

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.

General and Historical

Adiga, R.B. Incidence of leprosy detection in skin and V.D. department and the importance of knowing the differential diagnosis. *J. Nepal Med. Assoc.* **10** (1972) 27-36.

The author's experiences as a dermatologist in the skin and venereal diseases clinic of the Bir Hospital in Khatmandu resulted in the recording of 74 cases of leprosy among a total of 3,609 patients seen in a six month period. Twenty-eight of these were lepromatous, but the author did not think this ratio to be correctly representative of the type distribution throughout Nepal. More probably, factors related to clinic visits were determinative. Mass surveys have indicated the national incidence of leprosy at 2.2 per 1,000. —G. L. Fite

LEPROLOGIA, **17** (1972) 1-70.

Contains eight original articles, beginning with that of Carboni who discusses his experiences with sulfone treatment. He confirms the value of thalidomide in acute reactions, without suspending specific treatment during the reactive phase. Juan C. Gatti describes usage of depot sulfones, the phenylthiourea derivatives, ethambutol, and the newer antibiotics. Fliess, Balina, and Bachmann review developing concepts of leprosy as a disturbance of cellular mediation in immunologic processes. Bernard and Vazquez studied testis, prostate and mammary glands in 48 autopsied cases. Amyloid disease was present in 40% of the cases, and testes were involved in 54%. Stolar and Fliess report helpful psychotherapy to a patient in a general hospital. Other articles deal with adre-

nal gland alteration in leprosy, armadillo leprosy, and gingival changes including amyloidosis. —G. L. Fite

Reve, M. Views of general practitioners on leprosy. *Leprosy in India* **44** (1972) 55.

This paper contains the results of a sample survey from 92 respondents, the area of the survey including socio-economic groups, ranging from lower to upper middle. The respondents were persons chosen from the medical directory. The results of the survey indicate that more than half of the medical practitioners who were the respondents had not treated any leprosy patients, and did not treat them even at that time. However, the majority felt that they could detect cases with the facilities that they had. A very small number of doctors who were treating the patients made efforts to follow up these patients. About 15% of these doctors gave prophylactic treatment and of these only 8% believed that such prophylaxis is effective. The majority of the doctors appeared to believe that there was need for isolation and segregation of infectious cases. Further, a majority of the doctors felt that training and education of leprosy in their curriculum was sufficient. A total of 29% of the doctors advised patients as regards precautions necessary to prevent deformity. From these findings the author concludes that for the general practitioner it is necessary to have a thorough course in leprosy as a part of medical education, and that refresher orientation courses would help them to keep in touch with the latest developments. (*Adapted from abstract of paper*)

Clinical Sciences

✓ **Bechelli, L.M., Garbajosa P.G., Gyi, Mg Mg, Martinez Domínguez, V. and Quagliato, R.** Site of early skin lesion in children with leprosy. *Bull. WHO* **48** (1973) 107-111.

In this study of 28,220 children in Burma, where leprosy is highly endemic (in connection with a trial of BCG vaccination against leprosy) it was found that if children exposed to the risk of leprosy are kept under careful surveillance, and examined repeatedly, most of the cases that will be detected among them will appear at a stage when there is only a single skin lesion.

These lesions are found on almost any part of the body, with a predilection for thighs and buttocks, then arms and forearms, legs, and lumbar regions. Knees and elbows account for a relatively high proportion. Single, early lesions, are more common on the posterior surface of the trunk and upper limbs and anterior surface of lower limbs. The fact that these parts of the body are usually covered and do not come in contact with ulcerated lesions of patients makes it unlikely that they develop at the point of entry of *M. leprae*.—G.L. Fite

✓ **Bechelli, L.M., Garbajosa, P.G., Gyi, Mg Mg, Walter, J. and Tamondong, C.** Late lepromin reaction in untreated patients with indeterminate leprosy under 21 years old in Burma. *Bull. WHO* **48** (1973) 113-116.

Studies on lepromin reactivity in indeterminate (I) leprosy have usually been carried out among patients in whom the disease appeared one or more years before testing. This may result in misleading findings because a high proportion of patients, probably those showing moderate or strong lepromin reactions, seems to progress to the tuberculoïd pole of leprosy in a relatively short time (<1 year), and in many the lesions heal spontaneously. The object of the present study was to determine the frequency and intensity of late lepromin reactions (macroscopic readings) in untreated I patients aged under 21 years who had had the disease for less than one year. Of 209 patients tested with lepromin containing 160×10^6 bacilli/ml only a small proportion (2.7%) showed a negative

or doubtful lepromin reaction, while 61.5% were 2+ and 3+ reactors. These findings indicate that a favorable outcome may be expected in most I cases in the trial area.—G.L. Fite

Browne, S.G. Common causes of depigmentation of the skin in the tropics. *Trop. Doct.* **2** (1972) 59-64.

This practical review of the differential diagnosis of depigmentation as related to leprosy, begins with a general discussion of the examination of the skin. The depigmentations are then divided into congenital conditions and acquired conditions. The former briefly characterizes birthmarks, albinism, congenital differences in depth of skin pigmentation and Mongolian spots. The acquired conditions discussed are: postinflammatory hypomelanosis, vitiligo, symptomatic hypopigmentation, pityriasis alba, mycotic lesions, seborrhoeic dermatitis, lupus erythematosus, leprosy, nutritional hypochromia, macular hypochromia, leishmaniasis, spiriochetal hypopigmentation and onchocercal depigmentation. The basis for differential diagnosis is primarily clinical without discussion of histopathologic differentials.—O. K. S.

✓ **Busi, B.R.** Taste sensitivity to phenylthiourea among leprosy and filarial patients in coastal Andhra Pradesh. *Acta Genet. Med. Gemellol.* **21** (1972) 332-336.

Taste blindness for PTC has been studied in a) 416 leprosy patients and 424 healthy subjects, and b) 261 filarial patients and 136 normal individuals of both sexes. A significant difference was found between leprosy patients and the healthy control group in the proportion of nontasters ($X^2 = 4.096$, for 1 *DF*, $P < 0.05$). No significant difference could be observed between the filariasis and the control group ($X^2 = 0.605$, for 1 *DF*, $P > 0.30$).—Author's Summary

✓ **Carayon, A., Van Droogenbroeck, J.B. and Giraudeau, P.** Bilan de la chirurgie palliative des paralysies lépreuses du pied. [Results of palliative surgery in paralysis of the foot in patients with leprosy.] *Med. Trop.* **32** (1972) 695-710. (In French, English summary)

The authors provide a useful historical review of the surgical procedures that have been used for the correction of footdrop in leprosy and summarize the operative details of the different interventions. They much prefer the operation introduced by Carayon himself in 1953 (Carayon *et al.* Rev. Medico-Chirurg Forces Armées d'Extrême-Orient **1** [1953] 66), which consists of the transfer of the tibialis posterior tendon to the tibialis anterior, and the transfer of the common flexor of the toes to the common extensor and the extensor of the great toe. The tendons are passed through the interosseous membrane, a portion of which is actually removed; this technic is said to be important if post-operative adhesions and fibrosis are to be avoided. Details are also given of an operation designed to correct the clawing of the toes that follows irreversible damage to the plantar nerves. The authors discuss and compare their results; 101 out of 158 were said to be very good and 27 good. Lengthening of the Achilles tendon was resorted to in 43 patients and in 7 patients the Carayon operation was combined with an arthrodesis of the midtarsus.—S.G. Browne (*From Trop. Dis. Bull.*)

✓ **Kunigoshi, Uichi.** On the middle lobe syndrome including a traction oesophageal diverticulum in a leprosy patient. *La Lepro* **41** (1972) 124-126. (In Japanese, English summary)

A middle lobe syndrome having a traction oesophageal diverticulum in a leprosy patient is presented. The author describes its pathogenesis, clinical symptoms, diagnosis and treatment in detail.—Author's Summary

✓ **Lim, S. D., Fusaro, R. and Good, R. A.** Leprosy VI. The treatment of leprosy patients with intravenous infusions of leukocytes from normal persons. *Clin. Immun. Immunopath.* **1** (1972) 122-139.

We treated four leprosy patients with intravenous infusions of leukocytes from normal blood donors. Within the short period of two to three months, the patients showed remission of their clinical, histologic and bacterial findings. During the subsequent four month follow-up period, the patients remained in clinical remission.—Authors' Summary. (*It is worth noting in relation to this*

report that the patients all were reactional and that their chemotherapy was stopped during the total period of leukocyte infusion. From the presentation there is some difficulty, therefore, in judging whether the charges reported were due to subsidence of leprosy reaction or actual improvement of clinical leprosy.—O.K.S.)

✓ **Miranda, Rui Paulo G.** Leprotic inflammation of the gums in children. (Prior note.) *Publ. Cent. Estud. Leprol.* **12** (1972) 23-24.

It has been clearly demonstrated that lepromatous inflammation of the gums exists. The infiltrate of Virchow cells (very intense in the cases of patients Nos. 8 and 11) not only occupied intensely the dermis but advanced as far as the limits of the epithelium, with the nonexistence, therefore, of the classical Unna band in these tegumentary lesions of lepromatous leprosy. Also the Hansen bacilli, very abundant in patients 8 and 11, were noticed immediately under the epithelium, even invading the latter. It was observed further that in certain parts of the histological cuts the epithelium was found to be thinned, and one may conclude that the person who has leprotic inflammation of the gums (whose gums as those of everybody are easily wounded) is a great eliminator of bacilli, and therefore a great disseminator of the disease.—(*Adapted from author's comments*)

✓ **Noordeen, S. K.** Epidemiology of (poly) neuritic leprosy. *Leprosy in India* **44** (1972) 22.

The study is based on an intensive annual follow-up of a small population in Chingleput District (Tamilnadu) for about five years, and the occurrence of over 100 cases of neuritic type of leprosy among them. From the prevalence and incidence of neuritic leprosy in the population studied it was found that neuritic leprosy contributed up to one-sixth of all cases detected. Mononeuritic leprosy was found to be far more common than polyneuritic leprosy. Lower limb involvement was more frequent than upper limb involvement. Regression of nerve thickening was quite common as found during follow-up examinations, and compared favorably with regression of skin lesions in tuberculoid and maculoanesthetic leprosy in the same population. Incidence of leprosy by age, sex and location are discussed.—(*From abstract of paper*)

- ✓ **Pedley, J.C.** The nasal mucus in leprosy. *Leprosy Rev.* **44** (1973) 33-35.

