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Editorial

LEPROSY WORK IN CHINA*

To understand leprosy in China today a brief background is needed covering the 30 years since China took its health destiny into its own hands.

China in 1933† was a country ravaged by scourges and epidemics, poverty and pestilence, with people dying on the streets and famine swirling over the land. The future looked dark and hopes that the situation could be changed in a lifetime seemed remote. The life span in 1949 at Liberation was estimated at 32 years, death rate was 28/1,000 and infant mortality 200/1,000 live births. An old Chinese saying suggested that 'A man to live to the age of 70 was a rare sight'.

Since 1933 there has occurred the Anti-Japanese War, the Second World War, and the War of Liberation which brought victory in 1949. Following the formation of New China great progress was made in the general health of the people, and many of the communicable and infectious diseases were eradicated, while others, for example malaria, schistosomiasis, tuberculosis and kala azar, were brought under control. Infant mortality dropped to 30/1,000 in rural areas and to 12/1,000 in urban cities, the average life span rose to 68 years and the death rate came down to 6.2/1,000, a phenomenal accomplishment when compared with other developing countries. When the authors first came to the city of Beijing in 1949, some of the first nine causes of death on the mortality list were diseases of the infectious variety and those connected with infancy, opium poisoning, suicides etc. The tenth on the list was cardiovascular disease and the eleventh was cancer. In a few short years after Liberation the mortality list changed: first was cardiovascular disease and second was cancer. Progress on the one hand brought new problems on the other. How had all this happened?

Briefly, in 1950 the first China National Health Conference laid down a strategy for health work, emphasizing (i) nationwide services for the people, (ii) prevention, (iii) coordination of the indigenous traditional doctors and the modern trained ones, and (iv) the tactic of melding medical campaigns with mass programmes.

Following these guidelines a nationwide anti-leprosy campaign was inaugurated in the mid-fifties, soon after the more devastating acute communicable diseases were controlled. This programme was integrated into the health system

*This article is based on a paper given at the Darwin, Australia Leprosy Conference in July 1981.

†When the senior author, Dr Ma Haide (George Hatem), first came to China.

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of the country. Organized by the Ministry of Health down to the provincial, prefecture, county and communes level, a network of leprosy stations, leprosariums, hospitals and leprosy villages was developed. Areas of higher endemicity were covered first. We now have 1,143 such institutions. The Institute of Dermatology and Venereal Diseases, organized in 1954 under the Chinese Academy of Medical Sciences, was responsible nationwide for technical and scientific leadership in leprosy work. Over the past 30 years a corps of 10,000 leprosy workers have been trained, not counting the short-term trainees among the barefoot doctors, who participated as aides in the many mass-survey campaigns. These trained barefoot doctors now participate in case detection, field treatment (after qualified diagnosis) and prophylactic treatment of family members and contacts, especially among the younger age groups. They perform follow-up duties in the field.

Leprosy has a history of over 2,000 years in China. It was first recorded in the *Nei Jing*, one of the earliest Chinese medical classics of the Warring States (403–221 BC) in which the symptoms and features of leprosy were described under the name of 'Da Feng'. Records of the symptoms and remedies for leprosy were also found in the medical books and literature of succeeding dynasties and in various traditional folk tales. Moreover, prescriptions for leprosy treatment were found inscribed on bamboo slips recently excavated from the Han Dynasty (206 BC–AD 220) tomb of Magistrate Hsi (Xi) (262–217 BC) located in the Yun Ming district of Hubei near Wuhan City on the Yangtze.

Leprosy is endemic in various provinces of China with a much heavier endemicity in the coastal provinces and along the Yangtze Valley. In addition to the Han people, leprosy is also found among the minority nationalities. While working in Hainan Island it was found that leprosy was prevalent among the Li and Miao minorities as well as the Hans. The same was true of the Zhuang people in the Guangxi Autonomous Region which our medical teams have visited over the past 20 years.

After Liberation the total number of leprosy patients was estimated at 500,000. Now the figure has dropped to approximately 200,000, some 300,000 having been treated and 'cured'. In passing, it must be noted that the old estimate of 2,279,000 leprosy patients in China, as reported in *Leprosy in the World* by the WHO in 1966, is way off the mark.

In our leprosy control we followed the four major guiding health principles mentioned above and adhered to well-tried methods of public health education, various mass and spot surveys for case finding, isolation of infectious cases, active treatment of all patients, protection of the contacts and organized follow-up. These measures have proved quite effective. For example, Guangdong, Guangxi, Jiangsu and Shandong are the four provinces with a high endemicity of leprosy among a population of 246 million people. From the mid-1950s until 1980 a total of 223,000 cases were found and treated, and now, in 1980,

there are still 29,277 under treatment. The prevalence rate has dropped from slightly less than 1/1,000 to 1.4/10,000.

China is a developing country with a vast territory and a large population. The geography of the country and the density of the population vary greatly in the different areas, and these characteristics affect the epidemiology of the disease and the efficacy of control. Thus, in the Inner Mongolian Autonomous Region there have been only 34 cases registered in the past 30 years. In the far northern province of Heilungjiang only 868 cases have been found in the past 35 years, mostly among immigrants (96%). In south-west China, whose population consists of a multitude of different ethnic groups, mostly in mountainous terrain, leprosy control work is more difficult than in the coastal provinces. Good progress is now being made in these outlying areas.

The endemic areas have been steadily localized and the number of newly infected children and adolescents has decreased. The results of large-scale BCG vaccinations for cross immunity have proved inconclusive and, as endemicity decreases, mass surveys have proved to be too expensive both economically and in man power. – A recent calculation indicated that approximately 700 Yuan (£185) was spent to find a new lepromatous case by the mass survey method. As an alternative the health authorities are rewarding the barefoot doctor or other medical workers for every new case they discover on their own. The patient is encouraged to report him or herself and is also rewarded.

Treatment of all leprosy cases is paid for by the State. In addition a basic food subsidy is provided for all institutionalized patients. Ambulatory cases are taken care of by the antileprosy network or the basic health organizations in the countryside.

Dapsone (DDS) was
of 50–100 mg for adults. Other drugs such as sulphetrone, TB-1, thiambutosine, rifampicin, and clofazimine were also used, and combination therapy is now replacing DDS monotherapy. Some formulations of Chinese traditional medicines were used in experimental therapy but so far none has been found to be very effective in direct treatment. For the treatment of reactions we have discovered an effective herbal drug called *Lei Gong Teng* (Tripterygium Wilfordii Hook F), which we now use. When this herb extract was used in reversal reaction (Type 1) there was improvement in 32/34 cases (94.1%). The average improvement of erythema was 4–5 days, neuralgia 6.3 days, oedema 3 days, and fever 4 days. The glucosides obtained from the herbal extract are also effective. The drug, still under investigation, is effective also in some dermatoses. We also use thalidomide and the corticosteroids in reaction treatment. At present investigations with acupuncture for nerve pain and herbal treatments combined with modern medicine are continuing in many leprosy hospitals and leprosaria. DADDS is used in therapy and prophylaxis. Most of the leprosy drugs mentioned above are produced domestically, but some in insufficient quantities. Reconstructive surgery of deformities, the prevention

and care of ulcers, orthopaedic surgery (claw hand, drop foot), plastic surgery (replacement of eyebrows, reconstruction of the nose) and the making of prostheses are done in several leprosy hospitals in some provinces, but on a small scale.

Isolation of 'open cases' was stressed during the 1950s and 60s when a large number of institutions were built, with a total of 86,000 beds. This was considered necessary at that time, and played an important part in guaranteeing regular treatment, reducing the sources of infection, in rehabilitation surgery, and in research. However, with the newer therapy being effective in 'closing' the 'open cases' quickly, it is possible to stop isolating the lepromatous cases except in special circumstances or for special needs. Already some leprosy hospitals have been combined with others or phased out. Work of the outpatient departments has been extended to take care of the ambulatory cases. Experience shows that with early discovery and treatment of cases the spread of the disease decreases after about ten years and this should improve with the introduction of the new drugs.

A few words on relapse in leprosy. The relapse rates seem to vary from 2% to 18%, depending on whether or not the sulfone or other treatment was regular and adequate. The whole problem is under investigation, especially with the introduction of the newer drugs such as rifampicin.

