radiologic residual signs of rheumatoid arthritis. All the patients had lepromatous leprosy of

more than three years' duration. In all of them the "rheumatoid syndrome" occurred only after recurrent episodes of erythema nodosum leprosum. In all the patients there was involvement of the skin and subcutaneous tissues in the erythema nodosum leprosum process. Everyone of them had systemic manifestations of fever, anorexia, and general malaise. The clinicopathologic features of exudative polyarthritis simulating acute rheumatoid arthritis, occurring in two lepromatous leprosy patients in association with erythema nodosum leprosum, are, as far as the authors are aware, described for the first time.—N. D. FRASER

Job, C. K. and Bhaktaviziam, C. Nerve abscess in lepromatous leprosy. Report of a patient. *Leprosy Rev.* **38** (1967) 243-247.

Nerve abscess is well known in the tuberculoid type of leprosy and is analogous to the "cold abscess" of tuberculosis, but its existence in the lepromatous type of leprosy has always been in doubt. The case is reported of a patient with lepromatous leprosy presenting all the features of a lepromatous nerve abscess, the histologic

appearance of which has been predicted. In this patient the nerve abscess occurred during an attack of ENL. The nerve was densely packed with neutrophil polymorphonuclear leucocytes forming an abscess. Acid-fast stain showed numerous acid-fast bacilli. The nerve lesion was present in association with numerous other skin nodules typical of ENL. Therefore, it proved beyond doubt, for the first time, that ENL-like reaction with abscess formation takes place in the nerve tissue also.—N. D. FRASER

Pant, G. C. and Sehgal, V. N. Calcification of superficial nerves in leprosy. *Leprosy Rev.* **38** (1967) 231-233.

Some workers have reported stray cases of calcification of superficial nerves in neuritic leprosy. Study on the radiologic evidence of calcification of nerves as such has not been thoroughly undertaken. Fifty patients in different stages of leprosy were studied for evidence of macroscopic radiologic calcification in superficial nerves. No calcification was seen in any of them.—N. D. FRASER

Chemotherapy

Rees, R. J. W. IV. Leprosy. A preliminary review of the experimental evaluation of drugs for the treatment of leprosy. *Trans. Roy. Soc. Trop. Med. & Hyg.* **61** (1967) 581-593.

The newly developed foot pad infection with *M. leprae* has provided an experimental method for evaluating drugs against leprosy. The infection can be reproduced and maintained indefinitely in the laboratory by passage, and is adaptable to quantitative analysis. Because leprosy progresses very slowly, at present each test occupies 6 to 8 months; however, it is probable that the use of animals after thymectomy and irradiation will reduce this time by half. There is good evidence to suggest that the huge residue of dead leprosy bacilli persist-

ing in tissues after administration of a therapeutically active drug is responsible for persisting nerve damage and reactional episodes. Therefore in addition to anti-leprosy agents, drugs capable of digesting dead bacilli or facilitating their destruction by the host will be required for completely successful treatment of the established disease. The infection produced in mice after thymectomy and irradiation now provides a suitable experimental model for all such investigations. [*From author's summary*]

Ridley, D. S. The evaluation of drugs for leprosy; bacteriological considerations. *Trans. Roy. Soc. Trop. Med. & Hyg.* **61** (1967) 596-600.

For short-term therapeutic trials in lepro-

sy the most important bacteriologic assessment is the percentage of solid-staining organisms. For long-term trials the most important assessment is the number of bacilli present in the skin. An approximate assessment can be readily obtained from skin smears. In any trial or research procedure in leprosy, biopsies should be made for the purpose of classification. Biopsies give additional information about the bacterial content of the skin.—AUTHOR'S SUMMARY

Browne, S. G. The clinical evaluation of drugs for leprosy. *Trans. Roy. Soc. Trop. Med. & Hyg.* **61** (1967) 601-606.

This paper attempts to clarify the methodology of trials of reputedly mycobactericidal drugs in leprosy, by isolating the factors that have in the past led to confusion. Leprosy is not only a slightly contagious disease; it is also the sum of immunologic reactions, and the outcome of consequential peripheral neuropathies. Clinical evaluation of drug efficacy may be impossibly difficult or misleading, and must be supplemented by regular calculation of the morphologic index. Many manifestations of the disease are related to the persistence in the tissues of acid-fast debris from dead *M. leprae*, which is not removed by the normal processes of phagocytosis.—AUTHOR'S ABSTRACT

Satake, Y. Studies on development of chemotherapeutic agents for leprosy. *La Lepro* **36** (1967) 94-95. (In English)

The problem of drug resistance has become apparent in the chemotherapy of leprosy. New and more potent therapeutic agents must be found in order to overcome it. We have developed several new agents, of which the following are some of the most promising. (a) DDS acetate: The presence of DDS acetate in the urine and blood following administration of DDS in man and rabbit was verified by paper electrophoresis, and studies were carried out to determine if the mono- and diacetate, the detoxifying forms, have a therapeutic effect. It was observed that deacetylation takes place in the body. Clinical tests were

conducted with the diacetate, which was named Acetamin. Among 14 cases treated, this agent was found effective in 8, somewhat effective in 3 and ineffective in 2 cases. There were no side-effects. An effect was also noted in cases no longer responding to DDS and Promin, and this agent may therefore be used in patients hypersensitive to the latter two compounds. (b) Thiozamin (4-amino-4-aldehyde-thiosemicarbazone diphenyl-sulfone). In this compound, the NH₂ of DDS was replaced by the effective side chain of Tibion, and the influence on the therapeutic effect of DDS was examined. Of a total of 19 cases of the lepromatous type treated with this substance, the drug proved effective in 8, somewhat effective in 6, and ineffective in 2. In 3 cases there was exacerbation. In all 3 cases of the neural type it was effective. The rate of efficiency was therefore 73.6%; there were almost no side-effects. (c) DOT (4-dimethylaminobenzaldehyde 4-oxyphenyl-thiosemicarbazone) and its derivatives. This compound belongs to the thiosemicarbazone group and the nucleus is similar to that of CIBA 1906. A potent antibacterial action against the tubercle bacillus is found *in vitro*. The toxicity is quite low and clinical tests indicated that it could be given safely in man. It was found that although there was marked improvement in the symptoms in some cases, ENL developed. Clinical tests are being continued on the dosage and other problems. (d) Pyrazine derivatives. Some of these show a pronounced suppressive action against the tubercle bacillus *in vitro*. Toxicity is also low, suggesting the possibility of clinical use. Pharmacologic tests are being carried out at present. [From author's abstract]

Languillon, J. Les thérapeutiques spécifiques actuelles del la lèpre. [The specific treatment of leprosy.] *Med. Trop.* **26** (1966) 131-156. (Special number)

After a brief historical introduction to the modern treatment of leprosy, this long review summarizes existing knowledge concerning the principal drugs now used against the disease, excluding those employed in reactional states. First place is accorded to dapsone, and the mono- and

disubstituted sulfone derivatives. The mode of action, dosage, and toxicity of members of this series of drugs are reviewed, together with practical advice on methods of administration of the oral and injectable forms of dapsone. The results of treatment are briefly cataloged. The section on thiambutosine provides data arranged along similar lines. The author's interest in the long-acting or depot sulfonamides is reflected in the length of this section, which gives a resume of the use of this series of drugs. A selection of paired photographs "before and after" follows the letterpress. [From abstract by S. G. Browne, *Trop. Dis. Bull.* **64** (1967) 741]

Chatterjee, A. Clinical evaluation of the dosage of DDS. *Indian J. Dermatol.* **11** (1966) 158-159.

After an initial dose of 25 mgm. daily of DDS in a group of leprosy patients (number, type of patients and duration of treatment not mentioned) symptoms and signs of reaction developed when DDS was stopped, and routine treatment for reaction was advised. Later, after subsidence of reaction, a dose of 5 mgm. per day was given initially, which was gradually increased. Patients improved satisfactorily, without reaction, and accordingly an initial low dose schedule was suggested.—S. GHOSH

Gaugas, J. M. Antimicrobial therapy of experimental human leprosy (*Myco. leprae*) infection in the mouse foot pad. *Leprosy Rev.* **38** (1967) 225-230.

In the present investigation Shepard's original method for transmission of human leprosy (*M. leprae*) to the mouse was confirmed. As expected, a very mild form of infection was induced. This model was used to test the effectiveness of antimicrobial therapy. At largely arbitrary dose ranges treatment with dapsone, solapson, sulphormethoxine, sulphadimethoxine, B.663 (M) phenazine, thiacetazone, thiambutosine, SU-3068, capreomycin, isoniazid, oxydiazolone, PAS, streptomycin, streptovaricin, viomycin, cephaloridine and Rifamycin completely suppressed the develop-

ment of the mild infection, but tetracycline or morphazinamide had no inhibitory effect; gentamicin had only a partial effect. The suitability of this method for the screening of compounds is discussed.—
AUTHOR'S SUMMARY

Floch, H. A., Rist, N. and Jacobi, J.-C. Intérêt de l'éthionamide en thérapeutique antilépreuse. [Interest in ethionamide in antileprosy therapy.] *Bull. Soc. Path. exot.* **59** (1966) 715-724.