An account is given of the examination of the nasal mucus discharge smears for the presence of *M. leprae* in 322 untreated cases of leprosy seen during a period of one year of which 111 were cases of lepromatous leprosy and the remaining 211 were borderline disease. The majority of the patients with lepromatous leprosy had leprosy bacilli in their nasal secretion, often in very great numbers, and showed a high Morphological Index. Of 41 of the most active cases among the 211 patients with borderline leprosy, only one had *M. leprae* in the nasal mucus. Morphologically normal bacilli are no longer found in nose-blows after six months' treatment with DDS. It is suggested that the nasal mucus provides a true index of infectivity, and that patients with borderline leprosy are in general not to be regarded as infectious.—G. L. Fite

- ✓ **Pfaltzgraff, R.E.** Management of neuritis in leprosy. *Trop. Doct.* **3** (1973) 138-139. Letter to the Editor.

Pfaltzgraff observes that there is no permanent value in injecting painful nerves, or incising nerve sheaths. Suppression of the reactions with anti-inflammatory agents with clofazimine is recommended, because of its antileprotic and anti-inflammatory properties. Because results are achieved slowly, corticosteroids (usually as prednisone) are given initially for 14 days. Remarkable return of both motor and sensory function in hands and feet has been observed where there had been significant loss.—G. L. Fite

- ✓ **Piva, J.R. and Merlin, V.E.** El dermatograma en leprologia. [The dermatogram in leprology.] *Leprologia* **17** (1972) 103-108. (In Spanish, English summary)

The authors have focused their attention on the morphological parameters which they think to be absolutely necessary for a dermatocytological evaluation in leprosy.

The authors feel that further information on extensive series is necessary in order to obtain valid statistical inferences with regard to the period of evolution, clinical state and treatment; this communication is limited to statistic-descriptive references of 80 cases.—English Summary

- ✓ **Ramanujam, K., Ramu, G., Balakrishnan, S. and Desikan, K.V.** Nephrotic syndrome complicating lepromatous leprosy. *Indian J. Med. Res.* **61** (1973) 548-556.

The clinico-biochemical features of the nephrotic syndrome developing as a terminal event in five cases of lepromatous leprosy who were subjects of recurrent lepra reaction along with the post-mortem findings in two of them are presented. The various etiological factors that might have played a part in the causation of this condition in this group of cases are discussed. It is suggested that the recurrent episodes of lepra reaction, which in the acute phases were associated with abnormal urinary findings indicative of a focal glomerulonephritis, could be due to the occurrence of lesions in the kidneys structurally similar to *erythema nodosum leprosum* or precipitation of antigen-antibody complexes in the glomeruli. Amyloidosis may be a more frequent accompaniment of recurrent lepra reaction than hitherto known. Properly designed studies for the assessment of renal functions supported by renal biopsies will serve to gauge the type of renal involvement.—Authors' Abstract

- ✓ **Ranney, D.A. and Furness, M.A.** Results of temporalis transfer in lagophthalmos due to leprosy. *Plast. Reconstr. Surg.* **51** (1973) 301.

Lagophthalmos, a seemingly minor effect of paralysis of a branch of the facial nerve, becomes a treatable eye-saving problem in leprosy. This article will be interesting to ophthalmologist surgeons interested in rehabilitation. The procedure is not new, and many variants are possible. It was performed on 76 eyes in 56 patients, and even with limited success, most patients are symptomatically improved and sight is saved that otherwise would be lost.—G. L. Fite

- ✓ **Srinivasan, H. and Desikan, K.V.** Cauliflower growths in neuropathic plantar ulcers in leprosy patients. *J. Bone Joint Surg. (Amer.)* **53A** (1971) 123-132.

1. A clinical and histopathological review of 13 cases of cauliflower growths occurring in neuropathic plantar ulcers in leprosy patients is presented.

2. The majority of these lesions were found to be pseudo-epitheliomatous hyper-

plasias although a considerable number showed atypical histological features.

3. Conservative surgical treatment by deep but limited local excision is advocated.

—Authors' Summary

✓ **Terencio de las Aguas, J. and Hierro, J. del.** Lesiones renales en la lepra. *Rev. Leprol.* **8** (1972) 473-490.

A study of nephropathy in leprosy was made in 635 clinical cases. Renal lesions were found in 46.93% and seemed to be more frequent in lepromatous cases (50.17%) and only 9.80% in the tuberculoid form.

It was observed that 94.92% of the patients with renal lesions have had leprosy

reactions. In 62.5% the most important cause of the dysfunction was renal lesions; and of a total of 88 necropsies, 61.5% presented nephrosclerosis with amyloidosis. The study was made from a clinical, laboratory and histopathologic point of view.

It is considered that *nephropathia han-seniana* originates in lepromatous patients with frequent reactional episodes due to the antigen antibody reaction. During this state a focal glomerulonephritis and interstitial nephritis is thought to occur, which after several years evolves to an irreversible renal fibrosclerosis and amyloidosis.—(Adapted from English summary)

Chemotherapy

✓ **Browne, S. G.** Leprosy. In: *Management and Treatment of Tropical Diseases*. B. G. Maegraith and H. M. Gilles, eds., Oxford and Edinburgh: Blackwell Scientific Publications, 1971, pp 226-239.

This brief outline primarily outlines very succinctly the uses of the major drugs employed in leprosy treatment as a contribution to this manual on the treatment of tropical diseases.—O. K. S.

✓ **Currey, H. L. F. and Fowler, P. D.** A study of clofazimine in the rat. *Br. J. Pharmacol.* **45** (1972) 676-681.

Clofazimine in oil, 50 mg/kg daily, was given to rats, and control rats were fed with oil only. Widespread arthritis was induced by one injection of heat-killed *M. tuberculosis* into a foot pad. Clofazimine (350 mg) suppressed the arthritis, while 200 mg and 100 mg produced partial suppression. The suppression lasted for two weeks. Inflammatory swelling of the foot pad was produced by an injection of 0.05 ml Freund's complete adjuvant. Pretreatment with clofazimine, 50 mg/kg for seven days, produced a 40% reduction of paw swelling. Antibody response to sheep erythrocytes and the tuberculin skin test were not suppressed by clofazimine. The authors conclude that "clofazimine exhibits anti-inflammatory (but not immunosuppressive) activity, and that it should be tested in patients with rheumatoid arthritis."—C. S. Goodwin (From *Trop. Dis. Bull.*)

✓ **Glader, B. E. and Conrad, M. E.** Hemolysis by diphenylsulfones: comparative effects of DDS and hydroxylamine-DDS. *J. Lab. Clin. Med.* **81** (1973) 267-272.

A chemical derivative of 4,4'-diaminodiphenylsulfone (DDS) was found to produce methemoglobin *in vitro*. This drug, hydroxylamine-DDS (DDS-NHOH), also depleted glutathione (GSH) in human erythrocytes with decreased hexosemonophosphate shunt activity due to G6PD deficiency or incubation with galactose. GSH also fell in rat red blood cells incubated with galactose and DDS-NHOH, and the ⁵¹Cr survival of these treated erythrocytes was decreased as compared to appropriate controls. DDS-NHOH inhibited catalase in the presence of aminotriazole, suggesting that intracellular hydrogen peroxide was generated. DDS had none of these effects. These results indicated that this chemical derivative of DDS may be responsible for some of the non side-effects of this antimalarial and antileprosy drug.—Authors' Summary

✓ **Hogerzeil, L. M.** Lamprene: First results of treatment in the Netherlands in a group of six leprosy patients. *Dermatol.* **143** (1971) 339-344.

This paper reports the use of Lamprene (clofazimine) in six patients suffering from long-standing lepromatous or borderline leprosy (average duration 17 years) who were intolerant of both dapsone and thiambutosine.

The skin lesions improved and reactions decreased in every patient except one. A case of severe polyneuritis responded favorably. Tolerance to dapsone was temporarily increased and steroid dependence reduced.

The clinical improvement was matched by the bacteriological one, the Morphological Index falling to zero within seven months. No indication of resistance to Lamprene was seen and no side-effects were noted, except a ruddy or slate-grey discoloration of the skin.—G. L. Fite

✓ **Neelan, P.N.** Relapse in lepromatous leprosy under sulphone treatment. *Leprosy in India* **44** (1972) 23.

This is a retrospective study on relapse in cases of lepromatous leprosy, treated and followed-up in the Mobile Treatment Unit of the Central Leprosy Teaching and Research Institute, Chingleput.

Out of 463 cases followed for one to ten years, 53 showed relapse. The relapse rate for a total of 2,833 person years was 1.9% per year. It was 3.3% per year for 151 patients who had irregular treatment and 1.2% per year for 312 patients who had regular treatment. The maximum risk of relapse was in the first three years of treatment after bacterial negativity. It was influenced by the regularity of treatment of the cases in this period. The risks of relapse were reduced in the second and third three-year periods of follow-up and were not influenced by treatment status of the cases. After seven years of treatment the relapse rates were very low in both regular and irregular patients.—(From abstract of paper)

✓ **Noordeen, S.K. and Balakrishnan, S.** Spot test for DDS (diaminodiphenyl sulphone) in urine under field conditions. *Indian J. Med. Res.* **60** (1972) 367-371.

Child contacts (1,848) of patients with leprosy were given either "DDS... 10-75 mg" or dicalcium phosphate, and their urines were examined for the presence of dapsone by means of filter-paper strips impregnated with a solution of *p*-dimethylaminoazoben-

zaldehyde, oxalic acid, and Nacconol in alcohol. Three tables give the results in detail. Of 944 children receiving dapsone, a positive result was obtained in 80.4% and a weakly positive result in another 12.2%. Of 904 children receiving dicalcium phosphate, a weakly positive result was obtained in 11.5% and a positive result in another 3.8%. When urine was obtained 48 hours after the dapsone was given, 7.7% gave a negative test, but 42% of urines obtained at 72 hours gave a negative test. The authors recommend this "spot test" when 25 mg or more dapsone is given and when urine has been collected up to 48 hours after drug administration.—C. S. Goodwin (*Adapted from Trop. Dis. Bull.*)

Rees, R.J.W. Drugs for leprosy. *Trop. Doct.* **3** (1973) 92-95.