After 30 years of struggle against leprosy we have achieved some satisfactory results. Our campaigns of treatment and care have, as stated above, resulted in 300,000 cases 'cured', although this has left a large amount of work in both rehabilitation and the relief of disabilities, the deformities, ulcers and other stigmata so that the patients can be returned to society. The task that faces us in the future is very great. The problem of relapses has to be handled seriously. With the easily discovered cases already found, there remains the hard core problem of finding the remainder, now less than one per hundred thousand population. Early detection methods must be sought and ways to identify the 'risk group' must be studied. Improvements in the treatment of deformities and their prevention, and the search for more effective therapy combining traditional Chinese and modern medicines are further tasks to complete. Much work is needed in research to support epidemiological and control measures, and on immunology and the mechanism of nerve injuries as well as rehabilitation-oriented research. Whilst aiming at the full control and basic eradication of leprosy by the year 2000, we realise there is much work to be done in China.

We have established international exchange and co-operation with various organizations abroad such as the WHO, the International Leprosy Association, and the Leprosy Mission and hope to extend these exchanges in the future.

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Lepr Rev (1982) **53**, 85–90

The *in vitro* and *in vivo* effects of clofazimine on the motility of neutrophils and transformation of lymphocytes from normal individuals

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Summary The effects of clofazimine on neutrophil motility to endotoxin-activated serum and mitogen-induced lymphocyte transformation of leucocytes from normal individuals *in vitro*, and after ingestion of clofazimine by normal adult volunteers have been assessed. Clofazimine caused a progressive dose-dependent inhibition of neutrophil motility and of lymphocyte transformation *in vitro*. Ingestion of the drug by normal volunteers was accompanied by decreased neutrophil motility and lymphocyte transformation to mitogens. These findings suggest that the anti-inflammatory properties of clofazimine are related to inhibition of these cellular immune functions.

Introduction

The antimicrobial therapy of leprosy is more complicated than that of other acute or chronic bacterial infections. This is due to the development of adverse immunological reactions which may accompany chemotherapy. The conditions associated with these reactions are referred to as erythema nodosum leprosum (ENL) and the reversal reaction caused by types III and IV immunological hypersensitivity reactions respectively. These complications probably develop

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due to two related factors: (a) the extremely high antigen load found in patients with the lepromatous form of the disease and (b) the high degree of disease-associated immunosuppression, i.e. specific anergy to lepromin[1] and decreased neutrophil motility.[2] Drug-induced ENL is probably due to the destruction of leprosy bacilli with the formation of localized and circulating immune complexes and the development of tissue damage mediated by the phagocyte-complement system. Likewise, the decreased antigen load which accompanies successful antimicrobial therapy may result in a decrease in the specific unresponsiveness to the leprosy antigens with activation of hitherto suppressed antigen-specific T-lymphocytes. This may cause increased macrophage recruitment with resultant tissue damage due to cell-mediated mechanisms. These complications could develop solely as a consequence of the antimicrobial activity of drugs used in patients with leprosy.

However, a second more direct mechanism of induction of chemotherapy-associated hypersensitivity reactions may occur if the chemotherapeutic agents *per se* possess immunostimulatory activity as has previously been reported for dapsone.[3,4] This agent was found to cause stimulation of neutrophil motility and a possible role for this drug in the pathogenesis of some cases of ENL suggested.[3] There are reports that clofazimine is useful in the treatment of some cases of ENL[5,6] and in controlling some reversal reactions.[6,7] It has been shown in animal studies that clofazimine may possess anti-inflammatory properties[8] although the precise mechanisms of this are unknown.

In this study we have investigated the effects of clofazimine on neutrophil motility and lymphocyte transformation in normal individuals *in vitro* and *in vivo*.

Materials and methods

Clofazimine (B663, lamprene) pure substance for *in vitro* studies and 100 mg capsules for *in vivo* studies was kindly donated by Ciba-Geigy (Pty) Ltd, Johannesburg. For *in vitro* studies the drug was solubilized in dimethylsulphoxide (DMSO) to give a concentration range of 10^{-6} M to 10^{-3} M (equivalent to 0.3 to 300 μg/ml) in Hanks' balanced salt solution (HBSS) for studies of motility, and TC199 for lymphocyte studies. (Both HBSS and TC199 were obtained from the Grand Island Biological Co., Grand Island, NY, USA). Control systems containing the corresponding DMSO dilution only were included for each clofazimine concentration tested, i.e. 0.0015 to 1.5% DMSO for 10^{-6} M to 10^{-3} M clofazimine. For *in vivo* studies 6 normal adult volunteers ingested 2 x 100 mg capsules of clofazimine as a single oral, daily dose for 5 days. Tests of neutrophil motility and lymphocyte transformation were performed prior to the ingestion of clofazimine, at 2 h and at 24 h after ingestion of a single oral dose of 200 mg clofazimine and on the 5th day of ingestion of 200 mg of clofazimine daily (testing was performed 2 h after ingestion of the last dose).

Neutrophil motility. Neutrophils were obtained from heparinized blood (5 units of heparin/ml) from normal adult volunteers and were resuspended to a final concentration of 3×10^6/ml in HEPES (N-2-hydroxyethyl-piperazine-N′-2-ethanesulphonic acid obtained from the Sigma Chemical Co., St. Louis, Mo., USA) buffered HBSS following hypotonic lysis of residual erythrocytes with 0.84% ammonium chloride as previously described.[9] The leucoattractant used was endotoxin-activated serum (EAS). Fresh autologous serum was activated with 100 μg bacterial endotoxin per ml (*Escherichia coli* 0127:B8, Difco Laboratories, Detroit, Mich., USA) and diluted 8-fold with HBSS before use. The assays of motility were performed in modified Boyden chambers[10] using 5 μm-pore size membrane filters (Sartorius-membranfilter, Göttingen, West Germany) and a 2-h incubation period. The results are expressed as the number of cells which have completely crossed the filter, per microscope high-powered field as an average of triplicate filters.

Lymphocyte transformation. Blood for studies of lymphocyte function was defibrinated and fractionated by density gradient centrifugation (Ficoll-sodium metrizoate) at 400 g for 25 min. The mononuclear cells were washed twice in TC199 and resuspended to 4×10^6/ml in TC199 supplemented with 20% autologous serum; 2×10^5 cells were used in the assay system which was done as previously described using phytohaemagglutinin (PHA) and concanavalin A (Con A) as the mitogens at concentrations of 25 and 50 μg/ml.[9]

Results

The results are expressed as the mean value with standard error for 6 separate experiments for *in vitro* studies and 6 different individuals for *in vivo* studies. Statistical analyses were performed by Student's t-test for paired means.

Neutrophil motility. Clofazimine at concentrations greater than 5×10^{-6} M *in vitro* caused a progressive inhibition of neutrophil motility to EAS. These results are shown in Table 1. DMSO at all concentrations used had no significant effect on motility to EAS (results not shown). No effect on neutrophil motility to EAS was observed 2 h after ingestion of clofazimine by the group of normal individuals. However, a consistent slight inhibition of motility was observed 24 h after the ingestion of a single oral 200 mg dose of clofazimine and on the 5th day of clofazimine ingestion. This difference did not achieve statistical significance. These results are shown in Table 2.

Lymphocyte transformation. Incubation of lymphocytes with clofazimine at concentrations greater than 10^{-5} M *in vitro* caused inhibition of lymphocyte responsiveness to both mitogens at both concentrations (Table 1). DMSO, at a concentration of 1.5%, contained in the 10^{-3} M clofazimine system, caused inhibition of transformation. Lower concentrations had no detectable effects on the assay system. Ingestion of clofazimine was accompanied by a

Table 1. The effects of clofazimine on neutrophil motility to EAS and lymphocyte transformation to PHA and Con A *in vitro*

Clofazimine concentration	Neutrophil motility to EAS	Lymphocyte transformation to PHA (25 μg/ml)	Con A (50 μg/ml)
Control	143 ± 26†	57,841 ± 9,775‡	8,830 ± 4,767‡
10^{-3} M	35 ± 10**	N.S.§	N.S.§
10^{-4} M	70 ± 13**	30,536 ± 7,063*	1,764 ± 696*
10^{-5} M	121 ± 23*	59,278 ± 11,817	7,497 ± 3,583

†Results as mean neutrophils/microscope high-powered field with standard error for 6 experiments.

‡Results as mean radioactive counts per minute with standard error for 3 experiments.

§Results not shown due to the inhibitory effects of DMSO on the reaction system.

*$P < 0.05$.