Ethionamide, a derivative of isonicotinic acid, with some structural relation to isoniazid, and a drug of recognized value in tuberculosis also, has definite activity against leprosy. The authors describe favorable clinical results with a dosage of 0.25 gm. per day in the treatment of 19 cases of leprosy.—E. R. LONG

Chaudhury, D. S. Etisul in out-patient treatment of leprosy. *Ghana Med. J.* **6** (1967) 8-9. (*Memoranda*)

A report on the use of Etisul in mass mobile outpatient treatment in Northern Ghana is described and compared with the findings in a control area. It is observed that the rate of decline of aggregate infectivity in the area where Etisul was used, expressed in percentage reduction of infectivity, was greater than that in the control area. The use of Etisul in suitable cases is recommended, together with dapsone in mass outpatient treatment. [Abstract by J. R. Innes, *Trop. Dis. Bull.* **64** (1967) 1211]

Saúl, A. Talidomida en el tratamiento de la reacción leprosa. Primeras observaciones en México. [Thalidomide in the treatment of lepra reaction. First observations in Mexico.] *Medicina (Mexico)* **47** (1967) 348-353.

The author treated 3 lepromatous patients with severe lepra reaction, all males and very ill with erythema nodosum, fever, bad general condition, and high blood sedimentation rates. The drug was administered in a dose of 100 mgm. per day. Relief from the main symptoms of lepra reaction, including fever, and nerve and joint pains,

was noted in the first 24-48 hours after the first dose of thalidomide. The cutaneous lesions and sedimentation rates improved later. The 3 patients could take 25 mgm. of DDS every other day. No side effects were observed and the dose of the drug was reduced to 50 and 25 mgm. daily. The author confirmed the good results of Sheskin and believes that thalidomide is, for the present, the best drug against lepra reaction.—A. SAÚL

Terencio de las Aguas, J. and Contreras D, F. Tratamiento de las leporreacciones con talidomida. [Treatment of lepra reactions with thalidomide.] *Rev. Leprol. (Fontilles)* 6 (1967) 587-594.

Treatment of lepra reactions with thalidomide was initiated at the Fontilles Sanatorium in March 1966. At the time of writing this article 39 patients had been treated, 26 of them men and 13 women. In 30 the lepra reactions were intense; 23 of these had only one reaction, and 7 of them several reactions, for a total of 42 reactional phases. Initial doses ranged from 100 to 300 mgm. Fever disappeared at varying rates of speed, but without uniformity in the different cases and varying dosages. It was noteworthy that in 57% of cases treated with 300 mgm. the fever disappeared in 5-10 days, and in 45% of cases treated with 100 mgm. the fever disappeared in 102 days. Betterment and whitening of the cutaneous lesions accompanied the decline in fever. A maintenance dose of 100 mgm. was used for 10-30 days after the disappearance of manifestations of lepra reactions. There was no need to continue steroid treatment in patients who had received that type of therapy. Tolerance to thalidomide was excellent.—[From authors' summary]

Floch, H. A. Sur la thérapeutique des réactions lépreuses. [Treatment of leprosy reactions.] *Bull. Soc. Path. exot.* 59 (1966) 745-752.

Simple treatment consisting of combined chemotherapy with ethionamide (Trecator) and desensitization by sodium hypofite, both given intravenously, with

the addition of vitamin therapy (vitamin PP and B complex), was found to yield satisfactory results in all types of lepra reaction.—[From author's summary]

Laugier, P., Ellena, V. and Barale, T. Action rapide de l'isoniazide dans un cas de lèpre réactionnelle. [Rapid action of isoniazid in a case of reactional leprosy.] *Bull. Soc. franc. Dermatol. et Syphilig.* 73 (1966) 899-900.

Total remission was obtained in a patient suffering from reactional leprosy, on treatment with isoniazid, 500 mgm./day. The patient had suffered previous reactional episodes subsequent to treatment with other drugs. In one episode corticosteroid and antihistamine therapy had had temporary success.—E. R. LONG

Schulz, E. J. and Falkson, G. The treatment of lepromatous leprosy and erythema nodosum with the cytostatic drugs Ancyte and Vercyte. *Leprosy Rev.* 38 (1967) 221-223.

Six patients with lepromatous leprosy and severe recurrent ENL were given a course of treatment with two cytostatic drugs, first with Vercyte (N,N-bis (3 bromopropionyl piperazine), and after a 3½-week break with Ancyte N,N-bis (3 methan e sulfonyloxypropanoyl (piperazine). No significant side effects were encountered and no therapeutic benefit was observed. After withdrawal of Vercyte 3 patients had severe exacerbations of ENL.—[From authors' summary]

Hauvillier, O. A. and Oviedo, C. L. Efecto de una sustancia heparinoide en la pigmentación residual de los hansenianos. [Effect of a heparinoid substance on the residual pigmentation of leprosy patients.] *Leprológica* 11 (1966) 27-29.

An ointment containing a heparinoid and fibrinolytic substance (Pergalen, Hoescht, S. A., registered), used in leprotic ulcers, revealed a beneficial action against residual pigmentation of involuted lepromata.—E. D. L. JONQUIÈRES

Susman, I. A. Some results of the treatment of plantar ulcers with Polybactrin and Cicatrin. *Leprosy Rev.* 38 (1967) 213-220.

Nine leprosy patients with plantar ulceration of both feet and 5 with unilateral ulceration were chosen for treatment with the antibiotic preparations Polybactrin spray, Cicatrin powder and Cicatrin cream. In those with bilateral ulceration, only one foot was treated. Seventeen ulcers were treated in all. The results after 6 weeks and then 13 weeks of treatment are presented.

All the ulcers treated, except one, showed definite improvement. After 90 days, 7 of the ulcers (i.e., 41.2%) showed excellent results (between 90% and 100% reduction in size), especially taking into account the fact that all these ulcers were chronic, of very long duration. Although these drugs appear to be encouraging in the treatment of plantar ulcers in leprosy patients, they are not the last work in such treatment by a long way. Also the cost of such drugs for local application must be a prohibitive factor. However, they appear to be worthy of further trials.—AUTHOR'S SUMMARY

Surgical Treatment and Surgical Specialties

Arvelo, J. J., Camaran Pietri, A. and Thys, R. El enfermo de lepra amputado. [The leprosy-amputated patient.] *Bol. Asoc. Med. Puerto Rico* 58 (1966) 290-296.

The authors studied 37 patients in whom one or more amputations had been performed in the treatment of progressive leprotic deformities. Different procedures, according to need, were used in the various amputations. Treatment of the stump also varied with the type of case. The prostheses (25 cases) for various types of repair are described.—E. R. LONG

Williams, H. W. G. The treatment of peripheral nerve lesions of the hand in leprosy. *Internat. Surg.* 46 (1966) 573-577.

The treatment of leprosy in the Department of Reconstructive Surgery at the Catherine Booth Hospital, Nagercoil, India, is described. Treatment is aimed at restoration of function, but as sensory perception in palsied members cannot be restored, education in the care of the hands and training in safe crafts is employed. Tendon transfer is the mainstay of treatment. Operative procedure is described in detail. Surgical repair is followed by physiotherapy. It is stressed that the ideal place for reconstructive surgery is in general hospitals, where trained teams are available.—E. R. LONG

Sehgal, V. N. and Tuli, S. M. Leprotic nerve abscess: a case report. *Indian J. Dermatol.* 13 (1967) 19-20.

A 12 years old male child complained of gradual development of three half inch swellings in the left elbow and forearm over a period of 11 months. There was no visible skin lesion. The swelling was in continuation with the ulnar nerve. The left ulnar, median and radial nerves were thickened, the latter two without any signs or symptoms. Muscular wasting and deformity were evident. Histologic findings were consistent with a neuritic type of leprosy and the disease was diagnosed clinically as mononeuritic but without demonstration of acid-fast bacilli. Treatment was by neurolysis, with administration of DDS. The authors state that the incidence of such cases is 2.5/1000 in the areas under consideration.—S. GHOSH

Sinha, R. C. Role of reconstructive surgery in leprosy. *Indian J. Dermatol.* 11 (1966) 160-161.

The different types of deformity in leprosy, and the common surgical procedures for such deformities are described. The author holds that the majority of the trophic lesions are preventable and most of the deformities are amenable to surgery.—S. GHOSH

Pathology

Terencio de las Aguas, J. Cancer y lepra. [Cancer and leprosy.] *Rev. Leprol. (Fontilles)* 6 (1967) 613-620.

Twenty-three cancer cases were observed among 1,332 leprosy patients at the Fontilles Sanatorium, i.e., a rate of 1.72%. The lepromatous rate in these patients was 95%. Cutaneous forms of cancer were most frequent, accounting for 48% of the cancers found. Of the total number of deaths, 12 were due to internal or visceral cancer. Death from skin cancer was lower, viz., 5.5%. Skin cancers included epitheliomas and basal cell and spinocellular carcinomas. The majority of the cancers were on the head, but the spinocellular types were on the extremities. The author noted no predisposition to cancer in leprosy patients, finding the cancer incidence about the same as that in the general population. The value of early diagnosis, followed by surgical treatment, is stressed.—[From author's summary]

Levi, S., Bernard, J. C. and Altopiedi, A. J. Amiloidosis gingival en enfermos de lepra. [Gingival amyloidosis in leprosy patients.] *Leprológica* 11 (1966) 21-23.