This article reviews and updates the application to treatment of leprosy with dapsone, acedapsone for slow release, thiambutosine, clofazimine, and rifampicin.—G. L. Fite

X **Yokosawa, A., Arai, H., Sato, H., Motomiya, M. and Oka, S.** Experimental and clinical studies on the metabolic fate of rifampicin in animals and in humans. *Sci. Rep. Res. Inst. Tohoku Univ. [Med.]* **19** (1972) 177-182.

After oral (450 mg) administration, the peak blood level of rifampicin was found at 2 hours in humans. It was at 2 hours in rabbits and 3 hours in guinea pigs (20 mg/kg dose). In humans the presence of rifampicin and deacetyl-rifampicin could be confirmed in serum and in urine.

Deacetyl-rifampicin was detected as a major metabolic product of rifampicin in the bile of guinea pigs. In humans no definite difference in blood level of rifampicin could be found between before-breakfast administration and after-breakfast administration. By means of electrophoresis followed by microbiological assay, evidence was presented suggesting the association of rifampicin with α_1 -, α_2 - and β -globulins of human sera.—(*Adapted from authors' summary*)

Immuno-Pathology

✓ **Agarwal, S.C., Maheshwari, H.B., Mittal, M.M. and Kumar, S.** A histological study of liver lesions in leprosy. *Indian J. Med. Res.* **61** (1973) 389-395.

Thirty patients with lepromatous and non-lepromatous leprosy with varying duration of illness were studied in respect of their hepatic lesions and changes in liver function. Sixteen patients, 12 lepromatous and 4 non-lepromatous showed specific granulomatous lesions suggestive of leprosy hepatitis. In five of these there was progression to stellate fibrosis and in another four the change was characterized by early cirrhosis. Advanced cirrhosis was not observed in any patient. The remaining 14 cases revealed nonspecific inflammatory cell collections. Amongst these there were three lepromatous patients who showed stellate fibrosis in the liver with attempt at incomplete lobule formation. Amyloid deposition was not observed in any of the liver biopsies.—Authors' Summary

✓ **Baylet, R., Gouatter, P. and Yven, J.** Sur l'existence de fausses antistreptolysines dans la lèpre. [Presence of pseudo-antistreptolysins in leprosy.] *Sem. Hop. Paris* **49** (1973) 1093-1096. (In French)

The total antistreptolysin activity is distinctly elevated in leprosy, regardless of the clinical form of the disease. The values reach 563 units in the lepromatous and 669 in the tuberculoid. The high values are partly the result of the presence of specific beta-lipoprotein inhibitors. After treatment of sera by the Burnstein technic which suppresses the lipoprotein activity, the antistreptolysin titers are still high in both bipolar forms (338 and 339 units).—G. L. Fite (*Translation from authors' summary*)

✓ **Beiguelman, Bernardo.** An appraisal of genetic studies on leprosy. *Acta Genet. Med. Gemellol.* **21** (1972) 21-52.

The present paper reviews the research lines which have been explored to evaluate to what extent genetic factors are intervening on the mechanism of resistance and susceptibility to leprosy.

It presents a critical discussion of the investigations on the familial association of

leprosy, familial association of leprosy types, intrafamilial contagion of leprosy, concordance of leprosy in twin pairs, racial differences on leprosy prevalence and lepromatous rate, pedigree studies, association of leprosy to genetic markers, Australia antigen, and dermatoglyphic patterns. Space was also allotted to review family and twin-pair studies on the Mitsuda reaction, as well as to the investigation on the *in vitro* behavior of blood macrophages against killed *M. leprae*.

Some areas in which further research on leprosy and genetics may be considered as prioritary are outlined with some detail.

—Author's Summary

✓ **Bernard, Juan C.** Manifestaciones alergicas viscerales de la lepra. [Visceral allergic manifestations in leprosy.] *Leprologia* **17** (1972) 91-102. (In Spanish, English summary)

We have studied the allergic lesions in 61 autopsies of leprosy patients, comparing skin allergic lesions with visceral lesions.

The findings show the importance of knowing not only skin lesions but visceral lesions as well. These are destructive alterations in the following lesions: the adrenal cortical necrosis, central necrotic hepatitis and membranous glomerulitis.

The adenitis, splenitis, etc., show hyperplastic reaction of the endothelial reticulum system.—(*Adapted from English summary*)

✓ **Bernard, J.C. and Vazquez, C.A.J.** Estudio de la incidencia cancerologica de un hospital de lepra. [Study of the cancer incidence in a leprosy hospital.] *Leprologia* **17** (1972) 117-124. (In Spanish, English summary)

General findings on malignant tumors in 60 autopsies and 2,000 biopsies in leprosy patients of the Sommer Sanatorium indicate the following: 1) cancer appears in 2.23% of Sommer cases (16.6% in autopsies and 1.75% in biopsies); 2) the average age of cancer patients is 60 years old; 3) the most frequent tumor in biopsies (62%) and in autopsies (45%) is that of skin carcinoma; 4) epidermoid carcinoma is more frequent than basal cell carcinoma; 5) among other cancerous

pathologies, lung carcinoma is the most frequent in men and breast carcinoma in women. This fact agrees with findings for hospitals in general.—(*Adapted from English summary*)

- ✓ **Bernard, J.C. and Vazquez, C.A.J.** Necrosis cortical adrenal en lepromatosos. [Necrosis of adrenal cortex in lepromatosis.] *Leprologia* 17 (1972) 109-115. (In Spanish, English summary)

The histopathology of the acute adrenal cortical necrosis has been studied, observing a notable incidence of the latter in patients with lepromatous allergic reactions.

The conclusions are as follows: 1) adrenal cortical necrosis seems to be one of the fundamental pillars of the allergic reaction in leprosy patients; 2) this fact has been observed in active as much as in residual leprosy patients; 3) all cases observed have been previously treated with corticoids and ACTH, or salicylate antipyretics.—(*Adapted from English summary*)

- ✓ **Choyce, D.P.** Kerato-ueveal changes in leprosy and onchocerciasis: a question of immunity. *Proc. R. Soc. Med.* 65 (1972) 955-960.

The author announces his intention of developing the concept that the ocular complications of leprosy and onchocerciasis are conditioned by the immunological state of the patient or of the population at risk.

Lepromatous leprosy, in which most of the ocular complications occur, is sited at the minimal end of the spectrum of resistance whereas tuberculoid leprosy, in which a cell-mediated immunity is at work, is at the other end of the spectrum.

The ocular complications and the geographical distribution of leprosy are enumerated and discussed. It is observed that the further east one goes, the greater is the incidence of lepromatous leprosy.

A minatory interpolation is that, as far as the United Kingdom is concerned, since leprosy has an incubation period of from two to seven years, we are assured of a steady supply of new cases in years to come as long as the present level of immigration from endemic areas continues.

On the basis of 16 million world sufferers and a median figure of 5% for the incidence

of blindness, the author suggests a grand total of 800,000 persons made blind by leprosy.

The immunity hypothesis in the case of onchocerciasis is based on the different clinical manifestations found in onchocerciasis patients in Central America, in the rain forest and in the savanna regions of Africa, and in those patients who have been seen in the British Isles. The main differences are that: a) in African eyes microfilariae can circulate in the anterior chamber without apparently causing complications; in Central American and European eyes the microfilariae, when seen, are accompanied by keratitis and iridocyclitis. In Central America the iridocyclitis is particularly severe with a down-drawn pinpoint pupil; b) fundus lesions are fully evident in savanna Africa, less so in Central America, and have not been seen in European patients. These variations in behavior, it is suggested, are a matter of immunity, with the comparative immunity of rain forest Africans at one end of the scale and the high reactivity in Central America at the other. In the latter case, perhaps because the disease in that region was introduced not more than 100 years ago, too short a time has elapsed for the building up of immunity.—A. McKie Reid (*Adapted from Trop. Dis. Bull.*)

- ✓ **Cottier, H., Turk, J.L. and Sobin, L.** A proposal for a standardized system of reporting human lymph node morphology in relation to immunological function. *Bull. WHO* 47 (1972) 375-407.

This memorandum proposes a standardized system of reporting the histology of human lymph nodes based on commonly used simple staining techniques. The purpose is to provide a uniform, internationally acceptable system by which the histological structure of lymph nodes can be correlated with other parameters of immunological status. The proposed protocols are intended to provide information that is not available in conventional written reports, that use such terms as "hyperplasia" or "nonspecific lymphadenitis."—Authors' Abstract

- ✓ **Danielsen, Knud.** Odontodysplasia leprosa in Danish medieval skeletons. *Tandlaegebladet* 74 (1970) 603-625.

The present paper demonstrates that the study of old skeletal material may contribute

to dental pathology in revealing pathologic changes thus far not described in living patients.

An outline of the general pathology of leprosy is given with special attention to the low-resistance lepromatous type and to the intermittent development of the disease with periods of quiescence interrupted by acute attacks of reactivity, the lepra reaction.

Skeletal remains of about 1,000 persons from four medieval Danish leprosy cemeteries excavated by Møller-Christensen were studied. He described *facies leprosy*, the changes in the facial bones pathognomonic of low-resistance leprosy. In skeletons of children who developed *facies leprosa* during the first decade of life dental studies revealed some cases of characteristic malformations of the permanent maxillary incisors.

In the cases with the most typical malformations, the tooth diameters are suddenly and concentrically reduced, while the less marked cases exhibit a well-demarcated tapering and shortening of the roots. Transient interruption may result in slight hypoplasia of the enamel or cementum. Depending upon the severity of the process, the period of disturbance may be followed by arrested abortive or apparently normal odontogenesis. If the attack occurs early in the development of the tooth, amelogenesis may be involved and the formation of the root may be very deficient. When the disturbance starts later, only the root is affected. A disturbance shortly before apical closure may only result in slight apical deformity. The malformation may develop with varying intensity at two or three times interspaced with longer periods of apparently normal odontogenesis.

Roentgenograms reveal similar constriction or tapering of the walls of the pulp cavities. The pulpal surface of the dentin may be rather irregular.

The typical changes are found symmetrically in the permanent maxillary incisors, most marked in the central incisors. Similar, but less pronounced changes may be found in the mandibular incisors, the premolars or, especially the canines in the zones of these teeth which were formed at the same time as the affected parts of the maxillary incisors.

Apart from cases of very late disturbance with only slight apical deformity, the malformations are associated with crowding of the maxillary anterior teeth and palatal displacement of the lateral incisors.

The pathogenesis of the malformations is discussed. They are assumed to be developmental disturbances. The predisposition to lepromatous changes in the premaxillary parts of the nasal cavity, the oral cavity, the jaw bones, and the dentition is emphasized. The unique dental abnormalities appear to be caused by and to be specific to low-resistance leprosy in childhood.