**$P < 0.01$.

Table 2. The effects of ingestion of clofazimine by 6 normal adult volunteers on neutrophil motility to EAS and lymphocyte transformation to PHA and Con A

Time of testing	Neutrophil motility to EAS	Lymphocyte transformation to PHA (25 μg/ml)	Con A (25 μg/ml)
1 Before ingestion of clofazimine	192 ± 29†	59,339 ± 5,233‡	6,968 ± 1,119
2 2 h after the ingestion of a single oral dose of 200 mg clofazimine	177 ± 41	28,021 ± 3,305*	3,237 ± 446**
3 24 h after ingestion of a single oral dose of 200 mg clofazimine	135 ± 35	55,508 ± 3,245	4,502 ± 560
4 On the 5th day of ingestion of 200 mg of clofazimine daily	165 ± 34	45,985 ± 3,603*	4,127 ± 474*

†Results as mean neutrophils per microscope high-powered field with standard error for 6 individuals.

‡Results as mean radioactive counts per minute with standard error for 6 individuals.

*$P < 0.05$.

**$P < 0.01$.

decreased lymphocyte response to both mitogens in each individual tested. The inhibitory effects on transformation were detected 2 h after the ingestion of a single 200 mg oral dose of clofazimine and on the 5th day of ingestion of clofazimine. The lymphocyte transformation to PHA returned to normal values 24 h after the ingestion of a single oral dose of 200 mg clofazimine. These results are shown in Table 2.

Discussion

In this study we have found that clofazimine causes inhibition of neutrophil motility to EAS and of lymphocyte proliferation to mitogens *in vitro* and *in vivo*. Although the observed changes in neutrophil motility *in vitro* following exposure to clofazimine *in vivo* were not significant, they were consistently found and we believe that this is a true effect of clofazimine. These findings support to some extent previous reports that clofazimine may be of value in the treatment of ENL[5,6] and reversal reactions.[6,7] However, this does not exclude the possibility that in some cases clofazimine may precipitate these reactions by virtue of its ability to cause antigen release through antimicrobial mechanisms. Nevertheless, as a result of its immuno-inhibitory activity clofazimine therapy should be accompanied by considerably fewer adverse immunological reactions than dapsone, which possesses immunostimulatory activity. Clofazimine should therefore be considered to be a useful agent in the antimicrobial therapy of those patients undergoing serious immunological reactions or those who may be prone to developing such reactions since it will not counteract the therapeutic activity of prescribed anti-inflammatory or immunosuppressive agents. Indeed it could be expected to enhance their activity.

In describing the immunological effects of clofazimine we prefer to use the term immuno-inhibitory rather than anti-inflammatory. The use of the term anti-inflammatory is often taken as being synonymous with immunosuppressive. However, we feel that this implication is not necessarily correct. Indeed dapsone, which is used in a variety of dermatological conditions as an 'anti-inflammatory' agent,[11] has been found to possess non-specific immunostimulatory activity.[4] It is therefore possible that in some cases anti-inflammatory agents may possess immunostimulatory activity. This concept seems difficult to reconcile. Nevertheless, it is possible that dapsone by virtue of its ability to protect leucocyte membranes from auto-oxidation which causes marked inhibition of locomotion[4] may permit leucocytes, especially neutrophils, to enter inflammatory zones, phagocytose immune complexes and leave these zones. However, if they enter the zones and undergo strong auto-oxidation during function they may become immobilized and further contribute to tissue damage and chronic inflammation by release of proteolytic enzymes and toxic oxygen radicals.[12] This theory could rationalize the anti-inflammatory activity of dapsone in some conditions and its possible pro-inflammatory activity in ENL in which it may enhance the phagocyte response to chronic antigen release.

Clofazimine, as shown in this study, has the opposite effect to dapsone, i.e. it causes inhibition of neutrophil motility and lymphocyte transformation. These findings may explain the mechanism by which clofazimine is of value in the treatment of some ENL and reversal immunity reactions.

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Leprosy control in Surabaya

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Summary The number of registered leprosy cases in Surabaya, which has 2.5 million inhabitants, in December 1978 was 3,118, but it has been estimated that the total leprosy patients is probably around 5,000. The prevalence of leprosy in this city is at least 1.25 per 1,000 inhabitants. The Department of Dermato-Venereology of the Dr Sutomo Hospital in Surabaya, which is a general as well as a teaching clinic, is involved in many leprosy control activities. The latter covers among other aspects: epidemiological studies; passive and active case detection; free medical care for more than 75% of the registered leprosy cases in Surabaya; rehabilitation; health education to the patients and their relatives, to other medical staff members and the community; teaching activities; research work; and cooperation with the Netherlands Leprosy Relief Association to combat leprosy in and around Surabaya.

Introduction

Leprosy is a Sub-Department of the Department of Dermato-Venereology, which is one of many within the Dr Sutomo Hospital – a general and teaching hospital. Many patients attending the department are seeking advice and medication for a wide variety of skin diseases. Initially, leprosy patients were accepted for ambulatory treatment only at the leprosy outpatient clinic, which were held twice a week. Most of the patients were referred by public health doctors and private practitioners, operating within the vicinity of Surabaya, either to confirm or to rule out leprosy. In other instances, patients came from afar, often on their own initiative, and the number of patients attending the leprosy outpatient clinic gradually reached such proportion, as to warrant the commencement of a 5-day-week service since 1964. Today, if considered necessary, leprosy patients are treated also as inpatients in the dermatological

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wards. Considering that the Dr Sutomo Hospital is a general and teaching hospital we would like to emphasize the following points concerning leprosy control.

Epidemiology

Surabaya is next to the capital of Jakarta, the largest city in Indonesia, with approximately 2.5 million inhabitants. It is divided into 16 'ke camatan' or tertiary administration districts, of which each has a 'puskesmas' or public health centre. Medical care for leprosy patients in this town is provided mainly at the Dr Sutomo Hospital, Dr Ramelan Navy Hospital and 16 public health centres. A small proportion are treated by private practitioners, who are not under any obligation to report such cases.

Based on a survey in December 1978 and carried out at the previous mentioned clinics, we have found 3,118 registered leprosy patients, of whom more than 75% were treated at the Dr Sutomo Hospital. Taking into account leprosy cases who are treated by private practitioners, the many dropouts and the cases still to be detected, it was estimated that the total leprosy patients in Surabaya is probably around 5,000.

Table 1 shows the distribution of the 3,118 registered leprosy patients by forms, sex and age groups. From these data we have found that in Surabaya the prevalence of leprosy was at least 1.25 per 1,000 inhabitants; the lepromatous proportion was 34%; the male and female ratio was 1.7:1, and the proportion of children under 14 years was 16%. The respective numbers for the whole country were between 1 and 4.9 for the prevalence of leprosy; 33.1% for the lepromatous (LL, BL and BB) proportion; 2.3:1 for male and female ratio, and 13.4% for the proportion of children under 14 years of age.[1]

Table 2 illustrates the distribution of new patients attending the Department of Dermato-Venereology during an 8-year period, between 1971 and 1978. There were 96,055 new patients, of whom 4,678 or approximately 5% were new leprosy cases. There were thus an average of 584 new leprosy patients annually, or 2 new cases a day. As a whole, it can be concluded that leprosy is endemic throughout Surabaya.

Control activities

CASE DETECTION

The control activities in the past were confined to passive case findings of patients having different skin diseases or patches on their skin coming voluntarily for consultation at the Department of Dermato-Venereology. Nowadays,

Table 1. Distribution of leprosy patients by forms, sex and age groups in Surabaya (1978)

Age	Male			Female			Total			Total		Total	%
	T*	L†	I‡	T	L	I	T	L	I	Male	Female		
0–4	5	3	7	6	2	7	11	5	14	15	15	30	0.96
5–9	44	23	13	29	16	12	73	39	25	80	57	137	4.39
10–14	137	70	28	56	29	21	193	99	49	235	106	341	10.92
15–19	156	84	8	86	44	10	242	128	18	248	140	388	12.44
20–24	119	61	3	60	43	3	179	104	6	183	106	289	9.27
25–29	126	66	3	66	43	2	192	109	5	195	111	306	9.81
30–34	132	77	–	64	49	1	196	126	1	209	114	323	10.36
35–39	137	66	3	99	51	1	236	117	4	206	151	357	11.45
40–44	122	69	2	84	52	3	206	121	5	193	139	332	10.65
45–49	105	54	1	50	26	–	155	80	1	160	76	236	1.57
50–54	61	52	1	45	15	–	106	67	1	114	60	174	5.58
55–59	45	24	–	21	6	–	66	30	–	69	27	96	3.08
+ 60	41	30	–	26	12	–	67	42	–	71	38	109	3.50
Total	1230	679	69	692	388	60	1922	1067	129	1978	1140	3118	100.00

*T = Tuberculoid, includes TT and BT.
†L = Lepromatous, includes LL, BL and BB.
‡I = Indeterminate.