Fifty-two leprosy patients (48 lepromatous, 1 tuberculoid and 3 indeterminate) were submitted to biopsy of the gingiva to determine if amyloid was present. In 48% of the patients (clinical form not indicated) amyloid was revealed. Hematoxylin-eosin, gentian violet, Congo red, van Gieson, and fluorescent staining with thioflavin-S were employed. Positive biopsies were found in 3.9% of patients with massive proteinuria and in 13.4% of patients with mild proteinuria; 26.4% showed gingival amyloidosis without proteinuria. As the technic is without risk, it is proposed as a routine procedure to detect amyloidosis in leprosy patients.—E. D. L. JONQUIÈRES

Terencio de las Aguas, J. Inoculación accidental de la lepra por transfusión sanguínea en gemelos univitelinos. [Accidental inoculation of leprosy by blood transfusion in monozygotic twins.] *Rev. Leprol. (Fontilles)* 6 (1967) 603-611.

The history of voluntary and accidental inoculations with leprosy is reviewed. A case report is presented of monozygotic twin boys, 3 years old, without a familial history of leprosy or history of contact, each of whom was treated at the age of 20 months by 3 blood transfusions because of severe gastrointestinal disease with dehydration. The donor, a voluntary one, had a previous history of lepromatous leprosy. Two years after the transfusion, cutaneous lesions developed in each child, which were diagnosed as tuberculoid forms of leprosy, one of them of infantile type. The author emphasizes the significance of the low resistance to disease at the time of the transfusion, and of the probability of a genetic factor in the monozygotic twins. [From author's summary]

Serial, A., Bravo Luna, M. and Laterza, A. M. Mastocitosis experimental por inoculación de bacilos de Hansen. [Experimental mastocytosis by inoculation of leprosy bacilli.] *Leprológica* 11 (1966) 47-48.

M. leprae was inoculated by the intraperitoneal route in 10 mice and 8 hamsters. Six hamsters were inoculated in the same way with lepromin of the Mitsuda-Hayashi type (dead bacilli). In both cases (living and dead bacilli), the number of mastocytes seen in smears stained by the Ziehl-Neelsen method 30 minutes after the inoculation, was more than double that found in similar animals not injected.—E. D. L. JONQUIÈRES

Bacteriology and Immunology

Pedley, J. C. The presence of *M. leprae* in human milk. *Leprosy Rev.* **38** (1967) 239-242.

The author reports the finding of *M. leprae* in the breast milk of a Nepali woman who was diagnosed as suffering from lepromatous leprosy in a very active stage. The examination was undertaken at the patient's second visit, after she had been advised to take DDS, 30 mgm. per week for 2 months. Even so, one drop of milk revealed 11 solid rods, 82 fragmented bacilli, 23 short rods, and 2 granules. The appearance of the bacilli was characteristic of *M. leprae*. A control examination of the breast milk of a healthy lactating woman, using the same technic, revealed no bacilli. The author discusses the significance of these findings, and the possibility that in a 4-ounce feed 2 million bacilli might be present. This may present evidence, hitherto lacking, of a portal of entry via the alimentary canal and the blood stream. The author emphasizes the importance of preventive treatment, with both BCG inoculation and prophylactic doses of DDS, urging that this be maintained if at all possible until well past adolescence.—N. D. FRASER

Levy, L. Morphology of *Mycobacterium leprae* in tissue sections. *Arch. Dermatol.* **95** (1967) 451-455.

Examination of the morphology of *M. leprae* in tissue specimens stained by a modification of the Fite-Faraco technic yielded values for the morphologic index (MI) comparing closely with estimates of the MI made from smears of homogenates of the same tissue specimens. In making the estimate three groups of 100 bacilli each, in stained paraffin sections of skin biopsy specimens, were examined, only single bacilli being studied and no more than 25 bacilli being examined per oil immersion field. The statistical procedure in the analysis yielded a standard deviation of 1.45 for a single measurement, and of 0.661 for the mean of three replicate measurements. Use of the procedure in four illustrative cases is described.—E. R. LONG

Aplas, V. Über filamentös-myzeliale Globi des *Mycobacterium leprae*. [Filamentous-mycelial globi in *Mycobacterium leprae*.] *Zentl. Bakt. I. Orig.* **202** (1967) 497-502.

The author examined a cutaneous lepromatous lesion in frozen sections stained by his modification of prolonged staining with Giemsa. By this method extracellular globi of filamentous and mycelial forms, resembling actinomyces, were demonstrated. These forms were shown to be nonacid-fast, were chromophobic and did not stain by the usual histologic methods. They were demonstrable by prolonged Giemsa stain, by Sudan black, and in unstained sections could be shown as doubly refractive by polarized light. [Abstract by R. L. Vollum, *Trop. Dis. Bull.* **64** (1967) 1100-1101]

Prabhakaran, K. Phenoloxidase of *Mycobacterium leprae*. *Nature (London)* **215** (1967) 436-437.

Previous studies by the author have shown that among several strains of mycobacteria tested, only leprosy bacilli oxidized 3, 4-dihydroxyphenylalanine (DOPA), and this specific metabolic activity was proposed as an identifying test for *M. leprae*. The communication here reported records results in the oxidation of both D- and L-DOPA and catechol by *M. leprae* secured in suspension from the spleen of a patient dying with lepromatous leprosy. In the range of substrates oxidized the phenoloxidase of *M. leprae* oxidized D-DOPA, L-DOPA, and also catechol and catecholamines at essentially the same rate. The phenoloxidase, in its behavior, resembled the enzyme from plant sources more closely than that of mammalian origin. Because the phenolase might serve as an alternative mechanism for the oxidation of various substrates by *M. leprae* through the quinones formed in the reaction, this finding suggests a rational approach to cultivation of the bacillus, and chemotherapy of the disease through the use of selective inhibitors.—E. R. LONG

Shepard, C. C. and Habas, J. A. Relation of infection to tissue temperature in mice infected with *Mycobacterium marinum* and *Mycobacterium leprae*. *J. Bact.* **93** (1967) 790-796.

Intravenous and foot pad infections with *M. marinum* (*balnei*) and foot pad infections with *M. leprae* were compared in 9 strains of mice. The results varied according to the strain of mice. Intravenous injection of high doses of *M. marinum* resulted in 100% fatality rate after 28 days with strain A/HE, but with strain 101 there were no deaths. There was little correlation between the manifestations in intravenous and foot pad infections with *M. marinum*, and since the host and the mycobacterium were the same in each case the differences in outcome of the infections could not be attributed to the susceptibility and resistance of the mice. *M. marinum* and *M. leprae* were chosen for the experiment because they have similar low optimum temperatures for growth. The growth of *M. leprae* was correlated strongly with the temperature of the foot pads. But when all results were considered, together with the small difference in temperature between the different strains, which was no more than 1.26°C, it seemed unlikely that temperature could explain the large differences in growth. Instead, the differences were attributed to the state of the circulation in the foot pad. The preferred sites of *M. leprae* are peripheral sites of heat loss, characterized by rich blood supply when occasion demands. [From abstract by D. S. Ridley, *Trop. Dis. Bull.* **64** (1967) 976]

Gaugas, J. M. Effect of x-irradiation and thymectomy on the development of *Mycobacterium leprae* infection in mice. *Brit. J. Exper. Path.* **48** (1967) 417-422.

Using the mouse hind foot pad technic first described by Shepard, the authors found that inoculation in the order of 5.0×10^3 *M. leprae* bacteria showed a limited type of multiplication. General immunosuppressive treatment by thymectomy, potential lethal irradiation (900r. in mice then protected by marrow transplantation), or repeated sublethal doses of x-ray (420r.)

produced only a slight increase in susceptibility to infection. However, thymectomy combined with 900r. did provide much higher yields of bacteria. This combination led to a maximum 16,800-fold increase of the total initial inoculum number of bacteria from its inception in contrast to a 560-fold increase in untreated controls. The nature of the host's defensive mechanism which then halts multiplication is uncertain. Macroscopic lesions were not found and there was no spread of infection from the site of inoculation.—AUTHOR'S SUMMARY

Ghosh, S. Lepromin test with new antigen. *Indian J. Dermatol.* **11** (1966) 150.

An antigen prepared from *M. tuberculosis* var. *muris* (vole bacillus) was tested intradermally on two typical types of leprosy and compared with Dharmendra's lepromin in most cases. The tabulated results showed that the two antigens behaved almost similarly. It was concluded that it would be possible to produce lepromin without lepromatous tissue if this result is confirmed by other workers.—S. GHOSH

Escalante, J. A. Influencia del B.C.G. sobre la positividad de la lepromino reaccion. [Influence of BCG on positivity of the lepromin reaction.] Thesis, University of Mexico, 1967, pp. 79.