As low-resistance leprosy in childhood develops, the bacilli disseminated throughout the body find conditions for growth better in some tissues than in others. The nasal mucosa and the bone marrow are among the preferential locations. In the jaws, with their developing permanent teeth, the anterior parts, especially of the maxilla, are most prone to lepromatous granulation tissue infiltration. During lepra reactions, the "tissue panic" involves the odontogenic cells. Their function is disrupted for various periods of time and tooth formation is inhibited. Due to the predisposition for infection of the premaxillary region and/or the close anatomic relationship between the heavily infiltrated nasal mucosa and the odontogenic cells of the maxillary permanent incisors these teeth are affected most severely by the pathologic process. At the same time the growth of the premaxillary bone is inhibited.

The dental malformations are only found in skeletons with marked *facies leprosa*. On the other hand, *facies leprosa* may develop in children without causing tooth involvement. The malformations were only found when death had occurred in childhood or youth. This age distribution may relate to the early demise of lepromatous children in the Middle Ages. With increased survival times in modern patients, these changes may be seen in adults.—Author's Summary

Dastur, D. K. Ultrastructure of the nerve in tuberculoid leprosy. *Leprosy in India* 44 (1972) 29-30.

This preliminary communication reports our electron microscopic observations to date on the changes in five nerves from five cases of tuberculoid or borderline-tuberculoid leprosy. The nerves selected were sensory branches which were clinically unaffected, but obtained from patients who showed moderate thickening of some other larger nerves. At operation, however, some thickening of and adhesions around the

nerve were observed in all cases. Degenerative changes of varying degree were found on both light and electron microscopic examination in all nerves.

The early changes appeared to be: 1) some depletion of large fibers and relative prominence of small myelinated fibers; 2) increase of endoneurial collagen; 3) large number of bigger fibers showing prominent Schmidt-Lantermann (SL) clefts; 4) proliferation of sheath cells with prominent nuclei, but without formation of "onion bulbs."

The clusters of small myelinated fibers suggested regenerative activity confirming a similar impression on light microscopy. The prominence of SL clefts probably indicated an early stage of nerve fiber degeneration. The increase of collagen throughout the nerve, even when most fibers were intact, appeared significant.—(Adapted from abstract of paper)

Godal, T., Myrvang, B., Frøland, S.S., Shao, J. and Melaku, G. Evidence that the mechanism of immunological tolerance ('central failure') is operative in the lack of host resistance in lepromatous leprosy. *Scand. J. Immunol.* **1** (1972) 311-321.

The cellular immune defect in lepromatous leprosy has been studied. The following observations have been made: 1) Three lepromatous patients who had been on antileprosy treatment for more than ten years still failed to respond to *M. leprae* by lymphocyte transformation (mean 0.2%) while they responded strongly to BCG (mean 34.2%) and PPD (mean 56.1%); 2) Lepromatous serum failed to inhibit *M. leprae*-induced leukocyte migration inhibition; 3) Lepromatous lymphocytes revealed a reduced capacity to attach *M. leprae* to their surface. The only experimental condition compatible with the observed characteristics would seem to be a state of immunological tolerance to an antigen (or antigens) of *M. leprae*. The lasting nature of this nonresponsive state suggests that it plays a primary role in the pathogenesis of lepromatous leprosy.—Authors' Summary

Godal, T., Myrvang, B., Samuel, D.R., Ross, W.F. and Lofgren, M. Mechanism of "reactions" in borderline tuberculoid (BT) leprosy. A preliminary report. *Acta Pathol. Microbiol. Scand. [A] Suppl.* **236** (1973) 45-53.

Patients with borderline tuberculoid leprosy undergoing reactive phases of the disease have been studied.

A characteristic immunological feature of these patients was their strong response to *M. leprae*. Their average response in the lymphocyte transformation test was initially 16.88% and the average maximal response 27.43%. The average migration index in the leukocyte migration inhibition test was 0.74.

Some patients remained stable or increased in their immune responsiveness to *M. leprae* during the period of observation (usually several months), while in others a definite decrease in immunological reaction was observed. In one patient a shift in histological and clinical classification from indeterminate to reactive borderline tuberculoid leprosy coincided with a shift in lymphocyte transformation to *M. leprae* from 0.5% to 21.25%.

It is concluded that the reaction in these patients was precipitated by a rapid increase in cell-mediated immune responsiveness to *M. leprae*.

The findings are discussed in the light of the present concepts of reactive phases in leprosy.—Authors' Summary

Godal, T. and Negassi, K. Subclinical infection in leprosy. *Br. Med. J.* **3** (1973) 557-559.

Lymphocyte transformation has been used to study the immune response to *Mycobacterium leprae* among contacts and noncontacts of leprosy patients. Of 26 subjects living in a leprosy endemic area for less than two months none responded to *M. leprae*; 24% of subjects who had lived in an endemic area for more than a year gave a positive response to *M. leprae*; more than 50% of individuals with occupational contact of leprosy for more than a year responded; and about 50% of contacts of tuberculoid and treated lepromatous patients responded to *M. leprae*, while only 22% (4/18) of contacts of lepromatous patients treated for less than six months responded.

It seems that leprosy is more highly infectious than is indicated by the prevalence of the disease and that a subclinical infection commonly follows exposure to *M. leprae*. The relatively low response found in contacts of active lepromatous patients suggests that in these contacts "superexposure" to

M. leprae can bring about a decrease in host resistance.—Authors' Summary

Job, C. K. Nerve lesions in leprosy—an ultra-structural study. *Leprosy in India* **44** (1972) 29.

This paper presented an electron microscopic study of nerves from 16 early cases of lepromatous leprosy and 8 cases of tuberculoid leprosy. The radial cutaneous nerves were biopsied in the lepromatous cases before there was any motor or extensive sensory deficit. Electron microscopy in these cases revealed the specific lesion-infection of the Schwann cell with progressive damage to this cell-segmental demyelination and Wallerian degeneration. Only rarely could the organisms be found in the axon proper. It further showed disease of the capillary endothelium with narrowing of the lumen with possible ischemia of the nerve. Bacilli could also be seen lying free in the capillary lumina. In the case of tuberculoid leprosy, in three out of the eight cases no nerve fibers could be identified. In the rest, in addition to Schwann cell destruction, lymphocytes and macrophages were also seen to infiltrate and destroy the nerve. This early, quick and irreversible damage to the nerve in this type of leprosy is to be attributed to this destruction mediated by the lymphocytes and macrophages.—(From abstract of paper)

Kelkar, S. S., Niphadkar, K. B. and Khare, P. M. Titers of Australia (hepatitis-associated) antigen in healthy carriers, leprosy, cirrhosis of the liver and acute hepatitis. *Indian J. Med. Res.* **61** (1973) 648-688.

The titers of Australia (Au) (hepatitis-associated) antigen have been estimated in 84 serum samples. These were from 32 healthy carriers, 19 carriers with leprosy, 17 patients with cirrhosis of the liver and 16 with acute viral hepatitis. The titers were estimated by running doubling dilutions of each serum against a known anti-Au antibody by the immunoelectrophoretic technic. Titers in hepatitis were lower than in other groups. This finding supports the thesis that liver damage is not related to quantity of virus. Titers in lepromatous leprosy were higher than in other forms of the carrier state. Cellular immunity may, therefore, play an important role in determining the outcome of

the interaction between man and the serum hepatitis virus.—G. L. Fite

Khaire, D. S. and Magar, N. G. Copper in leprosy blood plasma concentration and urinary excretion. *Indian J. Med. Res.* **60** (1972) 1697-1701.

Copper (free, bound and total) and ceruloplasmin levels have been determined in fasting blood plasma of normal individuals and leprosy patients. Plasma concentration of these constituents was higher in nontreated leprosy patients than in normal persons. There was an increase in copper excretion through urine in all patients. The urinary copper excretion was higher in lepromatous than in the nonlepromatous types. Results indicate that the above values for the copper components in leprosy patients of all types decreased significantly after DDS treatment, thereby showing a tendency to attain normal values.—Authors' Summary

Kokrady, S., Bhakthaviziam, C., Mathai, R. and Bachhawat, B. K. Changes in glycolipids in peripheral nerves in leprosy. *Indian J. Med. Res.* **60** (1972) 632-635.

There was depletion of glycolipids, identified as galactose cerebrosides and sulphatides, in the peripheral nerves of patients with tuberculoid leprosy, which was taken as an index of demyelination. The result was correlated with loss of structure as seen in hematoxylin-eosin sections of the nerve.—D. S. Ridley (From Trop. Dis. Bull.)

Nayar, A., Narayanan, J. S. and Job, C. K. Histopathological study of early skin lesions in leprosy. *Arch. Path.* **94** (1972) 199-204.

Biopsies of skin lesions from 66 patients suspected of having early leprosy were studied. In 50 cases, a definite diagnosis of leprosy could be made according to the present available criteria. Careful examination of numerous sections from the other 16 biopsies showed perineural inflammation in 9 cases and only nonspecific changes in the other 7. The deficiency of existing pathologic criteria for early diagnosis of leprosy is brought out, and the need for further study on this subject is emphasized.—(From Trop. Dis. Bull.)

Noordeen, S. K. Mortality in leprosy. *Indian J. Med. Res.* **60** (1972) 439-445.

The study is based on a six year follow-up of 304 cases of lepromatous type of leprosy, 837 cases of nonlepromatous types of leprosy, and 304 normal controls all from the field, and 263 cases of lepromatous type of leprosy from a sanatorium. It was found that the lepromatous cases from the field experienced had a mortality of about $3\frac{1}{2}$ times that of the general population and twice that of the nonlepromatous cases; the nonlepromatous cases from the field experienced had a mortality which was almost twice that of the general population; the lepromatous cases admitted into the sanatorium had a death rate very close to that of the general population. The possible factors contributing to the increased risk of mortality among leprosy patients such as trophic ulcers, lepra reaction, intercurrent illnesses, and social neglect are discussed. It is estimated that, in the area studied, leprosy contributed to about 1% of all deaths in the community.—G. L. Fite

Papageorgiou, P. S., Vernace, S. and Glade, P. R. Hepatitis-associated antigen and cell-mediated immunity. [Correspondence.] *Lancet* (May 20, 1972) 1118.