Table 2. Distribution of new patients attending the Department of Dermato-Venereology during 8 years

Year	No. of new skin + VD patients	No. of new leprosy patients	Total no. of all new patients
1971	9.388	540	9.928
1972	11.319	693	12.012
1973	11.107	704	11.811
1974	11.460	538	11.998
1975	9.641	566	10.207
1976	10.799	554	11.353
1977	11.157	545	11.702
1978	16.509	535	17.044
Total	91.380	4.675	96.055

in close cooperation with the municipal health authorities, active case detection has also been carried out. This includes school and random surveys. Leprosy patients attending are told of the nature and the danger of transmitting the disease. They are encouraged to bring their contacts to the hospital for further examination. Public health workers from public health centres are often involved in visiting patient's homes for contact tracing, if for any reason their relatives refused to come to the hospital. Formerly, school surveys have been carried out together with the school health service, but in recent years only the latter has been done. Random surveys are accomplished in cooperation with the municipal health authorities in selected areas where high prevalence of the disease is suspected.

INTEGRAL TREATMENT

In Indonesia, where the social stigma against leprosy is still high, the community often takes a reluctant attitude against integral treatment. But for a long time this department has made efforts to treat leprosy patients according to this principle. All new patients attending the department are examined and suspected leprosy cases are referred to the Sub-Department of Leprosy, which is situated in the next room and bears no sign or name of the disease. Leprosy patients are charted, and all clinical and bacteriological particulars are recorded on their cards. All this is performed during the outpatient attendance, and interpreted as rapidly as possible in order to minimize repeated visits. They are then issued with the first supply of medicine for a certain period. Leprosy patients, if they come from afar, are given a letter for the doctor of their nearest public health centre, and advice is given as to the type of leprosy, dosage and length of therapy. Multi-bacillary types, in particular of reactional cases, are treated as inpatients in the same wards with patients of

other skin diseases and they are also cared for by the same nursing personnel. As adequate information has been given in advance about the true nature and transmission of leprosy, to date no observations have been noted of adverse reactions by paramedical personnel.

CHEMOTHERAPY

Recently, the need has been stressed to introduce combined chemotherapy in all lepromatous leprosy in an effort to prevent the resistance and persistance of *Mycobacterium leprae.* But anti-leprosy drugs, with the exception of dapsone, are very expensive and are not supplied by the hospital, so that for the time being we are forced to dispense the monochemotherapy to all leprosy cases attending the department. The routine medication for all types of leprosy in this department is 100 mg dapsone daily for an adult, while children receive 2 mg dapsone per kg of body weight. In cases of severe anaemia, treatment with dapsone is postponed until the anaemia has been corrected to a haemoglobin level of at least 10 g/ml. In the meantime alternative drugs, such as rifampicin, clofazimine, streptomycin or isoniazid are prescribed.

MANAGEMENT OF REACTION

The management of leprosy reaction has an individual variation, which is definitely different from patient to patient, depending on the severity of the reaction, except that the original dapsone treatment will be fully maintained. Light reaction cases are treated ambulatory with mild anti-reaction drugs as chloroquine, non-steroidal anti-inflammatory preparations, clofazimine and, if necessary, also corticosteroids. Severe reaction cases, in particular the multibacillary ENL cases, will be hospitalized temporarily in the dermatological ward and clofazimine and cortcosteroids given.

REHABILITATION

Our aim is to restore the ability of the patient to his former level. The responsibility does not end with curing the disease, but it continues until the patient has been prepared for a normal social life. The best form of rehabilitation is prevention of potential disability, especially in the reactional cases. With the invention of anti-leprosy and anti-reaction drugs, the armamentarium against this ailment is becoming more perfect, but the complications which occur are still a problem, in spite of modern orthopaedic and plastic surgery. It is therefore necessary to treat them at the earliest stage, i.e. before the appearance of physical defects. But in a retrospective study of 2,947 new leprosy cases attending the department during an 8-year period, 852 cases or 29% showed one or more complications at their first medical visit.[2] From these findings it

can be concluded that many leprosy patients in Surabaya were looking for medical help when the disease was at an advanced stage and complications had occurred. Rehabilitation in the department is limited to the prevention of deformities, physiotherapy, occupational training and health education, while rehabilitation in terms of curing disabilities needs the involvement of other departments.

HEALTH EDUCATION

In a developing country like Indonesia, where the social stigma against leprosy is still high, health education takes an important place in the control of the disease. It is given, personally, by doctors and nursing supervisors to the patients and their families, to health staff members of other departments through lectures and meetings and to the community via mass media like television, radio and newspapers. Although not yet satisfactory much has been achieved by this in changing the peoples' attitude, prejudice against the leprosy stigma and acceptance of leprosy patients in the community.

REGULARITY OF TREATMENT

Treatment and follow-up of leprosy patients is still difficult. This is understandable because of the long treatment schedule, ignorance of the patient and the acceptance by society of the leprosy stigma. We are also plagued by absenteeism and defaulting despite there being an absolutely free medical service and drug supply. It has been estimated that over 50% of the cases were either being treated irregularly or had dropped out after 2 years of treatment. In an effort to overcome this situation, workers of the public health centres are needed to trace the absentees and give them health education concerning the danger and harm of irregularity of medication.

Manpower development

As mentioned in the beginning, this department also serves as a teaching clinic for students of the Medical Faculty of the Airlangga University, as well as postgraduate training for specialists in skin and venereal diseases.

UNDERGRADUATE TEACHING

The curriculum for medical study is 7 years. From the 45 lecture hours received by the students during their fourth and fifth years in dermatovenereology, 4 h are devoted to leprosy. Out of the 6 weeks' clerkship in the department they have to stay 1 week at the Sub-Department of Leprosy

assisting the doctor in charge. Additionally, under supervision of a staff member, they go for a full-day field trip to the leprosarium Sumbergelagah, which is located in the mountains 50 km from Surabaya. These are done with the purpose of providing medical students with the knowledge of modern leprosy theories and treatment, to learn how to recognize and identify readily and to have more concern for rehabilitation and health education.

POSTGRADUATE TEACHING

The curriculum for postgraduate training of specialists in dermato-venereology takes 3 years. Aware that the prevalence of leprosy in our country is still high, 6 months are allotted for leprosy, during which period the candidates have to work full-time in the Sub-Department of Leprosy, examining and treating out- and inpatients, where beside the routine work they are obliged to prepare and present 1 scientific report on leprosy.

Research activities

In the past, with our limited laboratory facilities, research activities were restricted to mere simple epidemiological, therapeutical and immunological investigations. At the moment, with the aid of the Netherlands Leprosy Relief Association (NLRA), much more can be done.

Netherlands Leprosy Relief Association

In Indonesia several voluntary organizations have been assisting us in many fields of the leprosy control programme. Taking into consideration the relatively high prevalence of leprosy in and around Surabaya, and that without additional support it is unlikely that a full control of leprosy will be achieved in the near future, contact has been established between the Department of Dermato-Venereology of the Dr Sutomo Hospital and the NLRA in Netherland, for a combined effort in leprosy control activities. The joint operation began in June 1978 for a period of 3 years, and covers among others: the training of medical and paramedical staff; the supply of anti-leprosy drugs; the donation of a minibus for transport facilities and additional funds to support the department in treating the destitute and poor patients so that they may continue to receive optimum treatment.

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Leprosy surveys in urban slums–possibilities for epidemiological investigations*

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Summary Rapid industrialization and a population explosion in urban areas like Bombay have promoted the growth of a large number of slums where some 40% of the city's population is living in an overcrowded, unhygienic environment. This has led to many acute and chronic public health problems, one of the gravest of which is leprosy. Intensive surveys of 8 slums, in which 31,950 subjects were screened for leprosy, revealed a range of prevalence between 5.9 and 22.8/1,000 with an average rate of 11.9/1,000, thus indicating slums as hyperendemic foci. The average smear-positive case prevalence rate was 1.1/1,000 and this shows a high quantum of infection in the slum communities. Contrary to general belief, these urban slums are stable in nature, housing a population coming from different parts of India. Various epidemiological investigations relating to leprosy under urban conditions therefore seem to be possible if our experience is indicative.