After a short review of general aspects of the lepromin reaction, leprosy and tuberculosis, and the history of BCG in the world and in Mexico, the author reports his investigation in 107 child contacts of lepromatous patients tested with lepromin and tuberculin. BCG was injected intradermally in Mitsuda-negative children, and a second lepromin test was made one year later. Seventy-one per cent of children injected with BCG became Mitsuda-positive. The possible influence of tuberculosis on the change in the Mitsuda reaction was discarded because almost all of the children were Mantoux-negative. This is the first study of BCG in leprosy contacts in Mexico. It is necessary to determine the length of time the induced Mitsuda reaction remains positive, and its real or false protection against leprosy.—A. SAÚL

Saúl, A., Aguilar, R., Novales, J. and Rodríguez, O. Reacción de Medina. Intentos de interpretación actual. [The reaction of Medina. New approaches on its interpretation.] *Dermatología (Mexico)* **II** (1967) 17-24.

The first studies on the so-called reaction of Medina, carried out from 1944-1948, are reviewed. The reaction, first described by Manuel Medina in 1944, occurred in patients with diffuse lepromatous leprosy in whom the first phases of Lucio's phenomenon became apparent six hours after injection of lepromin or other antigens. The reaction observed at the site of injection was interpreted by Latapí as a hypersensitivity phenomenon of the Schwartzman type. A second study carried out on 30 patients with various clinical forms of leprosy with the use of four antigens, and clinical and microscopic examination, led to the following tentative conclusions: Medina's reaction is present not only in patients with reactive lepromatous leprosy but also in nonreactive lepromatous and even in tuberculoid and indeterminate forms of the disease. It does not seem to be a spontaneous Lucio phenomenon and cannot be elicited with other antigens than lepromin. Further studies are necessary to explain the nature of the reaction and its practical significance.—A. SAÚL

Ruge, H. Luesreaktionen an Lepraseren (Reihenuntersuchungen). [Reactions for syphilis with leprosy sera. Serial investigations.] *Med. Welt. (Stuttgart)* (1966) 2620-2622.

Two hundred and forty-eight patients with leprosy treated in the Philippines were serologically investigated for syphilis before and during treatment. The tests, which included the *pallidum* immobilization (TPI) test, were performed before treatment and 24 and 48 weeks after treatment had begun. There was a significant decrease in the number of "false positive reactions" with successful treatment from 19% before treatment to 9.1% 48 weeks later. There was a positive correlation between severity of leprosy and false-positive reac-

tions. The agglutination reactions were most often involved, while the TPI was believed to have been positive only twice when syphilis was ruled out. It is concluded that in patients with leprosy where syphilis is also thought to be present, leprosy should first be treated and the serologic picture reassessed a year later when the number of false-positive reactions will have declined and the position can be more easily interpreted. [Abstract by G. W. Csonka, *Trop. Dis. Bull.* **64** (1967) 739]

Languillon, J., Plagnol, H. and Giraudeau, P. L'insuffisance de la corticosurrénale dans la lèpre lépromateuse. Essai de pathogénie de la réaction lépreuse. [Corticoadrenal insufficiency in lepromatous leprosy. Study of the pathogenesis of the lepra reaction.] *Bull. Soc. Path. exot.* **59** (1966) 740-744.

The authors report 7 cases of corticoadrenal insufficiency and 3 cases of discordance in 10 lepromatous patients. A corticoadrenal insufficiency exists therefore in lepromatous leprosy and this insufficiency increases with the lepra reaction.—AUTHORS' SUMMARY

Azoury, F. J. and Gum, O. B. Antinuclear factors in nephrotic syndrome secondary to systemic lupus erythematosus and in leprosy. *American J. Med. Sci.* **253** (1967) 661-666.

Various immunologic phenomena occur in systemic lupus erythematosus (SLE). Among these are phenomena due to the presence of antinuclear factors that can be demonstrated by the immunofluorescent technic. Study of 55 patients with SLE yielded a characteristic type of immunofluorescence in those patients with nephrotic syndrome secondary to the disease. Certain features of leprosy overlap with characteristics of the rheumatic diseases. Articular and serologic findings in 10 unselected leprosy patients supported this general concept. Antinuclear factor tests were noted in two of these cases, each of which yielded homogeneous patterns in the immunofluorescence technic.—E. R. LONG

Epidemiology and Prevention

Fasal, P., Fasal, E. and Levy, L. Leprosy prophylaxis. *J. American Med. Assoc.* 199 (1967) 905-908.

A program of BCG vaccination has been instituted at the Leprosy Clinic of the U. S. Public Health Service Hospital in San Francisco. Recently reported results from studies elsewhere, indicate that, although the observation period up to the time of writing has been too short for firm conclusions, the results obtained so far provide tangible evidence that BCG vaccination confers a high degree of protection. At the San Francisco clinic 166 cases of leprosy have been seen during the last seven years. Of 198 family contacts of patients with lepromatous disease examined at the Clinic, 16 developed leprosy, representing an attack rate of 80.8/1,000 contacts examined. Since the degree of protection reported in other studies has not been greater in persons with larger tuberculin reactions than in those whose reactions did not convert, repeated tuberculin testing, with re-vaccination of nonconverters, is not projected in the program inaugurated at the San Francisco Leprosy Clinic.—E. R. LONG

Torouneff, N. A. Organización de la lucha antileprosa en la U.R.S.S. [Organization of the campaign against leprosy in the U.S.S.R.] *Dermatología (Mexico)* 10 (1966) 485-491.

The campaign against leprosy in the U.S.S.R. has been made on the following basis: isolation of leprosy patients in leprosaria, outpatient clinics for treatment of nonbacillary cases, periodic examination of households and all persons in contact with patients, check-up of the population in endemic areas, and the work of dermatologic institutions, dermatologists, epidemiologic stations, general practitioners in rural areas, and other specialists. The work is directed by the zonal leprosarium. The results are: fewer early cases, fewer patients isolated in leprosaria, and more patients treated in outpatient clinics. Chaulmoogra oil is still employed with sulfones in the treatment of the disease.—A. SAUL

Cordonnier, V., DeBeer, P. and Lundy-Mahieu, M. A propos de nouveaux cas de lèpre apparue en France chez des travailleurs noir africains. [On new cases of leprosy appearing in France among black African laborers.] *Bull. Soc. franc. Dermatol. & Syphilig.* 73 (1966) 849-853.

Two cases of leprosy are reported in Senegalese men, who developed first signs of the disease several months after their arrival in France. Diagnosis was made by clinical and histologic examination, in one case as tuberculoid leprosy and in the other as leprosy of macular form *a minima* in the stage of onset. The authors note the social problems involved in the migration to France of patients with exotic diseases, and the conditions of life favoring disease onset to which they are subjected. Suitable non-discriminatory regulations with respect to immigration, based on proper health measures, should be maintained.—E. R. LONG

Schollhammer, G. and Aubry, P. La lèpre en Polynésie Française. [Leprosy in French Polynesia.] *Bull. Soc. Path. exot.* 59 (1966) 939-943.

The leprosy endemic in French Polynesia is not alarming at present, and eradication of the disease appears possible in years to come, if all modern methods of combating its spread are employed. The origin of leprosy in French Polynesia is traced to a small number of Chinese immigrants in 1874. Eight cases of the disease were recognized in that year. Forty years later, in 1914, 168 cases were known. Variable rates of prevalence have prevailed since then. About 40% of the cases have been of the lepromatous type, with a range from 63% in Tahiti to 13% in the Marquesas. Total prevalence is given as 3.89%; prevalence of the lepromatous form, considered as an index of potential spread, was recorded as 1.58%. The infantile prevalence was 0.2%. Rates have been stable since 1960. Figures by age and sex are presented in tables. It is evident that a population increase in Polynesia has not been followed by a corresponding increase in the number of new cases of

leprosy. It is believed that with the passage of time a decrease in the severity of cases has occurred. The present is believed to be a favorable time for eradication of the disease.—E. R. LONG

Vaccaro, A. J., Martinez Prieto, P. R., Laterza, A. M. and Bravo Luna, M. Consideraciones sobre la endemia en la provincia de Santa Fe. [Comments on the endemic in the province of Santa Fé, Argentina.] *Leprológia* 11 (1966) 7-15.

A total of 1,963 cases of leprosy were registered in the province of Santa Fé up to October 1965. The prevalence rate was 1.040/1,000. The clinical forms seen were: lepromatous, 45.6%; tuberculoid, 37.9%; indeterminate, 10.7%; dimorphous, 2.4%; not classified, 3.2%. Among lepromatous cases 51.6% had positive smears and 48.3% negative smears. The high index of negative lepromatous cases is attributed to early diagnosis, effective treatment, and the presence of old patients treated for many years. The age of onset in 705 cases showed a peak at age 20-30 in graphs. On the basis of these findings the authors suggest that the risk of contracting the disease seems not greater during the two first decades of life than afterward, and that any susceptible adult exposed to contagion has the same chance of infection as younger persons.—E. D. L. JONQUIÈRES

Justo, E. Epidemiología de la lepra en el centro Oriente. [The epidemiology of leprosy in the Eastern Central Region of Peru.] *Rev. Sanid. Policia (Lima)* 25 (1965) 40-44.