The prevalence of hepatitis B antigen (Australia antigen, hepatitis-associated antigen) among patients with lepromatous and tuberculoid leprosy in Athens was determined by the immunodiffusion and immunoelectro-osmophoretic techniques. The antigen was detected in the serum of 1 of 72 (1.4%) patients with lepromatous leprosy and in 3 of 50 (6%) patients with tuberculoid leprosy. The incidence of hepatitis B antigen among the general Greek population is 1.8%.

It is known that the lepromatous type of leprosy is associated with depression of cellular immunity and it has been suggested that the higher incidence of hepatitis B antigen found by other investigators in this form of leprosy was due to impaired delayed hypersensitivity reactions. [Blumberg and Melartin, *Trop. Dis. Bull.* **68** (1971) abstr. 569; Shwe and Zuckerman, *J. Clin. Path.*, 1972, in press.] The findings in Athens, however, do not support this view.—A. J. Zuckerman (*From Trop. Dis. Bull.*)

Petchelai, B., Chuthanondh, R., Rungrueng, S. and Ramasoota, T. Autoantibodies in leprosy among Thai patients. *Lancet* **I** (1973) 1481-1482.

Although the authors found the prevalence of autoantibodies in their Thai leprosy patients to be somewhat higher than that in a control population, the titers were lower than those reported elsewhere, as were the percentages of positive results. Most of the positive results occurred in lepromatous cases. The rheumatoid factor was the most often increased. The results were thought to be regional and disagree with those from other reports.

In the subsequent issue, volume 2, 1973, 40, D. J. M. Wright adds a group of somewhat similar findings from Malaya. Again, the sera with positive findings came from the lepromatous group. All too briefly, Wright reports presence of mitochondrial antibody in seven sera which links the lepromatous form to the chronic false-positive reaction in which *M. fluorescence* is found.—G. L. Fite

Shankara Manja, K., Bedi, B. M. S., Kasturi, G., Kirchheimer, W. F. and Balasubrahmanyam, M. Demonstration of *Mycobacterium leprae* and its viability in the peripheral blood of leprosy patients. *Leprosy Rev.* **43** (1972) 181-187.

M. leprae was demonstrated in buffy coat smears or in leukocyte-rich plasma in none of 15 tuberculoid cases, in some borderline or treated lepromatous cases, and in all untreated lepromatous cases. When observed, the bacterial loads and morphology in the skin correlated well with the bacteremia.—G. L. Fite

Dwyer, J. M., Bullock, W. E. and Fields, J. P. Disturbance of the blood T:B lymphocyte ratio in lepromatous leprosy. Clinical and immunologic correlations. *N. Engl. J. Med.* **288** (1973) 1036-1039.

A significant increase in absolute numbers of bone-marrow-derived (B) lymphocytes and a significant decrease in the absolute number of lymphocytes forming spontaneous rosettes with sheep red blood cells (thymus derived [T] lymphocytes) were observed in peripheral blood among a group of 17 patients with lepromatous leprosy.

Lymphocyte response to phytohemagglutinin after three days of culture was significantly reduced in the patient group. A generalized impairment of delayed hypersensitivity responses was observed among our patients as manifested by skin-test anergy to lepromin and fungal antigens. These findings suggest that anergy of the cellular immune system in patients with lepromatous leprosy may be secondary to the destruction of T lymphocytes or disturbance of their recirculation.—Authors' Abstract

Gajl-Peczalska, K.J., Lim, S.D., Jacobson, R.R., and Good, R.A. B lymphocytes in lepromatous leprosy. *N. Engl. J. Med.* **228** (1973) 1033-1035.

B lymphocytes were quantified in periph-

eral blood of nine patients with lepromatous leprosy by means of an immunofluorescent technic. In five of seven cases with active lepromatous leprosy the proportions and absolute numbers of B lymphocytes were very high (60% to 85%). Two patients showed normal percentages of B lymphocytes (28.7 ± 6.9); and one of these had recently experienced a reversal reaction toward a tuberculoid form. Two patients with lepromatous leprosy treated effectively with sulfones, whose disease was apparently inactive clinically, continued to show elevated numbers of B lymphocytes. The high number of B lymphocytes may represent an overcompensation or stimulation of B cells when the T-cell population and its functions are deficient.—G.L. Fite

Microbiology

Browne, S.G. Recent advances in the bacteriology of leprosy. *In: Essays on Tropical Dermatology*. Simmons, R.D.G. Ph. and Marshall, J., eds., Excerpta Medica Monograph (ISBN 90 219 2044 1). Amsterdam: Excerpta Medica, 1969, pp 246-253.

This brief review discusses some current concepts of the characteristics of *M. leprae*, proceeds to a summary of the uses of mouse experimental models in human leprosy, then briefly notes some speculations regarding growth requirements of *M. leprae* and the status of attempts to culture this organism. The three quarter page review of the immunology of leprosy is of necessity extremely sketchy as is the paragraph on nerve involvement.—O.K.S.

Edwards, R.P., Draper, G.J. and Draper, P. The effect of antibacterial drugs on the ultrastructure of *Mycobacterium leprae* in human skin. *Leprosy Rev.* **43** (1972) 173-180.

Biopsies of skin from patients with lepromatous leprosy were taken before treatment, after one year's treatment with DDS, and after three and six weeks' treatment with DDS, rifampicin or streptomycin, and sectioned and examined in the electron microscope. Longitudinally sectioned *M. leprae*

were classified into grades of morphological intactness. Analysis of the results showed a significant shift towards less-intact bacteria after one year of DDS treatment and after six weeks of rifampicin treatment. The assessments agreed qualitatively with conventional Morphological Indices measured by light microscopy. Some details of the process of degeneration were noted.—G.L. Fite

Hanks, J.H., Abe, M., Nakayama, T., Tuma, M., Bechelli, L.M. and Martinez Dominguez, V. Studies towards the standardization of lepromin. *Hanseniasis: Abs. News* **3** (1972) 97-104.

Because of the wide range of concentrations of *Mycobacterium leprae* in existing lepromins the authors studied methods of producing a standardizable lepromin containing 160 million bacilli/ml. The effects of using different dilutions of lepromin on the incidence of false-positive reactions were also studied.

Progress reported includes a convenient method for preparing large batches of non-sedimenting lepromin, which is directly suitable for microscopic counting of *M. leprae* cells; and a validation of current methods for microscopic enumeration of *M. leprae*. Skin tests with diluted lepromins have demonstrated that dilutions up to 1:16 increase

progressively the ability to distinguish between lepromatous and tuberculoid leprosy. This work has provided further evidence that 20 million bacilli/ml (a 1:8 dilution of the initial lepromin) should produce adequate Mitsuda reactions in general populations, provided that 3-mm reactions are taken as the criterion for 1 + positivity. The net effect of these findings is equivalent to expanding the world supply of lepromin by eight times. Recommendations for further research are proposed.—Authors' Summary

Koseki, Y., Anchi, T. and Okamoto, S. Ogawa's bacillus: slow growing mycobacteria isolated from mice previously infected with murine leprosy bacillus. I. *In vitro* cultivation and animal inoculation. *La Lepro* 41 (1972) 127-136. (In Japanese, English summary)

In 1969, Ogawa and Motomura isolated slow growing acid-fast bacilli from mice previously inoculated with the Hawaiian strain of *Mycobacterium lepraemurium*. The fourth subcultures of the organisms, designated here as strain HI of Ogawa's bacillus, were given through the courtesy of Dr. Ogawa and submitted to the present experiment in which comparative studies with other known strains of slow growing mycobacteria were carried out.

Growth characteristics *in vitro*. When heavily transferred by loop, the organism grew very slowly on Ogawa's 1% egg yolk medium but not on the 1% egg medium, the egg yolk medium deprived of glycerol, or the Morrison and Smith agar media containing mycobactin. The addition of heat-killed *M. phlei* cells to the egg yolk medium did not enhance the growth of the organisms. Small inocula from the filtered bacterial suspension, 0.01 mg to 0.3 mg (moist weight), yielded isolated colonies on the egg yolk medium; growth became barely visible to the naked eye after approximately 40 weeks of incubation at 37° C.

Animal test. Male mice of dd-Y strain, weighing 20 to 22 g, were inoculated intravenously with an amount of 0.2 mg or 0.02 mg of the fourth subculture and autopsied five to ten months later. As shown in Table 3, the organisms gave rise to a progressive murine leprosy-like disease with severe lesions involving liver, spleen and skin; the lungs were less severely affected. Most of

the smears from these tissues revealed vast numbers of acid-fast bacilli. For isolation, weighed tissue was ground in a mortar and treated with five to ten volumes of 1% hydroxide; 0.1 ml amounts (20 to 10 mg of tissue) of the resulting suspension were pipetted into Ogawa's egg yolk and egg slants. Of a total of 59 specimens inoculated, 35 gave positive cultures on the egg yolk medium, 19 negative and 5 contaminated. No positive cultures were obtained with the egg medium. All of the cultures recovered were identified with the organisms employed for injection.

It seems reasonable to conclude that strain HI is very characteristic *in vitro* and in experimental animals, and definitely distinguishable from other known culturable mycobacteria. Some similarities between Ogawa's bacillus and murine leprosy bacillus have been briefly discussed.—(Adapted from English summary)

Koseki, Y., Okamoto, S. and Anchi, T. Ogawa's bacillus: slow growing mycobacteria isolated from mice previously infected with murine leprosy bacillus. II. Drug susceptibilities and some differential characteristics *in vitro*. *La Lepro* 41 (1972) 137-148. (In Japanese, English summary)

Previously Ogawa and Hiraki reported that, according to their method, they had isolated slow growing acid-fast bacilli also from mice previously infected with the Keishicho (the Metropolitan Police Department in England) strain of *Mycobacterium lepraemurium*. The second subcultures of the organisms were given by Dr. Ogawa, which were designated in our laboratory as strain MPD of Ogawa's bacillus. Thus, the present paper is concerned with drug susceptibility and biochemical reactions of the two strains of HI and MPD. In an effort at differentiation, comparative studies with other known strains were carried out.

Drug susceptibilities. Despite the fact that some difficulties were encountered in performing drug susceptibility tests of Ogawa's bacilli, the following features were revealed. Both strains were highly susceptible to INH, ETA, RFP, and DDS; moderately susceptible to CS; but resistant to PAS, EB, and Tbl. On the other hand, there was some difference in susceptibilities to the remaining drugs between the two strains; strain MPD

was moderately or slightly susceptible to all of the five drugs, while strain HI was slightly susceptible only to DHSM, KM and PZ but resistant to VM and CPM. Among the most distinctive characteristic of Ogawa's bacilli was high susceptibility to both INH and DDS.