Introduction

Rapid industrialization and a constant influx of population into urban areas like Bombay, Calcutta and Madras have created environmental problems related to overcrowding, housing, water shortage, sewerage etc., leading in turn to a variety of public health problems in the form of diseases such as typhoid, infectious hepatitis, malaria, tuberculosis and leprosy. Since these problems could not be tackled on preventive grounds they are now acute and chronic. Leprosy has emerged as one of the major health problems in Bombay, where, in

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a population of 8 million people, it has been estimated that about 40% live in the slums of the city.

Earlier school surveys[1] clearly pointed out the existence of endemic foci for leprosy in different parts of Bombay, especially in the northern suburbs, and it was thought that the source of infection in the community could be mostly in the slums. One subsequent study[2] indicated the possibilities of subjecting slum dwellers to scientific screening for evidence of leprosy even under conditions prevailing in overpopulated cities such as Bombay. One such investigation[3] showed the existence of a hyperendemic slum focus with a prevalence rate of smear-positive cases of 3/1,000. Based on these studies, the urgent need to survey these slum pockets in order to contain the infection was stressed, but further studies are necessary to collect epidemiologically significant data to plan effective public health measures against this disease. However, it is generally believed, wrongly, that the urban slum population is unstable and therefore unsuitable for epidemiological investigations. In this study we have attempted to collect data on slum dwellers, on place of origin, period of residence in slums etc., and relate these to prevalence rates of leprosy.

Materials and methods

Intensive house-to-house surveys were conducted for leprosy in 8 slums located in H and T wards of the Municipal Corporation of Greater Bombay. The surveys were done by trained and well-experienced paramedical workers. In 3 slums (Mount Mary, Khar-East, and Anandnagar) a special effort was made to collect data on place of origin, period of residence, etc. The data from these 8 slums were analysed for the present study.

Results

Table 1–5 show the information gained from the surveys, and the following points emerge:

Table 1: (i) Intensive examination of the population with a coverage of 81% was quite possible. (ii) In none of the slums was the prevalence rate less than 1/1,000, at which level public health measures against leprosy should be implemented.[4] (iii) The overall prevalence rate of 11.9/1,000 is a clear indication of hyperendemicity. (iv) The prevalence rate of smear-positive cases ranged between 0.5 and 3/1,000 (mean 1.1/1,000) thus showing different levels of intensity of infection in these slum communities.

Table 1. Prevalence rate (PR) of leprosy in different slums

Slum	Enumerated population	Examined population	Total cases	PR/ 1,000	Smear +ve cases	PR of +ve cases
Danpada group Ambedkar Road	4,292	3,614	34	9.4	2	0.55
KM Colony	4,586	3,712	34	9.2	5	1.3
Madlapada group	3,925	3,248	74	22.8	10	3.0
Kherwadi	10,720	8,597	117	13.6	7	0.8
Khar-East	3,216	2,583	18	6.9	2	0.8
Mount Mary	4,703	3,803	36	9.5	5	1.3
Khotwadi	5,526	4,415	26	5.9	4	0.9
Anandnagar	2,377	1,978	43	21.7	1	0.5
Totals	39,345	31,950	382	11.95	36	1.1

Table 2. Duration of residence of slum dwellers

Residence (years)	Population enumerated	%	
0–5	2,559	25	
6–10	2,210	22	75%
Over 11	5,427	53	
Totals	10,196	100	

Table 2: An analysis of the enumerated population of 10,196 living in 3 slums whose information on this aspect was available (Mount Mary, Khar-East and Anandnagar) showed that 75% of the inhabitants had been living in these slums for over 6 years, which can be considered as a criterion for stability of the population.

Table 3: (i) Analysis of 382 leprosy patients showed that 272 (71%) had been living in the slums for over 11 years and 346 (90%) for over 6 years. (ii) We were struck by the fact that 32 (89%) smear-positive cases had lived in the slums for more than 11 years and 35 (97%) over 6 years.

Table 4: (i) People from practically all the states of India were living in these slums. (ii) 34% of the 10,196 enumerated population came from the Ratnagiri district of Maharashtra state and 28% from the remaining parts of the same state; 15% were from Uttar Pradesh. The remaining population came from other states. (iii) The overall prevalence of leprosy among those coming from various districts of Maharashtra was 16.2/1,000 (10.5/1,000 for those exclusively from Ratnagiri). The Uttar Pradesh group showed a prevalence rate of 7.4/1,000.

More detailed analysis pertaining to 382 leprosy patients regarding their

Table 3. Duration of residence of leprosy cases

Residence (years)	Total cases	%		Smear +ve cases	%	
0–5	36	10		1	3	
6–10	74	19	90	3	8	97
Over 11	272	71		32	89	
Totals	382	100		36	100	

Table 4. Place of origin and prevalence rate (PR) of leprosy

Place of origin of population	Enumerated population	Examined population	Cases	PR/1,000
Ratnagiri district	3,509 (34%)	2,199	23	10.5
Other districts of Maharashtra	2,880 (28%)	2,478	53	21.3
Maharashtra State as a whole	6,389 (63%)	4,677	76	16.2
Uttar Pradesh	1,490 (15%)	1,084	8	7.4
Other states	2,317 (22%)	2,016	13	6.4

Table 5. Multiple case families

Families with leprosy cases	– 321	
Multiple case families	– 44	(13.7%)
Families with associated Smear-positive case	– 16	(5%)

place of origin also showed that 94 (25%) were from Ratnagiri district 46 (12%) from Bombay proper. From Maharashtra as a whole there were 228 patients accounting for 60%.

Table 5: (i) 13.7% of the families were associated with more than one case. (ii) 5% had a smear-positive case in the family.

Discussion

For the first time, figures on a large scale on the prevalence of leprosy in some of the slums in Bombay are available. All these figures clearly point out that these slums are hyperendemic for leprosy with a high quantum of infection in the slum community, for which not only the slum dwellers but also non-slum

dwellers of all strata are constantly exposed. This stresses a need for an immediate implementation of public health measures to contain the infection.

This study also shows that the slums could be surveyed, with a minimum coverage of 80%, with proper planning and employing trained paramedical teams.

The reason for variable prevalence rates in different slums could not be explained. One possible factor could be the varying genetic stock, since about 95% of the slum dwellers came from different states, where prevalence rates of leprosy are also variable. The prevalence rate among those from Ratnagiri was almost 10 times the estimated prevalence rate of 1.67/1,000 in the district proper.[5] A possible explanation could be that, due to low endemicity, the Ratnagiri population has no chance of developing natural immunity, and once they become exposed to a hyperendemic situation in Bombay they may be more likely to contract the disease. However, statistically planned immuno-epidemiological studies on a larger scale in both Ratnagiri and Bombay may provide an explanation.

Contrary to the general belief, the urban slum population is stable, with minimal migration, so that long-term epidemiological studies can be undertaken easily.

The fact that 90% of the leprosy cases had been living in the slums for more than 6 years shows that some of them must have contracted the disease after their arrival. The period of residence of 97% of the smear positive cases for more than 6 years indicates their contribution towards the pool of infection in the community, and transmission of the disease.

The prevalence rates of deformities which were calculated for Mount Mary and Khar-East, 2.4 and 1.1/1,000 respectively, also helps to illustrate the overall gravity of the deformity problem in the slums, thus helping to plan a better service.

Many of the other factors related to the leprosy problem in slums are the subject of another study, which will be presented at a later date.

Acknowledgement

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Information sources for leprosy, with particular reference to developing countries*

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Summary A brief description is given of the library and information sources available to developing countries, with particular reference to Latin America, South-east Asia and Africa. The role of WHO in the on-going provision of literature services is reviewed. Four appendices deal with on-line service suppliers, directories of libraries and information services, a glossary of terms, and references to published work on libraries and information systems.

Introduction

Developing countries are often in the anomalous position of being almost totally dependent on information sources published by countries in Europe and North America, and on outside agencies to provide the kind of information service they themselves would like to offer their patrons.

Development of information services in the Third World, Asia, Africa and Latin America, has not been solely reliant on economic factors. Those countries which have strong ties with developed countries often have good information services despite their apparent lack of wealth, especially in India and Africa, where the links made with Great Britain during colonial times are still maintained by many libraries. The reliance of these countries on aid and support to finance the building, staffing and stocking of libraries has led to an unevenness of service from which national and international agencies such as the National

*This article, with particular reference to developing countries, has been abridged and adapted from one of considerably greater length, which contains further information on the use of libraries in the UK and elsewhere, which may be of interest to those who are not familiar with the services available. Copies may be obtained from the author at the address above. *Editor*

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Library of Medicine (NLM) and the WHO have emerged as life-lines for the continuing expansion of information services.