The author reports on the incidence of leprosy in Peru with special reference to the Eastern Central Region. According to the facts obtained by the Statistics Service the population of Peru increases annually by 2% while leprosy increases by 6.53%, so that leprosy increases 3 times more rapidly than the population in general. In Pucallpa in the Eastern Central Region, leprosy in the last 3 years has shown an increase of 13% annually, while it had decreased by 14% in the country generally. These figures cause the author to conclude that it is necessary

to create new antileprosy centers. The whole country should become interested in leprosy control and the Army, Navy and Air Force should mobilize personnel to help in the antileprosy campaign. [Abstract by J. R. Innes, *Trop. Dis. Bull.* 64 (1967) 1209]

Bogaert Diaz, H. Lucha contra la lepra en la Republica Dominicana. [Campaign against leprosy in the Dominican Republic.] *Rev. dominicana Dermatol.* 1 (1967) 106-110.

It is believed that leprosy was brought to Santo Domingo by Spaniards four centuries ago. It exists now throughout the country, but, especially in the National District and in San Pedro de Macoris. Fernando A. Defillo, in 1912, was the first physician interested in leprosy; later, in 1940, Dr. Guillermo Herrera became director of the leprosarium. In 1965, 668 cases of leprosy were registered, but 2,000 more cases were believed to exist: The Dermatologic Institute of Santo Domingo was opened in February 1966. To date 15,903 new dermatologic patients have been seen. Among these, 252 new leprosy cases were discovered, including 88 lepromatous cases, 79 tuberculoid, 84 indeterminate and 1 dimorphous. Only one case was hospitalized in the leprosarium.—A. SAÚL

Mali, I. B. Leprosy survey and control pilot project HMG/Nepal. *J. Nepal Med. Assoc.* 4 (1966) 330-338.

This work was carried out in Nepal, where little work has been done on leprosy. The author reports on his activity in a leprosy survey and the setting up of a control pilot project in Nepal sponsored by Emmaus Suisse. A WHO short-term consultant reported a prevalence of leprosy of 100/1,000, but the author found a prevalence of 5.7/1,000 in a village survey and 1.5/1,000 in a school survey. [From abstract by J. R. Innes, *Trop. Dis. Bull.* 64 (1967) 737-738]

Brubaker, M. L. and McCullough, J. C. A program for leprosy control in the Ryukyū

Islands. Publ. Hlth. Rept. 82 (1967) 802-806.

Traditionally in the Ryukyu Islands, as elsewhere in the world, leprosy control is attempted by isolation of most cases. The practice of isolation makes early casefinding more difficult because persons try to conceal their disease as long as possible. Family members are generally uncooperative because of their own fears of being put in an institution. To have an effective control program, cases of leprosy need to be diagnosed early in the course of the disease, at a time when spread may be

minimal and the development of deformity and disability most preventable. A public health staff trained to do leprosy casefinding in their routine field activities should be responsible for an aggressive program of seeking leprosy early. Geographic factors of an island population, coupled with a sophisticated level of professional personnel, make the Ryukyu Islands nearly ideal for control and possible eradication of leprosy. A change in professional, patient, and public attitudes about leprosy, through a well-developed and coordinated control program, is the key to achieving eradication.—AUTHORS' SUMMARY

Genetics

Mohamed Ali, P. Genetic influence in leprosy. Indian J. Publ. Hlth. 10 (1966) 145-155.

This paper shows, from studies conducted from the Central Leprosy Teaching and Research Institute, Chingleput, S. India, that the incidence of leprosy is in part genetically determined. During the past four years a census survey in a heavily infected district of Madras State in a population of 200,000 showed that factors like sanitation, housing conditions, economic status, literacy, and nutrition, had no significant influence on the incidence of leprosy; there was no correlation between the cases and the size of the family, and there is no basis for the theories of adult insusceptibility and the necessity of prolonged contact for contracting the disease. The following facts are cited in support of the genetic theory: (1) The significant difference in the sex ratio *vis-a-vis* lepromatous leprosy particularly. (2) The two decisive periods when infection was found to occur. (3) The greater concordance among the monozygotic twins in the incidence of the disease. (4) The tendency of the disease to cling to families. It is concluded that there is a dual etiology for leprosy infection, with *M. leprae* and an inherited individual sus-

ceptibility. Certain suggestions with regard to antileprosy campaigns in the light of a genetic basis for the disease are also given. [Abstract by J. R. Innes, *Trop. Dis. Bull.* 64 (1967) 857]

Salzano, F. M. Blood groups and leprosy. J. Med. Genet. 4 (1967) 102-106.

No indication was found of any differential susceptibility to leprosy or its forms among the carriers of different ABO and Rh phenotypes. In relation to the ABO system the data are sufficiently numerous to rule out any important contribution of genes in this system to the variance in this attribute. Information concerning other systems is still too scarce and need not be considered here.—AUTHOR'S ABSTRACT

Singh, G. and Ojha, D. Leprosy and ABO blood groups. J. Med. Genet. 4 (1967) 107-108.

ABO blood groups were studied in 633 leprosy patients and compared with 2,583 controls. No relation between blood groups and susceptibility to disease was observed. Lepromatous and nonlepromatous groups of patients did not differ significantly as regards pattern of ABO blood groups.—AUTHORS' ABSTRACT.

General and Historical Subjects

Browne, S. G. Summary of recent abstracts. VIII. Leprosy. *Trop. Dis. Bull.* 64 (1967) 917-924.

The author reviews *in extenso*, although briefly in each case, approximately 100 abstracts of scientific articles on leprosy published in *Trop. Dis. Bull.*, Vol. 63, 1966. Special significance is accorded the Third Report of the WHO Expert Committee on Leprosy (*Trop. Dis. Bull.* 63 (1966) 651-653) and the *Proceedings* of a Conference on Research Problems in Leprosy, sponsored by the Leonard Wood Memorial (*Trop. Dis. Bull.* 63 (1966) 764-765). The abstracts are grouped under the following headings: General, Epidemiology, Etiology and Pathology, Immunology, Clinical Findings, Treatment, Control, Animal Experiments and Rodent Leprosy.—E. R. LONG

Convit, J., Reyes, O. and Albornoz, R. La lepra. [Leprosy.] *Dermatol. venezolana* 6 (1967) 5-51.

The modern concept of leprosy is reviewed briefly. The paper deals with the definition and history of the disease. Problems in relation to Hansen's bacillus, such as its cultivation and inoculation, electron microscope examination, and its differences from other mycobacteria are stressed. Leprosy is a contagious disease, transmitted by intimate and prolonged contact with a patient with numerous bacilli in the skin. In addition a special susceptibility of the host to the disease is significant. Seventy-two per cent of the general population are "normal reactors" and do not become ill; 22% are "slow reactors" and can become tuberculoid cases. Only 6% are "nonreactors" and these can become lepromatous patients. Other aspects of leprosy are reviewed, such as its pathogenesis, the Mitsuda reaction, and the histopathology, classification, and symptoms of the different forms of the disease. Some of the diseases that may be confused with leprosy, such as leishmaniasis, pinta, syphilis, dermatomycosis, rhinoscleroma, and oncocercosis, are mentioned. With reference to treatment,

although DDS is considered the drug of election, other drugs are reviewed, including diphenylthiourea, TBI, cycloserine, Etisul, and long-action sulfonamides. Thalidomide is mentioned in the treatment of lepra reaction. Epidemiology and prophylaxis are discussed at the end of the paper with special reference to the distribution of leprosy in the world and in Venezuela.—A. SAUL

Sheskin, J. Probable influencia de las condiciones medico-higienicas, culturales y económicas sobre la propagación de la enfermedad de Hansen. [Probable influence of medico-hygienic, cultural, and economic conditions on the propagation of leprosy.] *Med. Cutanea* No. 4 (1966) 341-346.

Israel is in essence a country of immigration. In the 15 years between its initial year as a state (1948) and 1963 its population tripled, immigrants arriving from every quarter of the globe. As a result, many of its social, cultural, and economic attributes, and many of its health problems, are imported. Among the latter is leprosy. Within the last 12 years numerous cases have been detected, but in no one of these was there reason to believe that the infection was acquired in Israel. An epidemiologic survey in 1963, in which a ratio of natives to immigrants of 1:1.2 was noted, disclosed that only 34 of 173 existing cases of leprosy were among natives. The remainder, 139, had acquired the disease prior to arrival in Israel. The disease was predominantly lepromatous in type among natives and immigrating Europeans. Patients of generally lower economic status, immigrating from India and Yemen, showed a smaller proportion of lepromatous leprosy. No new cases of the disease were encountered in the course of 12 years in a stable environment studied, including a village in which the existing prevalence of leprosy was 3.4%. Apparently present economic and public health conditions tend to limit spread of the disease.—E. R. LONG

Wiedmann, A. Algunas notas históricas sobre la enfermedad de Hansen. [Some historical notes on Hansen's disease.] *Dermatología (Mexico)* **11** (1967) 9-15.