It seems likely that the *in vitro* growth inhibitory effects of these drugs on strain HI are comparable to the suppressive effects of the drugs on murine leprosy due to the Hawaiian strain.

Qualitative differential test. Ogawa's bacilli gave a positive catalase test at room temperature, but negative tests for heat-stable catalase, niacin, nitrate reductase, arylsulfatase, and Tween 80 hydrolysis.

The morphologic and cultural characteristics of strain MPD were also quite similar to those of strain HI. The final conclusion can be expressed as follows: It is very possible that Ogawa's bacillus is *Mycobacterium lepraemurium*.—(Adapted from English summary)

Koshy, A. and Karat, A.B.A. A study of acid-fast bacilli in the urine, gastric juice and feces of patients with lepromatous leprosy. *Leprosy in India* **43** (1971) 3-7.

Of 16 patients with lepromatous leprosy, whose urine, gastric juice and feces were examined, 9 (56%) showed acid-fast organisms in the gastric juice, and 3 also in the feces. In no urine samples were acid-fast organisms found.

Most of the patients who showed bacilli in the gastric juice were untreated or had treatment for less than six months. A direct relation between the presence of bacilli in the gastric juice and the height of the Bacterial Index was noted. It is suggested that the acid-fast organisms in gastric juice are most likely derived from the nasopharynx.—Authors' Summary

Murohashi, T. and Yoshida, K. An attempt to culture *Mycobacterium leprae* in cell-free, semisynthetic, soft agar media. *Bull. WHO* **47** (1972) 195-210.

This paper describes an attempt to culture *M. leprae* from leprosy nodules, using cell-free, semisynthetic, soft agar media, and the effects of varying the incubation temperature and the composition of the basic me-

dium, as well as of pretreating the bacterial suspensions with alkali. The identification test carried out in leprosy patients by intradermal injection of bacillary suspensions prepared from the primary cultures and third subcultures suggested that the bacterial masses that had formed in the suspensions were composed of *M. leprae*.—Authors' Abstract

Nakamura, Masahiro. Elongation of *Mycobacterium lepraemurium in vitro* by α -ketoglutaric acid. I. Extraordinary elongation of the bacilli and an elongation curve. *La Lepro* **41** (1972) 182-187. (In Japanese, English summary)

This report describes the condition for the occurrence of significantly remarkable and nonexceptional elongation of *M. lepraemurium in vitro*. The *M. lepraemurium* used was the Hawaiian strain. The culture medium, which was referred to as NK medium, was the Kirchner medium enriched with 0.25% glucose, 0.25% pyruvate, and 7.5% sucrose, to which was added bovine serum and α -ketoglutaric acid at the final concentration of 10% or 20% and 0.1% respectively.

When the bacilli were cultivated for 10, 20 and 30 days at 30° C, the bacilli gradually elongated to 4.5 μ m, 6.5 μ m, and 8.9 μ m, respectively, from the initial length of 2.3 μ m, in the case of the NK medium containing 20% bovine serum. It was decided that the optimal concentration of α -ketoglutaric acid for addition to EK medium was 0.1% at the final concentration. Furthermore, it was determined that this remarkable elongation phenomenon of the bacilli in NK medium was not due to acidity of the medium which resulted from the addition of α -ketoglutaric acid, but to the specific effect of α -ketoglutaric acid.—(Adapted from English summary)

Ogawa, T. and Hiraki, M. Studies on murine leprosy bacillus. V. Growth in relation to concentrations of monopotassium phosphate, sodium glutamate and glycerol in the 1% egg yolk medium, and in relation to pH of the medium. *La Lepro* **41** (1972) 113-117. (In Japanese, English summary)

The 1% egg yolk medium is prepared as follows: the salt solution consists of KH_2PO_4 , 1.0 g; sodium glutamate, 1.0 g; distilled wa-

ter, 100 ml. Added 6 ml glycerol, 6 ml of a 2% malachite green solution and 200 ml egg yolk to the salt solution, mixed well, and distributed in sterile test tubes (170 mm long, 18 mm in diameter) in 5 ml amounts. The medium is then coagulated in a slanting position at 90° C for 60 minutes. Reaction of the medium is about pH 6.1.

Despite the fact that only the egg yolk medium supports gross visible growth of the acid-fast organisms, supposedly murine leprosy bacilli, the ability of the medium proved unsatisfactory. As previously described, all of the ingredients in the medium appeared to be necessary for growth of the organism. This paper aimed for improvement of the medium.

The following modified egg yolk media were prepared by varying the concentration of the salts and the glycerol or by varying the pH of the medium. The test media in Experiments I and II had the same composition as the original (standard) one except that the amount of monopotassium phosphate in the salt solution was varied to give concentrations ranging from 0.3% to 3%. As a result, these slants possessed different pH values from that of the standard. In Experiment III, similarly, the test media had the same formula as the standard one except the concentration of sodium glutamate in the salt solution was altered from 1% to 0.5% or 2%. The glycerol was decreased or increased to give final concentrations ranging from 0.5% to 16% in the case of the test media in Experiments IV and V.

In Experiments VI-IX, the pH of the medium was adjusted to 6.4 to 7.0 either by adding dibasic sodium phosphate to the salt solution or by adding an aqueous sodium hydroxide solution to the medium before inspissation.

A total of 169 subcultures of the supposed Hawaiian strain was used for these growth experiments. Small portions of the growth were transferred by a loop lightly to the middle of the surface of media and then the tubes were incubated at 37° C for three months. Observations were repeated weekly or biweekly to compare the size of the gross visible growth on the standard and modified egg yolk media with that of the negative control growth on Ogawa's egg medium inoculated in parallel.

Evaluation of the modified media was made according to whether the frequency

of the positive growth on them was higher or not than that of the positive growth on the standard egg yolk medium. The results showed, however, that none of the modified egg yolk media tested were superior to the original one.—(Adapted from English summary)

Ogawa, T. and Hiraki, M. Studies on murine leprosy bacillus. VI. Attempt to cultivate *in vitro* one other strain of *Mycobacterium lepraemurium*: primary isolation of slow growing mycobacteria from mice previously inoculated with the Keishicho strain. *La Lepro* 41 (1972) 118-123. (In Japanese, English summary)

By almost the same method as that employed for the primary isolation of acid-fast organisms, supposedly murine leprosy bacillus, from mice which were infected with the Hawaiian strain, a similar attempt was made to isolate mycobacteria from tissue specimens of mice with the Keishicho strain.

Male mice, ddN strain, were inoculated intravenously or subcutaneously with 0.1 ml each of a bacterial suspension prepared from a subcutaneous leproma (Keishicho strain). At various intervals, 3 to 11 months after inoculation, they were sacrificed to obtain various infected specimens including lungs, liver, spleen, kidneys, lymph nodes and local lesion.

Each of the materials was removed aseptically, ground in a mortar, treated with an equal or a half amount of 1% sodium hydroxide solution, and then inoculated by loop on both of Ogawa's 1% egg yolk and 1% egg media. The tubes were incubated at 37° C for over three months.

Of a total of 63 specimens inoculated, 25 (40%) gave positive cultures of slow growing acid-fast bacilli. All culture-positive specimens were derived from the mice sacrificed at six months or later, at which time gross lesions could be distinguished easily. The positive cultures were obtained more frequently in the mice intravenously inoculated than in those subcutaneously inoculated. The specimens with a great number of stainable acid-fast bacilli tend to give more positive results in primary cultures. In view of the fact that these results are quite similar to those of the previous report dealing with the Hawaiian strain, the method employed seemed to have a high degree of reproducibility.

bility. The colony of the organisms grown on the 1% egg yolk medium is rough, slightly moist, and buff in color. The cells are acid-fast bacilli. Growth occurs only on egg yolk media such as the 1% egg yolk medium, with no growth on Ogawa's 1% egg medium. The growth on subcultivation however could be recognized only when the organisms were inoculated by loop as a small but visible colonial fragment, and not when inoculated in the form of a bacterial suspension. Niacin formation was negative and catalase activity was weakly positive. Thus, the characteristics of the organisms appeared to be the same as those of the acid-fast organisms isolated from the mice with the Hawaiian strain.

At present, the eighth generations are growing and a reproduction test of the disease in mice is now in progress.—(Adapted from English summary)

- ✓ **Ogawa, T. and Hiraki, M.** Studies on murine leprosy bacilli. VII. Temperature range and temperature optimum for growth of the supposed murine leprosy bacilli. *La Lepro* 41 (1972) 176-181. (In Japanese, English summary)

As previously reported, two strains of the supposed murine leprosy bacilli have been isolated and maintained on 1% egg yolk medium incubated at 37° C. However, it is not clear whether or not this temperature is optimal for their growth. The present paper is concerned with the temperature for growth of the organisms.

The growth used for inoculation was 37 subcultures of the organisms which had been isolated from mice previously inoculated with the Hawaiian strain of *M. lepraemurium* and 29 subcultures of the organisms isolated from mice with the Keishicho strain of *M. lepraemurium*. Each colonial growth on the egg yolk slant, two to three months old and about 2 mm to 4 mm in diameter, was divided by loop into five or seven pieces which were then transferred to one egg slant and four or six egg yolk slants separately; three of them (one egg and two egg yolk slants) were incubated at 37° C and the rest were incubated in pairs at a lower or higher temperature. Incubators were used at centigrade 22°, 30°, 37°, 40° and 45°. Observations were repeated weekly or biweekly and the final reading for positive growth was made after three months of incubation by comparing the size of the gross visible growth on the egg yolk slant with that of negative control growth on the egg slant at 37° C.

The results indicate that the temperature for growth of the supposed murine leprosy bacilli ranges from 30° C to 37° C, their temperature optimum being 37° C. In control experiments the temperature range of *M. tuberculosis* and *M. bovis* (BCG) was found to be from 30° C to 40° C, and that of certain saprophytic growers from 22° C to 45° C.

These findings suggest that the two strains of the supposed murine leprosy bacilli are quite distinct from the mycobacteria used as the controls.—(Adapted from English summary)

Experimental Infection

- ✓ **Narayanan, E., Shankara Manja, K., Bedi, B.M.S., Kirchheimer, W.F. and Balasubrahmanyam, M.** Arthropod feeding experiments in lepromatous leprosy. *Leprosy Rev.* 43 (1972) 188-193.