The last decade has seen a radical rethinking of policies and commitments to information services by the introduction of a global information network (GIN) to provide different user groups everywhere access to the world's store of scientific knowledge. The leader in this field was UNESCO, which set up UNISIST (World Science Information System) in 1971, leading to the establishment of NATIS (National Information Systems) in 1974. The United Nations and other international agencies, particularly ICSU (International Council of Scientific Unions), have been responsible for the founding of numerous international information systems. The *Directory of UN Information Systems and Services* lists some 30 UN agencies responsible for more than 100 information systems of which three-quarters relate to science and technology.

The three areas of library services with which libraries in developing countries are most concerned are the acquisition of stock, document delivery and access to the world's published literature in the form of indexes and abstract journals.

The high cost of books and journal subscriptions, and the physical effort taken to acquire them are two of the reasons why collections in the majority of libraries are small and out of date. Time is the greatest factor where document delivery is slow and costly, and many libraries have to rely on national and international agencies for the supply of literature searches, photocopies and original documents. One such agency is the NLM's international services. The NLM supplies such publications as *Index Medicus* and *Abridged Index Medicus* to nearly 400 libraries in 70 countries in exchange for periodicals and monographs issued by foreign medical institutions that could not be easily obtained by the NLM otherwise. Some 15% of its photocopy requests come from outside the United States, and under the US Agency for International Development (AID) programme it provides MEDLINE searches and subscriptions to *Index Medicus* to libraries mostly in Latin America and South-east Asia.

A joint project with WHO is the publication of the *Quarterly Bibliography of Major Tropical Diseases*, which lists citations from MEDLARS on research and treatment relating to filariasis, leishmaniasis, leprosy, malaria, schistosomiasis and trypanosomiasis.

Latin America

Pan American Health Organization (PAHO). Following a study of biomedical communications in Latin America by PAHO, with the NLM acting as an adviser, a recommendation was made to establish a regional library of medicine in South America. Thus the Bibliotheca Regional de Medicina (BIREME) was founded in 1965, based on the library of the Escola Paulista de Medicina,

Sau Paulo, Brazil. Funding was jointly given by the Ministries of Health and Education in Brazil, the PAHO, the Commonwealth Fund and the Kellogg Foundation, and today BIREME's annual budget is provided by PAHO, WHO and other external sources in Brazil and South America. The NLM continues to act as adviser and still supplies photocopies, serials and books exchange and literature searches. BIREME has recently undertaken to develop specialized audio-visual and computer-based reference services using a subset of the NLM–MEDLARS database. BIREME also provides reference services, specialized bibliographies, interlibrary loans and library staff training not only within Brazil but to other South American countries.

Owing to the lack of Latin American material in *Index Medicus*, 1979 saw the publication of the first issue of *Index Medicus Latino Americano* by BIREME, covering 250 journals out of approximately 800 published in South America. Only 44 Latin American titles are covered by *Index Medicus*.

South-east Asia

The South-east Asia Medical Information Centre (SEAMIC) began in 1973, funded by the International Medical Foundation of Japan to assist South-east Asian countries in health planning, medical care and the exchange of medical and health information and materials. Currently, work is progressing on the establishment of a health literature network based on the developed countries in this region, such as Australia and Japan, to provide document and support services to libraries and health centres in South-east Asia.

Asia and Africa

Many medical libraries in India and Africa have close ties with libraries in Great Britain, especially through such agencies as the British Council. Some of the librarians have been trained at library schools in Britain and British medical librarians lecture at and advise library schools and libraries in these continents. The majority of medical libraries in Africa are part of the various countries' medical schools but are at different stages of development. The commitment to provide adequate library and information services varies from country to country and even amongst libraries within the same country.

The WHO plan for Africa does not envisage the creation of a single regional medical library as in Latin America, or a single regional network as in South-east Asia, but the development of a national network based on three regional health literature centres, one each for the English-, French-, and Portuguese-speaking countries. At the moment it is WHO which provides the literature services necessary for continued medical research in these continents.

World Health Organization

In 1972 WHO began operating a MEDLARS service using a batch retrieval programme, switching to on-line searching in 1974 by using the TYMSHARE network to access the MEDLARS service of the NLM. The service is available to all the WHO member states in Asia, Africa and Oceania. The WHO search service is backed up by a document delivery service, supplying photocopies of relevant journal articles, although there is a considerable time lag between request and receipt of the items. To aid librarians and users, a newsletter on health literature topics is sent to all users of the WHO MEDLINE Centre, and covers such topics as WHO library activities, a glossary explaining technical terms used in information retrieval, guidance on how to complete a search request form, and so on. In addition to MEDLINE, access to a wide range of other databases from SDC and DIALOG is available.

In 1977 the NLM terminated its agreement with WHO to provide on-line access from Geneva. Instead the WHO Regional Offices in developing countries without a regional medical library network undertake the fulfilment of search requests.

The WHO involvement in the *Index Medicus Latino Americano* has already been mentioned. Another project being undertaken is the possibility of publishing three regional editions of *Index Medicus* for Africa, the eastern Mediterranean and South-east Asia, in conjunction with the Rockefeller Foundation.

WHO are also planning to sponsor a Health-Related Information System (HERIS), which will provide essential information, generated by or specifically for developing countries, to health planners and health care administrators who are involved in the development of national programmes and services to achieve the WHO aim of 'Health for All by the Year 2000'.

The Future

Developments and research in the field of new technology will bring about radical changes in the use of computers and computing systems. Work is progressing on full-text retrieval systems, whereby the whole text of a document is stored in a computer and can be retrieved instead of just the bibliographic details. Computers lend themselves easily to the storage and display of data, so that graphics and figures can be easily manipulated by a computer program. Computer storage media such as video discs will enable much more information to be stored on-line, and as costs recede more in-house information retrieval systems will become commonplace. As telecommunication systems become more sophisticated and computer hardware cheaper to produce, retrieval systems of all types should become more widely available in both the home and work environments.

On-line document delivery and on-line book ordering are new concepts that will become more widely available, whereby documents can be ordered on-line at the terminal following the retrieval of the selected references. The database service suppliers are already using document delivery for journal articles by passing on the order to the database supplier, who processes the request and dispatches either a photocopy of the journal article or a copy of the original document.

In a field which is expanding so rapidly and which is full of perplexing technology, it is becoming increasingly difficult for those who seek information from library services to appreciate the potential. Some of the more important terms, sources of information and references are included here in the form of appendices, but the basic principle to follow is to seek the help and advice of trained library staff, who are willing and able to guide an enquirer through the mass of information.

Appendix 1. Online service suppliers address list

Blaise Marketing
2 Sheraton Street
London W1V 4BH, England

Data-Star
199 High Street
Orpington
Kent BR6 0PF, England

Dimdi
Weisshaustrasse 27
Postfach 420580
D-5000 Köln 41
Federal Republic of Germany

Dialog Information Services Inc.
3460 Hillview Avenue
Palo Alto
California, USA 94304

ESA-IRS
Department of Industry
Technology Reports Centre
Orpington
Kent BR5 3RF, England

or

European Space Agency
ESRIN/IRS
Via Galileo Galilei
Frascaitti
Italy

SDC Search Service
2500 Colorado Avenue
Santa Monica
California, USA 90406

BRS Inc.
1462 Erie Boulevard
Schenectady
New York, USA 12305

Appendix 2. Directories of Libraries and Information Services

MEDICAL

Directory of Health Sciences Libraries in the United States 1979. Compiled and edited by A M Rees and S Crawford, Case Western Reserve University, Cleveland Health Sciences Library, Cleveland, Ohio. Chicago, Illinois, Medical Library Association, 1980.

Directory of Major Medical Libraries Worldwide. US Directory Services. Miami, Florida, US Directory Service, 1978.

Directory of Medical Libraries in the British Isles. 4th ed. London, Library Association, 1976. (Fifth edition in preparation.)

GENERAL

American Library Directory. 33rd ed., New York, Bowker, 1980.

Directory of Documentation, Libraries and Archive Services in Africa. Paris, UNESCO, 1977.

Directory of East African Libraries. 2nd revised edition by M E C Kibwuka-Bagenda, T K Lwanga and G A Thomspon. Kampala, Makerere University College Library, 1969.

Directory of Libraries and Documentation Centres in the United Nations System. Geneva, United Nations Library, 1979.

Directory of Libraries and Information Services, by the Sierra Leone Library Association. Freetown, the Association, 1976.