The author recalls the history of the Castle of Wartburg and Isabel of Thuringia who later became the protector of patients with leprosy. He tells of the origin of the word "Aussatz," which was the designation for the disease in the German language, and of the origin of leprosy according to quotations from the Old Testament, as well as the prevailing customs of the epoch in treating these patients. It seems that the expeditions of the Romans were responsible for the spread of the disease all through Europe during the 12th century, necessitating the establishment of numerous leprosaria. He also points out that some of these institutions existed in Austria and tells about the regulations to which patients were subjected by law. We are told of the search for the cause of the disease from Hutchinson's "fish theory" on to the discovery of the lepra bacillus by Hansen. Concluding his brief historical essay, the author emphasizes the futility of compulsory isolation of patients with a disease that is so little contagious and can be cured. He feels that the still existing prejudice against leprosy is anachronistic and unworthy of civilized man.—[From author's summary]

Gonzalez del Cerro, R. and Ruiz-Maldonado, R. El prejuicio contra la lepra. Sondeo de la opinión de los estudiantes de la Ciudad Internacional de la Universidad de Paris. [Prejudice against leprosy. Survey among the students of the International City of the University of Paris.] *Dermatología (Mexico)* **11** (1967) 79-82.

A special questionnaire with more than 20 questions about leprosy was distributed among 3,000 students from different countries living in the University City of Paris, in order to learn the opinion of this group about leprosy. Only 20% of these students, from 56 countries, answered the questionnaire. Seventy-three per cent knew that leprosy still exists in Europe. As to etiology, 68% answered that it was caused by a bacillus, and 1% by a virus; 23% said the

cause is unknown. Fifty-five per cent believed that leprosy is not a contagious disease; 30% answered that it is highly contagious. With reference to treatment, 81% answered correctly that it is curable; 75% replied that leprosy is not the most terrible disease. On the basis of this survey the authors concluded that the population of the University City of Paris is well informed about leprosy, but they represent an intellectual group in their countries—A. SAUL

Takashima, S. Leprosy rehabilitation in Japan. *La Lepro* **36** (1967) 63-67. (In English)

As the Japanese government faithfully enforced a segregation policy after 1907, patients were not allowed to be discharged, and their freedom to go out of the sanatorium was severely restricted. Although compulsory segregation is now abolished and rehabilitation encouraged, the patient himself does not wish to be discharged, nor is our society ready to take him back. Here lies the difficulty in rehabilitation. Before chemotherapy, leprosy was believed to be incurable. Consequently segregation ended only with patients' death. Now that leprosy has become curable, the present Leprosy Prevention Law in Japan needs to be amended, but prejudices against leprosy hinder it. To improve this state of affairs, it is essential to promote education of the general public about leprosy, obtain more effective drugs, and make greater progress in reconstructive surgery. Restoration is not synonymous with driving patients out of the sanatorium, just as institutionalization and segregation were not synonymous with lifelong exile in the past. To promote leprosy rehabilitation smoothly will be the final achievement of leprosy work in Japan. [From author's summary]

Marshall, C. L., Maeshiro, M. and Korper, S. P. Attitudes toward leprosy in the Ryukyu Islands. *Publ. Hlth. Rept.* **82** (1967) 795-801.

A fixed-alternative questionnaire designed to ascertain public beliefs about

leprosy was administered to 1,023 Ryukyans, and the results were analyzed by age, sex, and type of community (urban or rural). The most striking differences of opinion were related to age. Younger persons were better informed about the nature of leprosy, voiced greater confidence in the effectiveness of early diagnosis and treatment, and held less rejecting attitudes toward persons who have or have had leprosy. Nevertheless, factual knowledge of leprosy was widespread at all ages, and it cannot be said that on the Ryukyu Islands attitudes toward leprosy are conditioned by ignorance. Although the facts are widely known, leprosy remains equated with crippling, deformity, and, to an unknown extent, isolation. A new image of leprosy is

needed to alter traditional attitudes, which facts alone do not alter when they conflict with direct observation.—AUTHORS' SUMMARY

Sahu, K. C. Pattern of concept and reaction to leprosy in oriental antiquity and modern time. *Indian J. Dermatol.* **11** (1966) 140-141.

The wood and stone carvings of the temple Jagarnath, depicting different signs and symptoms of leprosy ten centuries ago, indicated love for these people during those primitive days. The author recalled Gandhiji's sayings about leprosy, suggested a new terminology for the disease, and stressed the cooperation of other branches of medicine to solve leprosy.—S. GHOSH

Other Mycobacterial Diseases

Chang, Y. T., Andersen, R. N. and Vaituzis, Z. Growth of *Mycobacterium lepraemurium* in cultures of mouse peritoneal macrophages. *J. Bact.* **93** (1967) 1119-1131.

Successful growth of *M. lepraemurium* was observed in cultures of mouse peritoneal macrophages. The optimal host cell maintenance medium was composed of 40% horse serum, 50% of the chemically defined medium NCTC 109, and 10% of a 1:5 dilution of beef embryo extract, supplemented with both liver extract and ferric nitrate. Multiplication of the bacilli was observed in one week and maximal growth in six to seven weeks. All macrophages were filled with tens to hundreds of the organisms in cultures showing maximal growth. Glycerol caused an increase in the normal length of *M. lepraemurium*, without a corresponding increase in the number of the bacilli. Elongation of *M. lepraemurium* was observed three or four days after infection. Rapid and uniform growth of *M. lepraemurium* was achieved in serially transferred cultures (subcultures). The cumulative increase of the number of intracellular bacilli was 1.4×10^{20} -fold in 14 transfers over a period of 68 weeks in one

series and 10^{17} -fold in 12 transfers over a period of 56 weeks in another series. The generation time of *M. lepraemurium* was seven days, a growth rate approximating the fastest growth of the organisms *in vivo*. Organisms harvested from cultures at various stages of growth produced murine leprosy in mice, but showed no growth in bacteriologic media. The present model offers an opportunity for studies on the host-parasite relationship without the complication of extracellular growth of the parasites.—AUTHORS' SUMMARY

Hobby, G. L., Redmond, W. B., Runyon, E. H., Schaefer, W. B., Wayne, L. G. and Wichelhausen, R. H. A study on pulmonary disease associated with mycobacteria other than *Mycobacterium tuberculosis*: identification and characterization of the mycobacteria. *American Rev. Resp. Dis.* **95** (1967) 954-971.

A study designed to increase understanding of pulmonary disease in which there appears to be an etiologic relationship with mycobacteria other than *M. tuberculosis* was conducted by the U. S. Veterans Administration-Armed Forces Cooperative Study hospitals. Isolation and characteriza-

tion of the mycobacteria from each patient was fundamental to the study. The strains isolated were characterized by 5 separate laboratories on the basis of their morphology, biochemical reactions, and phage-susceptibility patterns, and by serotyping. No single test is adequate for identification of a strain of mycobacteria, and the various laboratories relied on different combinations of test procedures for identification of the strains. In essentially all instances, the laboratories were in uniform agreement as to group designations. Five hundred and seventy-six mycobacterial strains were received. Fourteen of these were strains of *M. tuberculosis*. Five hundred and thirteen (91%) of the remaining 562 showed clear-cut patterns indicating group identification. Three hundred and ninety-one of the 562 mycobacterial strains were derived from 199 patients admitted to 27 Veterans Administration hospitals, and included in the Veterans Administration-Armed Forces Cooperative Study of mycobacterial disease other than tuberculosis. Two hundred and forty of these 391 cultures were found to belong to Group I, 3 to Group II, 114 to Group III, and 19 to Group IV. Only 15 cultures failed to clearly fit one of the four groups; and a portion of these 15 appeared to be "unique," possibly intermediate between Groups II and III. Occasional cultures of Battey bacilli were atypical in that they were unusually pigmented, resistant to oleate, or vigorous in catalase activity. The data obtained clearly indicate that reliable and reproducible procedures are available for grouping of mycobacteria. The inclusiveness of each group, however, is an indication that in group determination the goal of species identification has not been obtained. The Group I cultures studied were distinguished by greater susceptibility to isoniazid than the other mycobacteria tested; and the majority of these were also susceptible *in vitro* to ethionamide, cycloserine, streptomycin, and viomycin. Data derived from the small number of Group II strains included in the study suggest that frequently these may be susceptible to streptomycin, viomycin, ethionamide, kanamycin, and PAS. The Group III and Group IV strains tested showed

little *in vitro* susceptibility to any of the antituberculosis drugs used. No conclusions may be drawn from the present investigation concerning the prevalence, incidence, or geographic distribution of these mycobacteria within the United States.—
AUTHORS' SUMMARY

Yamamoto, M., Sudo, K., Taga, M. and Hibino, S. A study of diseases caused by atypical mycobacteria in Japan. *American Rev. Resp. Dis.* 96 (1967) 779-787.

A clinical study was made of 109 cases of disease caused by atypical mycobacteria observed in Japan by May 1966, including 102 cases of pulmonary disease. Nonphotochromogens were the major causative agents, followed by scotochromogens. Photochromogens and rapid growers were the least important agents. Four-fifths of the patients were males and approximately one-half were older than 50 years. In no instance were more than 2 patients observed within a single family. About one-fifth of the patients had pneumoconiosis as a complication and/or a history of long-term exposure to dust. Symptoms were generally mild, although a relatively high incidence of hemoptysis was observed. Most cases were chronic. X-ray examination demonstrated a relatively localized cavitory lesion, thin-walled cavities or a dense and well demarcated pulmonary shadow, and infrequency of bronchogenic spread. The clinical manifestations in most patients were similar to those of pulmonary tuberculosis. The susceptibility of the bacilli to antituberculous drugs was low and medical treatment appeared to be least effective. Surgical treatment brought about complete cure in most patients. Nonphotochromogenic pulmonary disease seemed more extensive and progressive than the scotochromogenic form. Six cases of meningitis and one case of multiple abscess due to atypical mycobacteria were reported. [From authors' summary]

Tsukamura, M., Tsukamura, S., Mizuno, M. and Toyama, H. Bacteriologic studies of atypical mycobacteria isolated in Japan. IV. Characteristics of the pathogenic

nonphotochromogens. (In Japanese) *Kekkaku* **42** (1967) 49-53.