Laboratory-reared *Culex fatigans* and *Cimex hemipterus* were fed on untreated lepromatous leprosy patients. The presence of acid-fast bacteria in a high proportion of these insects after feeding showed that they

can take up the bacilli from the patients' blood. The dependence of infestation of fed insects on the degree of bacteremia in patients and the detection in *Cimex* of bacteria-laden leucocytes suggest that the insects took up the bacilli along with the blood rather than from the skin. Results of mouse foot pad harvests showed multiplication of *M. leprae*, and therefore one must conclude that the leprosy bacilli in the insects were viable.—G. L. Fite

Narayanan, E., Shankara Manja, K., Kirchheimer, W. F. and Balasubrahmanyam, M. Occurrence of *Mycobacterium leprae* in arthropods. *Leprosy Rev.* 43 (1972) 194-198.

Mosquitoes, bed bugs, head lice and scabies mites were collected from the dwellings of persons suffering from lepromatous leprosy (patient collections) and from those where no known case of leprosy existed (random collections). Suspensions made from pools of these arthropods were used for making smears for acid-fast staining, culture on Lowenstein-Jensen medium and for mouse foot pad inoculation. In the patient collections acid-fast bacteria were detected microscopically in 4.1% of *Anopheles*, 3.6% of *Culex*, 22.2% of *Anopheles* and *Culex* (mixed), 4.8% of *Cimex*, 7.4% of *Pediculus* and in a single pool of *Sarcoptes*. In the random collections acid-fast bacteria were found in 7.7% of *Anopheles*, 6.8% of *Culex*, 9.2% of *Cimex*, in none of *Pediculus*, and in two out of three *Sarcoptes* pools. Foot pad multiplication was obtained from two *Culex* pools, one collected at random and the other from patients. The findings strongly support the conclusion that the acid-fast bacteria obtained from the two pools of *Culex* were indeed *M. leprae*.—G. L. Fite

Sushida, Kiyo. The relationship between inoculation with human leprosy bacilli in mice and body temperature. *La Lepro* 41 (1972) 167-171. (In Japanese, English summary)

Thyroid tissue was destroyed in mice previously injected with sodium iodine (^{131}I). This destruction caused the body tempera-

ture to fall and also lessened the resistance of reticulo-endothelial system. However, uniform results for all the mice were not found. Therefore, the amount of decrease in body temperature and the amount of destruction of thyroid tissue in sodium iodine-injected mice varied among the animals and were not uniform. ^{131}I -doses between 100 μc to 300 μc administered to each mouse caused the same level of destruction of thyroid tissue. It was then assumed that we might be able to foretell the lessening of native resistance in these mice injected with ^{131}I , by measuring the body temperature. The body temperature was taken in the anus of the mouse by means of a thermistor probe for mice. These treated mice had also been injected with primary human leprosy material (LL26, 27, 28, 29 and 30 strains) in the testes. Acid-fast bacilli were proved to be present in imprint smears made from the testes. The results of experimental transmission of the leprosy bacilli in the mouse and its effect on body temperature, and the results in the control animals (those having no ^{131}I) were compared.

The relationship was examined by the X^2 test by means of which results of the inoculation with leprosy bacilli and fall of body temperature in mice were compared.

Sixty-seven percent of the positive ^{131}I -mice (showing acid-fast bacilli in the testes, + G) also showed lower temperatures. Seventy-seven percent of the negative (–) mice showed higher temperature, and in about 90% of the higher temperature mice, acid-fast bacilli were not found. Acid-fast bacilli (+G), however, were not present in any large amount in mice having a lower body temperature.—(Adapted from English summary)

Epidemiology and Prevention

Bechelli, L. M., Barrai, I., Garbajosa, P. G., Uemura, K., Gyi, Mg Mg and Tamondong, C. Correlation between leprosy rates in villages different distances apart. *Bull. WHO* 48 (1973) 257-260.

In order to study the role of genetic factors in susceptibility to leprosy infection, the prevalence of leprosy in 118 pairs of Burmese villages different distances apart was investigated. The distribution pattern of the correlation coefficients for leprosy rates was

compared with that known to occur for genetic markers under similar conditions. The correlation coefficients decreased rapidly as the distance between the pairs of villages increased and then showed periodicity with distance, becoming negative at almost regular intervals of 4 km: negative values were preponderant for villages more than 25 km apart. Thus, with this set of correlations it was not possible to fit a monotonically decreasing function of the type that would fit similar data for a genetic marker.

Thus, although the distribution of cases does not correspond to a genetic marker, this is still a possible factor, although exposure to lepromatous cases or the migration thereof is indicated—G.L. Fite

Bello, P. A lepra em Minas Gerais. Considerações em torno do registro de casos no período de 1948 a 1970. [Leprosy in the State of Minas Gerais, Brazil. Cases registered in the period 1948 to 1970.] *Rev. Ass. Med. Minas Gerais* **22** (1971) 177-182. (In Portuguese, English summary)

The author mentions that registration of cases of leprosy in the State of Minas Gerais, Brazil, began in 1926; these cases were reported from six sanatoria and four dispensaries. Before 1956, 24,616 cases had been notified. In 1957 the national antileprosy campaign was started as a pilot scheme in the State of Rio de Janeiro. In Minas Gerais the scheme now covers about 80% of the state. After 1956, in view of much greater attention given to the disease, the numbers notified rose considerably; from 1957-1970 over 1,000 cases per annum were notified in eight different years but since 1966, when 1,016 cases were notified, there has been a steady fall to 838 in 1970. Of these 838 cases, 411 were lepromatous, 269 indeterminate, and 158 tuberculoid. [There is a mistake in Table 1 in the column headings for numbers and percentages.] The author thinks that the incidence is really declining. In addition, there has been a considerable change in the type of case, as, taking the two periods 1948-1956 and 1957-1970, the incidence of the lepromatous forms has fallen and that of the indeterminate has increased considerably, while the number of tuberculoid forms has remained more or less stationary. In the period 1957-1970, of 12,851 cases notified there were 6,567 lepromatous, 3,554 indeterminate, and 2,715 tuberculoid and 15 other [? unclassified] forms. [The total in the second part of Table 2 should read 8,238.] In this latter period the arrangements made for the active search for cases have produced twice as many as by the usual static procedures, particularly of the indeterminate forms.—W.K. Dunscombe (*Adapted from Trop. Dis. Bull.*)

Ruscher, H., Faye, I., Bloc, G. and Diouf, S. Utilisation du BCG itératif chez des lé-

promateux (résultats après un an). [The use of repeated BCG vaccination in lepromatous leprosy (results after one year).] *Bull. Soc. Med. Afrique Noire Lang. Franc.* **17** (1972) 27-35. (In French, English summary)

Because BCG vaccine has a stimulating action on the reticuloendothelial system, the authors gave fortnightly intradermal injections of a lyophilized BCG vaccine to seven patients suffering from lepromatous leprosy. Five of them received standard antileprosy treatment as well. The injections were followed in four cases by a papular rash and generalized prurigo. Tuberculin and lepromin tests became variably positive.

[In view of the small numbers involved, and the chemotherapy given concurrently, it is not possible to draw any definite conclusions from this trial.]-S.G. Browne (*From Trop. Dis. Bull.*)

Saugrain, J. and Stanghellini, A. Aspects de la lèpre en Polynésie française. [Aspects of leprosy in French Polynesia.] *Med. Trop.* **32** (1972) 735-741.

Leprosy was probably imported into French Polynesia by immigrant workers from China in the second half of the 19th century, although tuberculoid leprosy may have been present among the indigenous population.*

In Tahiti itself, out of a total of 168 patients (of whom 40% had lepromatous leprosy), 72 were segregated in 1914. In 1958, the prevalence increased to 277, and to 329 in 1971—in a population numbering just under 100,000. Of these, 317 are Polynesian and only 11 of Chinese extraction; at least 127 are considered to be suffering from the lepromatous form, as are about half of all cases diagnosed since 1965. Severe peripheral neuropathies are common and about one-third of all patients have some form of eye complication. No fewer than 11 patients have tuberculosis as well as leprosy. Relapses and severe reactional episodes are frequently encountered. The patients are said to tolerate sulfones and sulfonamides badly.—S.G. Browne (*From Trop. Dis. Bull.*) (*A remarkable statement which is at variance with general concepts of the immunology of leprosy.—O.K.S.)

✓ **Schuppli, R.** Zur Frage der Infektiosität der Lepra in Europa. [On the contagiousity of leprosy in Europe.] *Dermatologica* **145** (1972) 102-105.

The observations of the course of leprosy infections in Europe have shown that individual factors are responsible for the susceptibility to the disease and for its clinical form. Infections with the leprosy bacillus may occur in Europe, but rarely lead to clinical manifestations.—English Abstract

✓ **Wardekar, R.V.** Some aspects of epidemiology of leprosy. *Indian J. Med. Res.* **60** (1972) 1733-1743.

Wardekar airs, in a most interesting review, the nature of the "contact" essential to the transmission of leprosy. "In the context of our inadequate knowledge about the period that is necessary for transmission to occur, it seems safer to use the word repeated instead of prolonged." In endemic countries, leprosy is commonly acquired at an earlier age, which could mean greater childhood susceptibility or greater exposure or both. The importance of opportunities for exposure in children may be much more significant than susceptibility.

Wardekar offers recapitulation of his, Dharmendra's, Doull's, and others' figures and views, and his summary is especially useful in relation to the emergent concepts of the roles of depressed cellular immunity in leprosy, which seem to complement his view that "... in an endemic country, the whole population is exposed ..." and that "... those who are susceptible are likely to develop leprosy regardless of the age ..." of exposure.

To this "excerpter" this lecture provides a good classical picture of the left bank of the epidemiology of leprosy. It is correct. The newer "rive droite" with its grasp of cellular immunology as an elementary factor in epidemiology of leprosy is also correct, and the twain shall meet.—G.L. Fite

✓ **Worth, Robert M.** The risk of transmission from lepromatous leprosy cases under therapy. *Bull. WHO* **46** (1972) 853-854.