A Directory of Libraries and Information Sources in Hawaii and Pacific Islands. Revised edition by A D C Luster. Hawaii, Hawaii Library Association, 1977.

Directory of Libraries in Botswana. Compiled by L B Mushonga. Gaborone, Botswana, National Institute for Research in Development and African Studies, Documentation Unit, 1977.

Directory of Libraries in Ghana. Compiled by A Nitecki. Legon, Department of Library and Archival Studies, University of Ghana, 1974.

Directory of Libraries in Kenya. Compiled and edited by J R Njuguna. Nairobi, Gazelle Books, 1977.

Directory of Libraries in Singapore. Compiled by L U Wen Lim, YL Wicks and J Neo. Singapore, Library Association of Singapore, 1975.

Directory of Libraries in Tanzania. Dar es Salaam, Tanganyika Library Service, 1972.

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Directory of Research and Special Libraries in India and Sri Lanka. Edited by N Chatterjee. Calcutta, Information Research Academy, 1979.

Directory of Special Libraries and Information Centres. 5th ed. 3 volumes. Edited by M. L. Young. New York, Gale, 1979.

Directory of Special Libraries in Malaysia. Compiled by the Persatuan Perpustakaan Standing Committee on Special Libraries. Kuala Lumpar, Persatuan Perpustakaan Malaysia, 1976.

Directory of Swaziland Libraries. Edited by A W Z Kuzwayo and M Ward. Roma, Lesotho, University of Botswana, Lesotho and Swaziland, Swaziland Campus Library, 1975.

IFLA [International Federation of Library Associations] *Directory*, 1979. New York, K G Saur, 1978.

Major Libraries of the World. Edited by C R Steele. New York, Bowker, 1976.

Appendix 3. Glossary

Abstract: A summary of the content of a publication, usually an article in a periodical, with full bibliographic details of the source journal.

Batch processing: A technique of processing computer data by collecting the items into a group and running it at the most economic time, as opposed to on-line processing.

Bibliography: A list of books or other publications. Many kinds are available, national, international, comprehensive, selective, subject, historical, cumulative, personal, etc. In some bibliographies entries are arranged in a classified order by subject with separate author and title lists. In others, author, title and subject are arranged in one alphabetical sequence.

Database: A collection of data held in a machine-readable form, typically on magnetic discs. A bibliographic database stores bibliographic records.

Database supplier: The organization responsible for the creation of a machine-readable file.

Index: An alphabetical list of the contents of journals and books usually arranged by subject, but may also include author and subject lists. An indexing journal identifies articles on given subjects which have appeared in a wide range of journals. It gives bibliographic details but does not elaborate on the contents.

Information retrieval: The finding of documents, or the information contained in documents, in a library, selectively recalling recorded information.

Intermediary or *search analyst*: The person, either a librarian or information scientist, who carries out on-line searches on behalf of the requester, and who is an expert on searching techniques, database structure, etc.

Keypad: A keyboard containing the characters 0–9 and * used to access a viewdata system.

Modem: Modulator/Demodulator. Converts a digital signal into a signal suitable for telephone transmission and vice versa.

Network: Telecommunication. A telephone network allowing access to computer systems throughout the world via the public telephone system.

Off-line: Mode of operation in which terminals or other equipment can continue to operate whilst disconnected from a central processor. Contrasted with *on-line*.

On-line: Mode of operation in which terminals or other equipment, are controlled by a central processor. Contrasted to *off-line*.

On-line service suppliers or *spinners*: The organization responsible for gathering together various databases, creating a program by which the databases can be searched and offering the service as a package to libraries and information centres.

Packet-switching: A technique for transmitting data packets through a telecommunications network.

Password: A (secret) identification number keyed by the user and checked by the system before permitting access to the database.

Record: A complete set of bibliographical information referring to a particular item in a machine-readable file.

Reference: A bibliographic reference or citation is a set of data describing and identifying a particular publication, such as an article in a journal or a chapter in a book, to enable the original document to be located.

Search strategy: The selection of terms and formulation of a strategy to link the terms, using the operators OR or AND to retrieve references on a given topic.

Terminal: A device used to communicate information to and from a computer system. It can be wired directly to a computer or used through a network at some distance from the system.

Thesaurus: A list of pre-determined and acceptable index terms. It is used to define a subject or aspects of a subject where synonyms may present problems.

Videotex: The CCITT (Comité Consultatif International Télégraphique et Téléphonique) approved name for narrow-band interactive services such as *Viewdata*.

Viewdata: A generic term to describe a service for channelling information from information providers to users via the public telephone system and a television set.

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Lepr Rev (1982) **53**, 115–117

Borderline-tuberculoid leprosy in reaction presenting as photodermatitis: a case report

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Summary A 30-year-old female patient with BT leprosy in reaction presented as a case of photodermatitis. The diagnosis was confirmed by the skin biopsy and demonstration of AFB in the biopsy section.

Introduction

Leprosy in reaction can mimic many other diseases, especially the collagen disorders. But the presentation as photodermatitis is not common and since no previous reference of such a case could be found,[1–4] it was decided to report this case.

Case report

BT card No STO 7276 – a 30-year-old female patient, was referred from Yekatit 12th Hospital to ALERT Hostpital on 14.5.1981 for a photodermatitis and rheumatic pains of 1 year's duration. A presumptive diagnosis of dermatomyositis was made at Yekatit 12th Hospital and she was put on steroids, which gave a temporary improvement. The patient gave no history of drug-taking prior to the onset and she had no skin lesion 1 year previously.

O/E: Patient had a diffuse erythema and swelling of the face, V-area of her neck, exposed parts of forearms, hands and feet. The erythema and oedema were strictly localized to the exposed areas. The area of the forehead covered by her turban was completely free. A probable diagnosis of systemic lupus erythematosus (SLE) was made because of the persistent photodermatitis of 1 year's duration and rheumatic pains. There was no Raynaud's phenomenon,

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no enlargement of the liver and spleen, and no abnormalities were detected in the lungs or heart. There were no skin lesions elsewhere and no enlargement of peripheral nerves. Records from Yekatit 12th Hospital showed that she had a puffy face and oedema of the hands and feet of 1 year's duration. Hb, 11.5 g%; WBC, 6558/cmm; ESR, 44 mm/h; blood urea, 4 mg%; urine, nothing abnormal; urine culture, sterile; fasting blood sugar, 90 mg%; stool, no ova or parasites; LE cells, neg; skin biopsy, granumola; no AFB.

Investigation at ALERT Hospital

Skin smears for AFB from 6 sites: No AFB. WBC, 9750 cmm; Hb, 14.7 gm%; ESR, 25 mm/h; differential leucocyte count, P:78, L:18, M:11, Eo:1; Mantoux test, neg; Skin biopsy, epidermis normal. In the upper and mid-dermis there was loosely constructed epithelioid granuloma with several small giant cells and a good number of lymphocytes. There was one oedematous nerve with onion-peel perineurium containing infiltrate. *Fite* stain showed few intraneural AFB. Conclusion: BT leprosy in reaction.

The patient was prescribed steroids and DDS. She has improved well. Erythema and oedema have become much less. She was discharged on 18.6.1981, with a sliding dose of steroids and DDS 100 mg daily.

Discussion

This case is very unusual. A BT female patient presented as a case of photodermatitis and therefore went to a general hospital. Because of her photodermatitis and rheumatic pains she was investigated on suspicion of a collagen disease. The only clue suggestive of leprosy in this case was the skin biopsy which showed granuloma. Sarcoidosis was excluded because few AFB could be demonstrated in the biopsy. Here the final diagnosis of leprosy was made by the histology section.

This case should heighten our awareness that, especially in endemic areas, leprosy in reaction can have unusual presentations. All necessary investigations including biopsy and special stain for AFB should be done in such cases. We should always be aware of this fact.

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SPECIAL ARTICLE

The evaluation of nerve damage in leprosy

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Introduction

Nerve damage is an almost invariable accompaniment of leprosy. It can increase even under chemotherapy; this is a significant risk for patients who develop reactions. Nerve damage may recover partially or completely with effective treatment.

The assessment of nerve damage is of the first importance in evaluating the results of therapy of neuritis, whether chemotherapy, anti-inflammatory therapy, or nerve surgery. The availability of corticosteroids and other drugs to control neuritis, and the present interest in surgical treatment of neuritis, make it important that any therapeutic procedure is evaluated in the short and long term by the most precise methods that can, in practice, be employed at each treatment centre.