An investigation was made of the biochemical characteristics and nutritional requirements of 37 strains of Group III nonphotochromogens. At least 21 of these were pathogenic for man, and were clearly differentiated from *M. tuberculosis*, *M. bovis*, *M. kansasii* and *M. marinum* on the basis of these attributes. Their relationship with *M. avium*, *M. terrae*, and *M. aquae* is under study. [From abstract by I. T. Ebisawa, *American Rev. Resp. Dis.* **96** (1967) 110]

Gray, H. H., Kingma, S. and Kok, S. H. Mycobacterial skin ulcers in Nigeria. *Trans. Roy. Soc. Trop. Med. & Hyg.* **61** (1967) 712-714.

Case reports are given for four patients, all females, and all members of the Tiv tribe in Nigeria, ranging from 4 to 28 years of age, who came under medical care for ulcerating lesions of the skin in which acid-fast bacilli were conspicuous. Secondary infections were cleared up by penicillin and other antibiotic therapy. For treatment of the basic disorder wet dressings with silver nitrate in 0.25-0.5% concentration were helpful in clearing the lesions. However, because of extensive damage already done, skin grafts were required to cover defects, and in some cases there were residual contractures. The authors note that they did not have an opportunity to use Phenazine (Geigy B 663) as recommended by Connor and Lunn (*THE JOURNAL* **3** (1965) 698-709, Part 2).—E. R. LONG

Davey, M. E. Some clinical aspects and treatment of anonymous mycobacterial infections. *Med. J. Australia* **2** (1967) 438-441.

This is a paper read at the Inaugural Australian Clinical Tuberculosis Conference in Sydney, 27 February to 3 March 1967. It is divided broadly into several parts and reviews current knowledge on general aspects relating to classification of anonymous mycobacteria, distribution, incidence, mode of infection and the sites of infection in man. It also deals with past

work on symptoms and signs of atypical pulmonary infection and then branches into work being done at present at The Randwick Chest Hospital in New South Wales. Over the last six or seven years about five cases of anonymous mycobacterial infections by Group III nonchromogenic strains have been diagnosed at this hospital each year. There has been an increase in diagnoses over the past two years, probably because the means for more accurate diagnosis are now available. Anonymous infections can be fatal and must therefore be regarded as serious. They and *M. tuberculosis* infection can coexist in the same patient. At Randwick, both "first line" and standard "second line" drugs gave poor results, whereas trials with ethambutol over the past two years appear most promising. All organisms (number not quoted) were sensitive to ethambutol *in vitro*, and resistance has not developed during treatment. Patients have experienced a sense of well-being, no side-effects have been noticed, and all have improved quickly, both clinically and bacteriologically. Thiocarlide ("Isoxyl") has been used for the three months prior to presentation of the paper in a few cases as a companion drug for ethambutol, with dramatic results and minimal side-effects. The author suggests that the anonymous organisms are species distinct from Koch's bacillus and not merely mutants.—M. F. R. WATERS

Armstrong, A. L., Dunbar, F. P. and Cacciatore, R. Comparative pathogenicity of *Mycobacterium avium* and Battey bacilli. *American Rev. Resp. Dis.* **95** (1967) 20-32.

The characteristics of *M. avium* recently isolated from naturally infected chickens were compared with those of Battey bacilli from 5 patients in the southwest Florida Tuberculosis Hospital, who had pulmonary disease attributed to these organisms. Differences *in vitro* were limited to the ability of *M. avium* to grow at 45°C, and to the presence of arylsulfatase activity in each of the Battey strains. Chickens, rabbits, and guinea-pigs were inoculated with 0.01 mgm. of each strain and survivors were held for a minimum of 378 days. In overall

responses to avian tuberculin and to PPD prepared from *M. avium* and from Battey bacilli, distinctions could be made between avian-infected and Battey-infected animals. Intravenous infection with *M. avium* resulted in progressive and fatal disease in chickens and rabbits. Chickens infected with Battey bacilli revealed no gross, microscopic or bacteriologic evidence of infection. The histopathologic examination of the spleens of several rabbits infected with these organisms indicated a definite and identifying difference in the pathogenesis of Battey bacilli and *M. avium*. Other changes noted among Battey-infected rabbits included tendonitis, bursitis, and involvement of soft tissues of the feet and legs. With the exception of several guinea-pigs with regional lymph node enlargement, none of these animals revealed gross, microscopic, or bacteriologic evidence of mycobacterial infection. This study provided no evidence that the Battey bacilli used were attenuated strains of *M. avium*.—AUTHORS' SUMMARY

Takeya, K., Mori, R., Nomoto, K. and Nakayama, H. Experimental mycobacterial infections in neonatally thymectomized mice. *American Rev. Resp. Dis.* **96** (1967) 469-477.

Effects of neonatal thymectomy on experimental mycobacterial infections were studied. After 4 to 7 weeks of sublethal infection with human tubercle bacilli, the number of culturable bacteria recovered from each organ was found to be greater in the neonatally thymectomized mice than in the controls. In the thymectomized mice the lesions of the lung and the liver were extensive and exudative, and the epithelioid cell formation in the lesions was usually slight as compared with those in the control mice. The development of active protective immunity after BCG immunization was impaired to some extent in the neonatally thymectomized mice. Both in cases of infection with BCG and with a nonphotochromogenic strain of atypical mycobacteria, no significant difference between the neonatally thymectomized mice and the control mice was found in the number of

culturable bacteria recovered from each organ during the observation period of 8 to 9 weeks, although some differences were noted in the histologic findings of BCG-infected mice.—AUTHORS' SUMMARY

Joos, H. A., Hilty, L. B., Courington, D., Schaefer, W. B. and Block, M. Fatal disseminated scotochromogenic mycobacteriosis in a child. *American Rev. Resp. Dis.* **96** (1967) 795-801.

Fatal disseminated mycobacterial disease caused by a proved scotochromogen has rarely been reported. The authors present the case of a three-year-old child with overwhelming intracellular parasitism involving chiefly the reticuloendothelial system without tubercle formation. The patient had been under treatment with corticosteroid preparations for seborrheic dermatitis, diagnosed when she was 10 months old. Skin tests with PPD and preparations of fungal antigens were negative. Occasional leucopenia occurred. An acid-fast mycobacterium was cultured from needle biopsy specimens of liver and bonemarrow, which was identified as a scotochromogen, serotype Gause, resistant to streptomycin, isoniazid and PAS, but sensitive to kanamycin and ethionamide. Treatment was instituted with the latter drugs, but the disease proved progressive, with fever and emaciation. The scotochromogen was cultured later from urine and an aural discharge. Death occurred seven months after diagnosis of mycobacterial disease. Autopsy disclosed widespread involvement including lesions of lungs, lymph nodes, liver, bonemarrow, spleen and gastrointestinal tract. Acid-fast bacilli in macrophages and free fluid were very numerous. Typical tubercles and giant cells were not present. The source of infection and portal of entry remained unknown. It was believed that prolonged administration of corticosteroid drugs for the skin disease and blood dyscrasia promoted the mycobacterial infection.—E. R. LONG

Kestle, D. G., Abbott, V. D. and Kubica, G. P. Differential identification of mycobacteria. II. Subgroups of Groups II and

III (Runyon) with different clinical significance. *American Rev. Resp. Dis.* **95** (1967) 1041-1052.

The isolation from a patient of an acid-fast organism other than *M. tuberculosis* immediately gives rise to the question of its clinical significance, i.e., is it responsible for an active disease process? A total of 455 slowly growing acid-fast bacilli have been divided into a number of subgroups of species by the use of 47 characters in an Adansonian type analysis. The median reaction pattern of each species or subgroup in these 47 features is presented. An evaluation of the clinical significance of some of the subgroups in human disease revealed (1) confirmation of the observation that low catalase strains of *M. kansasii* were not associated with disease; (2) the scrofula type of Group II scotochromogens and *M. xenopei* and the Battey-*avium* subgroups among the Group III nonphotochromogens often were associated with disease in man; and (3) the remaining subgroups (tap water type scotochromogens and *M. terrae*, *M. gastri*, and the "V" subgroup among Group III nonphotochromogens) were only rarely associated with disease and appear to be usually saprophytic in nature. Tests of value in differential typing are presented.—**AUTHORS' SUMMARY**

Wayne, L. G., Doubek, J. R. and Diaz, G. A. Classification and identification of mycobacteria. IV. Some important scotochromogens. *American Rev. Resp. Dis.* **96** (1967) 88-95.