Bechelli and Guinto (*Trop. Dis. Bull.* **68** [1971] abstr. 1014) in discussing the implications of experimental infections with *M. leprae* in the mouse foot pad, said that "final proof" of the relationship between the Morphological Index and contagiousness could come only from a controlled study of children exposed to infection. In the present communication, the author analyzes and discusses his previous papers on his studies in Hong Kong in relation to the observations by Bechelli and Guinto. He concludes that "the Hong Kong study and follow-up come very close to meeting the criteria proposed by Bechelli and Guinto for final proof. It is very desirable, however, that these observations should be repeated in another population to obtain confirmation." Mention is also made of the important study by Shepard *et al* (*Trop. Dis. Bull.* **66** [1969] abstr. 2158) on biopsy specimens from patients with leprosy, in which it was shown that *M. leprae* lost their ability to multiply shortly after the start of therapy, the Morphological Index falling at about the same time. The closely reasoned argument should be read in the original.—F.I.C. Apted (*Adapted from Trop. Dis. Bull.*)

Rehabilitation

✓ **Davey, T.F.** Psychological rehabilitation in leprosy. *Leprosy in India* **44** (1972) 66.

Disabling illness is always liable to be accompanied by psychological maladjustment, the intensity of which varies with the extent of disability and social attitudes to the underlying cause of it. In leprosy, emotional upset may overshadow in severity the actual physical disease, and materially influence both its course and the effectiveness of public health measures.

Leprosy is highly evocative of anxiety on two grounds. Environmental factors condition the patient to the fear of rejection by family and community, a fear that is both potent and deep-rooted. The subjective experience of leprosy is itself of such a nature as progressively to erode the personality. From both sources there is set in motion in the minds of many patients a progressive chain of depersonalization, which passes from anxiety through depression to withdrawal, and manifests itself by a loss of con-

fidence, diminished capacity to cooperate, loss of self-respect, and ultimately to apathy and maybe antisocial behavior. Rehabilitation becomes increasingly difficult as this chain of events advances, and once rejection has become a fact of experience its difficulties increase tenfold.

Few patients need the services of specialist psychiatrists, but a very large proportion need the help which comes from understanding and practical sympathy, such as can and must be given by the leprosy worker as a normal expression of his vocation. Health education and early treatment are important. The personal relationship between patient and leprosy worker is crucial to the building up of mental health. The patient needs to be protected from unnecessary publicity, his family relationships need to be preserved, the whole range of physical and economic rehabilitation are powerful agents in restoring self-confidence, once the foundations of this have been laid. Where psychological upset has been severe, these measures may not suffice, and there is then an important role for the modern leprosy institution in rebuilding the personality of such patients through suitable activity and psychotherapy. —(From abstract of paper)

Frist, Thomas F. A developing country, leprosy control and the severely disabled. *Leprosy Rev.* 44 (1973) 90-93.

Patients who are severely disabled by reason of past leprosy are frequently neglected by government planners and communities when emphasis is increasingly laid on medical care and preventive measures. Even in the presence of economic stringency, efforts should be made to help these patients. —Author's Summary

Jennings, W.H. Some further aids for the handicapped leprosy patient. *Leprosy Rev.* 43 (1972) 199-204.

On the basis of his practical experience in the field the author describes four ingenious and, in respect of three of them, inexpensive appliances which have been devised primarily for the use of handicapped leprosy patients—but which could be equally useful to persons disabled from other causes—to enable them to carry on a useful and gainful occupation. —G. L. Fite

Rotberg, A. The name "leprosy" was the principal cause of the failure in health education. *Hanseniasis: Abs. News* 3 (1972) 135-139.

Health education about "leprosy" was a failure according to the Seminar on Methods of Administration in Programs of Leprosy Control (Guadalajara, Mexico, 1968) of the Pan American Health Organization. A group of that seminar was of the opinion that the word "leprosy" was responsible for the failure and recommended studies for its possible substitution; this recommendation was reinforced by two Brazilian Congresses of Hygiene.

It is not possible indeed to educate and integrate employing the term "leprosy" an anti-educative and anti-integrating "label of primary force," criticized by physicians, sociologists and educators (Lendrum, Faget, Lichtwardt, Burgess, Feldman; Rabello, Gramberg, Quiroga, Mangiaterra and others) and rejected collectively by the patients of Carville [U.S.] and Pernambuco [Brazil].

The solution of the Conference of Manila (1931) and Congresses of Havana (1948) and Madrid (1953), through substituting "leprosy patient" for "leper," was ineffective.

No time and resources should be wasted trying to educate with the stigmatizing pejorative "leprosy" because no technic will ever make acceptable that degrading millenary "tragic name." In S. Paulo, Brazil, a new terminology (hanseniasis, hansenology; hansenologist, hansenic, hansenoma, hansenid; Virchow's cell, Virchowian Hanseniasis (V), Tuberculoid (T), Indeterminate (I), Dimorphous (D), Hanseniasis, Mitsuda's antigen, hanseniasis patient, hospital) is gradually substituting "leprosy" and derivatives. This new terminology was built with the help of 123 hansenologists of the whole world (63.1% of 195 who responded) and members of the Health Council of the State of S. Paulo, Brazil. —Author's Abstract

Selvapandian, A.J., Richard, J. and Wilson, T.F. Comparison of attitude to leprosy between rural and urban areas. *Leprosy in India* 44 (1972) 69.

The authors report on two sample surveys on attitudes to leprosy; one of these was from Madras City and other from villages

near Vellore. The survey was carried out with the aid of a suitable questionnaire, and about 50 persons engaged in different occupations were interviewed by a psychologist for each of the two surveys. The results of these surveys are interesting. All the urban and the majority of the rural respondents had heard about leprosy even before they saw the first leprosy patient. The first reaction to the patient was one of sympathy in the majority of the urban respondents, and in more than half of the rural respondents. Likewise, the majority of the respondents, both urban and rural, knew that leprosy was a contagious disease. Only a small percentage of the urban and none of the rural respondents knew anything about the details of the disease. The majority of the respondents in both groups mentioned that they

would not have any matrimonial relationship with families where there was a leprosy sufferer. Further the majority of the respondents also were aware that the disease caused deformities. Varying percentages of other opinions were elicited in relation to the infectivity of the disease and the emotional state of the patient suffering from the disease. It was surprising that the large majority of the respondents expressed fear and anxiety if they discovered that they were also having leprosy. Hospitalization was preferred to domiciliary treatment. The chances of complete cure even with good treatment were variously commented upon, and several of the respondents felt that it will be better for leprosy patients to be isolated in colonies.—(From abstract of paper)

Other Mycobacterial Diseases and Related Entities

✓ **Kunigoshi, Uichi.** On the bird's eye view of the mass chest survey for pulmonary tuberculosis at the leprosarium of Kryurakusen-en, Gumma Prefecture, Japan in the year of 1971. *La Lepro* **41** (1972) 172-175. (In Japanese, English summary)

A mass chest survey for pulmonary tuberculosis was performed on all the patients at this leprosarium in 1971, the following results were obtained.

1. The number of patients having tuberculous x-ray findings, including calcification of the hilar nodes and/or lung fields, was 64.38%.

2. Stable and noncavitary tuberculosis (V-type, VI-type) was 62.51% and there were more males than females.

3. The number of patients with unstable lesions or cavitary tuberculosis (III-type, II-type) was 1.87%; the males higher than the females in percentage.

4. Therapy should, of course, be applied concentratedly to the unstable or cavitary tuberculosis.

5. Compared with the number of tuberculous patients about ten years ago, the tuberculous patients at present have markedly decreased; therefore, the mass chest survey for pulmonary tuberculosis in this leprosarium is now on the high road of controlling pulmonary tuberculosis with success.—(Adapted from English summary)

Lee, Sun Kyung. Histochemical studies on macrophages of dermal tuberculous lesions in guinea pigs. *Pusan J. Med.* **12** (1972) 1-9.

The author has observed the relationship between lysosomal activity and subsequently developing cellular immunity of macrophages in dermal tuberculous lesions of guinea pigs. The tuberculous lesions were produced by intradermal inoculation of tubercle bacilli in the normal guinea pigs and in those sensitized previously by typhoid or BCG vaccines. The dermal lesions were biopsied periodically, and were studied for histology, histochemistry and fate of acid-fast bacilli.

The findings thus obtained were compared and discussed among each experimental group. The conclusions drawn therefrom were as follows.

1. Macrophages developed first into immature epithelioid cells and then mature ones under the stimulus of tubercle bacilli. This development was accompanied by lymphocytic infiltrations in the tuberculous lesions.

2. The development of epithelioid cells from macrophages was accompanied by a marked increase in acid phosphatase and cytochrome oxidase, and a decrease in the number of macrophage containing acid-fast bacilli.

3. BCG vaccine accelerated the development of epithelioid cells and lysosomal activity of macrophages, while typhoid vaccine had no such effect.

4. It was suggested that lysosomal enzymes are highly activated by cellular immunity and that they destroy tubercle bacilli and induce degenerative change of the host cells.—(Adapted from Korean Medical Abstracts)

- ✕ **Wu, Yung-Tung.** Atypical mycobacteria in Taiwan. *J. Formosan Med. Assoc.* **71** (1972) 747-765.

From cultures of 43,511 specimens taken from patients of the Taiwan Provincial Tuberculosis Control Bureau and National Taiwan University Hospital during the period from September 1970 to August 1971, 4,761 strains of mycobacteria were isolated. Of these, 4,709 strains (98.91%) were identified as *M. tuberculosis*, and 52 strains (1.09%) as atypical mycobacteria, by means of the niacin test.

By using the Runyon method of classification, 44 strains (84.6%) out of 52 were identified as Runyon Group II (scotochromogen), 7 strains (13.5%) as Runyon Group III (non-

photochromogen), and 1 strain (1.9%) as Runyon Group IV (rapid grower). None of the Runyon Group I (photochromogen) were observed.

This incidence among the tuberculosis patients differed little from those reported in literature.

Based on the nitrate reduction, Tween 80 hydrolysis, tellurite reduction and other biochemical tests, an attempt to identify the species was made on the 52 atypical mycobacteria isolated. Three strains of the 44 Runyon Group II mycobacteria were found to be *M. scrofulaceum* and the remaining 41 strains *M. gordonae*. Four strains of the seven Runyon Group III mycobacteria were *M. intracellulare*, and the remaining, *M. terrae*. One strain of Runyon Group IV was *M. flavescens*.

It was concluded that from the bacteriological point of view, the majority of atypical mycobacteria isolated in this study belonged to Runyon Group II, most of which were clinically not significant *M. gordonae*. Only seven strains of Runyon Group III were isolated, however, over half of them were found to be clinically significant *M. intracellulare*.—(Adapted from author's summary)