Three clusters of scotochromogenic mycobacteria have been identified, accounting for 136 of 310 assorted cultures of mycobacteria studied in an Adansonian analysis. One of these clusters accounts for most of the scotochromogens that have been implicated in human disease. This cluster includes cultures received as *M. scrofulaceum*, *M. marianum*, and the two cultures used for preparation of the scotochromogen PFD's. This cluster probably represents a species, *Flavescens*, a cluster intermediate between the slow and fast growers, is sufficiently distinct to be acceptable as a

species. The tap-water strains are probably predominantly members of a single species, *M. aquae*, but there is evidence that it may be possible to segregate a fourth cluster, which may ultimately be definable as a separate species.—**AUTHORS' SUMMARY**

Yamamoto, M., Ogura, Y., Sudo, K., and Hibino, S. Diagnostic criteria for disease caused by atypical mycobacteria. *American Rev. Resp. Dis.* **96** (1967) 773-778.

The virulence of atypical mycobacteria for man is generally low and their occasional discharge is not unusual in normal healthy persons. Isolation of atypical mycobacteria in large numbers is essential for diagnosis of mycobacteriosis; the discharge of mycobacteria on four or more occasions in numbers of more than 100 culturable units is considered by authors as significant for diagnosis of the disease. Atypical mycobacteria may be isolated from resected lungs, pleural fluid, cerebrospinal fluid, and pus. Histopathologic diagnosis of a disease process is essential in order to exclude saprophytic mycobacteria as etiologic agents. The presence of antigens in common with tuberculin is generally accepted as of diagnostic importance; a stronger skin reaction to atypical mycobacterial "tuberculin" than to true tuberculin is highly significant of atypical mycobacterial infection. Atypical mycobacteria and human type tubercle bacilli are occasionally discharged concomitantly. It is difficult to determine the part played by one or the other mycobacterium in this case.—**E. R. LONG**

Schaefer, W. B. Serologic identification of the atypical mycobacteria and its value in epidemiologic studies. *American Rev. Resp. Dis.* **96** (1967) 115-118.

The majority of the atypical mycobacteria implicated in human disease were classified into some 20 serotypes. Two of these serotypes corresponded to *M. avium*, the agent of natural tuberculosis in the chicken. The frequency of these two serotypes in human infections varied in different countries. The various serotypes of atypical mycobacteria encountered in hu-

man disease were also found in tuberculin reactors among cattle and swine not having bovine tuberculosis, indicating that man and the other animals are infected by the same bacteria and probably from a common source, the soil. The isolation of atypical mycobacteria of serotype IV from sparrows, also reported herein, raises the question of the role of nondomesticated birds in the contamination of the soil by atypical mycobacteria.—AUTHOR'S SUMMARY

Kazda, J., Vrabel, F. and Dornetzhuber, V.

Course of infection induced in man by inoculation with mycobacteria originating in water. *American Rev. Resp. Dis.* **95** (1967) 848-853.

Cases of human infection by mycobacteria occurring in nature as facultative saprophytes are becoming more numerous. A case is reported of accidental laboratory infection of a male animal worker with a 14-day-old culture of a mycobacterium originally isolated from water and from unchanged parenchymatous organs of chickens. In the case here reported the infection resulted from a prick with a syringe needle, which extended 2 mm. into the ball of a forefinger. The amount of mycobacteria injected was estimated as 0.1 mgm. Evidence of infection developed within 6 hours. Some 10 days later a painful abscess developed, and the entire phalanx became inflamed. Treatment was by incision and surgical drainage, and several antituberculosis drugs, including streptomycin, thiosemicarbazone, and cycloserine. Mycobacteria were seen in specimens and a pure culture of acid- and alcohol-fast rods was obtained from the lesion. Biopsy showed a granuloma with epithelioid and giant cells. The rods grew as weakly cream-colored, confluent colonies; growth in primary cultures occurred in 10-14 days, with an optimal temperature of 37-42°C. The organisms survived at 60° for at least 4 hours. They were catalase-positive. A variety of metabolic tests were recorded. The bacteria were pathogenic locally for guinea-pigs, moderately pathogenic for mice and rather markedly so for rabbits and chickens. The organism could not be reliably classified within any recog-

nized species of mycobacteria. Immunologically relationships were evident with *M. balnei*, *M. avium*, *M. aquae*, *M. vaccae* and *M. phlei*.—E. R. LONG

Tsukamura, M. and Tsukamura, S. Further observations on *Mycobacterium terrae*. A method for isolating slowly growing, nonphotochromogenic mycobacteria from soil sources. *American Rev. Resp. Dis.* **96** (1967) 299-304.

A method for isolating slowly growing, nonphotochromogenic mycobacteria has been described. The method consists of inoculating soil samples, which were treated with alkaline solution and were neutralized intravenously, to mice, and of isolating mycobacteria from mouse organs. By this method, many slowly growing, nonphotochromogenic mycobacteria were isolated. Forty strains (1711 to 1740) taken at random were examined with respect to 75 characters. The results have revealed that new isolates belong to a new species, *M. terrae*.—AUTHORS' SUMMARY

Runyon, E. H. *Mycobacterium intracellulare*. *American Rev. Resp. Dis.* **95** (1967) 861-865.

Confusion mounts as years go by with no species name adopted for an important mycobacterial pathogen of man, the Battey bacillus. Avian and Battey bacilli are indistinguishable in many properties, such as cellular and colonial macro- and microscopic morphology, rate of growth at 37°C, and many metabolic properties. Differences, however, in host range, the kind of disease produced, and other attributes are significant. The geographic distribution of Battey and avian diseases indicates that Battey bacilli are not being produced currently from avian bacilli. Adoption of the designation *M. intracellulare* for Battey bacilli is considered justified.—E. R. LONG

Takeya, K., Nakayama, Y. and Nakayama, H. Relationship between *Mycobacterium fortuitum* and *Mycobacterium runyonii*. *American Rev. Resp. Dis.* **96** (1967) 532-535.

A number of strains of rapidly growing mycobacteria, identified or suspected either as *M. fortuitum* or as *M. runyonii*, were tested for their biologic properties and also for their specificities in the stimulation of tuberculin reaction. The results of this Adansonian classification were in accord with those of specificity studies in the tuberculin reaction, indicating that *M. fortuitum* and *M. runyonii* can be sharply separated from each other. These findings support the establishment of the new species, *M. runyonii*. Several distinctive biochemical characteristics, by which both species can be differentiated, were presented. The two species can be distinguished usually by tests of utilization of citrate, heat-stable phosphatase, and nitrate reduction.—AUTHORS' SUMMARY

Tsukamura, S., Mizuno, S. and Tsukamura, M. Utilization for growth of ten carbohydrates by slowly growing mycobacteria in the presence of ammoniacal nitrogen and trimethylene diamine nitrogen. American Rev. Resp. Dis. **96** (1967) 529-531.

Although the majority of the Group III nonphotochromogens and the Group II scotochromogens utilized glucose for growth in the presence of ammoniacal nitrogen, *M. avium* and *M. terrae* did not utilize glucose. *M. avium*, *M. terrae*, the nonphotochromogens, and the scotochromogens utilized acetate and pyruvate for growth in the presence of ammoniacal nitrogen, and, excluding *M. terrae*, usually utilized these compounds also in the presence of trimethylene diamine as sole nitrogen source. *M. terrae* never utilized pyruvate in the presence of trimethylene diamine nitrogen. Among 10 carbohydrates tested in the presence of ammoniacal nitrogen, *M. kansasii* utilized only glucose, and *M. tuberculosis* and *M. bovis* utilized none of them. Tests for utilization of glucose,

acetate, and pyruvate in the presence of ammoniacal nitrogen, as well as in the presence of trimethylene diamine nitrogen, would be useful for differentiation of slowly growing mycobacteria.—AUTHORS' SUMMARY

Tsukamura, M. and Tsukamura, S. A comparative study of carbon source requirements of *Mycobacterium avium*, Group II scotochromogens, Group III nonphotochromogens, and *Mycobacterium terrae* in the presence of glutamate-nitrogen. American Rev. Resp. Dis. **96** (1967) 512-516.

A comparative study of the utilization of carbohydrates in the presence of glutamate-nitrogen was done with *M. avium* (14 strains), Group III nonphotochromogens (45 strains), Group II scotochromogens (22 strains), and *M. terrae* (40 strains). Growth in utilization of 10 carbohydrates—glucose, fructose, sucrose, acetate, citrate, succinate, malate, pyruvate, malonate, and fumarate—was tested. *M. avium* was differentiated from the nonphotochromogens and from the scotochromogens by the pattern of utilization of the carbohydrates. At least three types were differentiated in the nonphotochromogens. The scotochromogens belonged to one type or its variety.—AUTHORS' SUMMARY

Nakamura, R. M., Tokunaga, T. and Murohashi, T. Premature lysis of bacteriophage-infected mycobacteria induced by kanamycin. American Rev. Resp. Dis. **96** (1967) 542-544.

The present findings show that kanamycin is an effective agent in inducing premature lysis of phage-infected and kanamycin-susceptible mycobacteria. No such effect of kanamycin was observed in phage-infected and kanamycin-resistant bacteria.—AUTHORS' SUMMARY