The aim of this paper is to present a protocol with a limited objective, namely to define and describe in detail tests which could be used to evaluate the progress (deterioration or recovery) of damage to the ulnar and median nerves. These tests, performed, recorded, and graded as described, and repeated periodically, will be of value in enabling different centres to report the results of their studies in a standard and comparable format. Though planned with particular reference to nerve damage caused by leprosy, it is possible that they will be of use in assessing the treatment of injuries to the median and ulnar nerves.

The tests are in general simple to perform; most of them could be undertaken by a person without professional qualifications, trained specifically for this task. They should, however, be performed by staff not directly concerned with the treatment of the patient and who are not aware of the results of previous tests. This will help to eliminate bias in favour of an expected or hoped-for result.

The frequency of testing will vary according to whether the patient is in

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hospital or an outpatient, and whether time and staff are freely available. As a minimum they should be undertaken: 1, at the start of the study; 2, 1 day before an 'important event', e.g. surgical treatment or commencement of new drug therapy; 3, 2 weeks post-operation/2 weeks in trial; 4, 4 weeks; 5, 2 months; 6, after 3 months; 7, after 6 months; and 8, 6 monthly thereafter. During the periods between full assessments it would be sound practice for a single sensory test and a single motor function test to be undertaken very frequently; definite improvement or deterioration of either test will indicate the need for full assessment to be repeated.

A scoring system has been suggested, so that progress or deterioration of nerve damage can be expressed quantitatively. This system is arbitrary; it has, however, been designed to give appropriate 'weight' to the results of different tests. In particular, greater weight is attached to the sensory tests as a whole than to the motor function tests, because the latter may improve due to muscle hypertrophy in the absence of improved nerve function. Also, results of tests (such as nerve tenderness) where there is a large subjective element carry less weight than the more objective tests.

Many leprosy centres concerned with the treatment of neuritis have competent staff but severe limitations on time and facilities. It is hoped that this protocol will encourage such centres to undertake planned trials of the treatment of neuritis, using tests that are within their means.

Neuritis is too important a subject to be studied in any but a well-conceived, well-thought-out protocol. This document is not such a protocol; it merely gives tests which are suitable for evaluating the neurological results of treatment. Those planning trials of the treatment (medical or surgical) of neuritis must ensure that the trial design is sound, and that sufficient numbers of patients will be included to obtain statistically valid results.

Protocol for evaluating the treatment of nerve damage affecting the ulnar and median nerves

SUMMARY OF TESTS

The tests employed indicate sensory and motor functions, as well as recording pain, tenderness and the possible presence of constrictions of the ulnar nerve in the region of the elbow. The sensory tests are derived from current understanding of the neurophysiological characteristics of cutaneous receptors in the glabrous skin of the hand: however, awareness that distal cutaneous nerve branches and endings can be damaged in leprosy is essential to the interpretation of the results of tests of the function of larger, more proximal nerves. These tests and their scores are summarized in Tables 1 and 2.

Table 1. Summary of tests in protocol

Test	Method	Importance	
		Mandatory	Optional
Sensory tests:			
1 Slowly adapting Mechano-receptors (free nerve endings and Markels discs)	a Touch threshold (graded stimuli)	M	
	b Static 2 point discrimination		O
2 Rapidly adapting Mechano-receptors			
(i) (Meissner corpuscles)	a Moving 2 point discrimination	M	
	b Direction of movement		O
	c Low frequency (60) tuning fork		O
(ii) Pacinian corpuscles	High frequency (256) tuning fork		O
3 Pain receptors	Pin prick	M	
4 Thermo receptors	No specific technique suggested		O
Muscle power	Voluntary muscle power tests	M	
Nerve conduction	Nerve conduction velocity	M (if available)	
Pain of nerves	Clinical history	M	
Tenderness of nerves	Direct palpation	M	
Constriction points	Stretch test	M	
	Compression test		O

Table 2. Summary of scores

Test	Maximal score per nerve	
	Mandatory	Optional
Touch threshold	12	–
Static two-point discrimination	–	9
Moving two-point discrimination	9	–
Direction of movement	–	9
Tuning fork – Low frequency	–	3
Tuning fork – High frequency	–	3
Pin prick	9	–
Totals for sensory tests	30	24
Voluntary muscle power	10	–
Nerve conduction velocity	20	–
Nerve pain	3	–
Nerve tenderness	3	–
Stretch test	3	–
Compression test	–	3
Totals	69	27

PRINCIPLES OF SENSORY TESTING

1 Do not go on for too long; 20 min is long enough for most patients. If necessary, do tests in two or more sessions.
2 Conduct tests in a quiet and comfortable room with minimal possible extraneous disturbance.
3 All tests are performed with the patient blindfolded (or with a barrier so he cannot see the stimulus) but always demonstrate the test before blindfolding, using a skin area with normal sensitivity. Ensure that the patient understands what is required of him before starting the recorded tests.
4 Always supply, from time to time, stimuli that will be felt (if necessary by stimulating an irrelevant site). Every third or fourth stimulus should be one which the patient can feel.
5 All tests should be carried out with the arm and hand relaxed, supinated and supported to the finger tips on a soft surface. This will prevent positive response due to awareness of movement of the fingers being recorded as, for instance, sensitivity to touch.

HOW TO PERFORM TESTS

Sensory tests

For all tests, 6 areas each about 1 cm diameter should be tested (see Fig. 1)

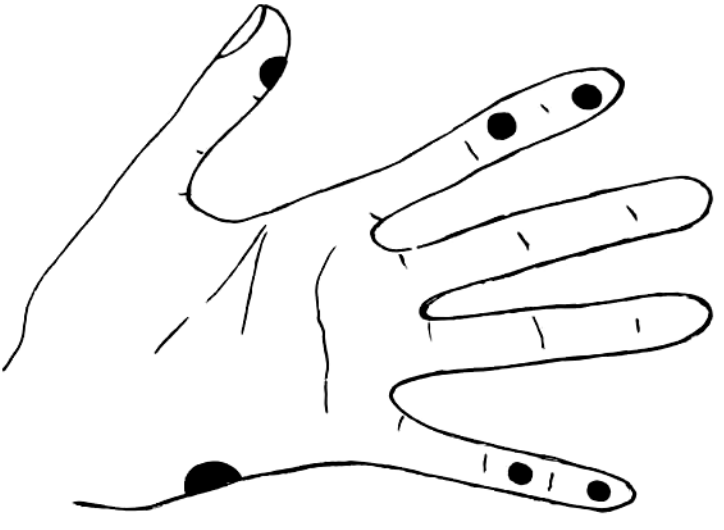

Figure 1. Areas where stimuli for sensory tests are applied.

Ulnar supplied
1 Distal pulp, little finger
2 Proximal phalanx, little finger
3 Ulnar border of hand.

Median supplied
1 Distal pulp, index finger
2 Proximal phalanx, index finger
3 Distal pulp, thumb.

Within these areas, sites where the skin is abnormal (where, for instance, callus or scars are present) should be avoided for testing purposes.

Touch threshold

The stimulator (Fig. 2) consists of a set of 4 nylon threads mounted on wire handles. The threads are of different lengths, calibrated to bend slightly when forces of 0.5 g, 2.0 g, 5.0 g, and 10.0 g, respectively are applied. Details of their fabrication are given in the Appendix.

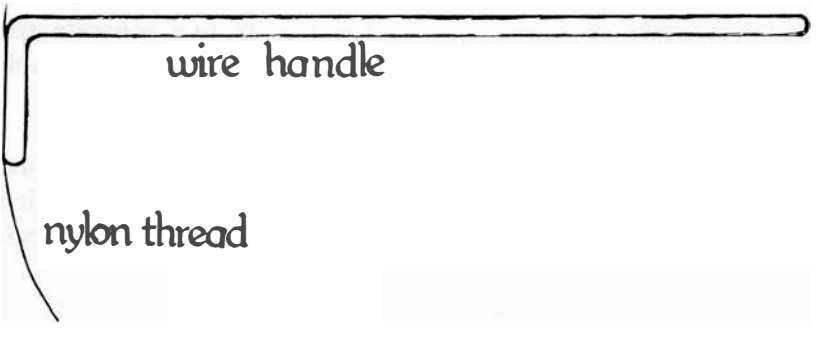

Figure 2. Stimulator for testing light touch threshold.

Method. The thread is touched once lightly on the skin at the test sites, and then withdrawn (as if testing for pin prick). The force should be sufficient to bend the thread slightly. One to three individual stimuli are delivered in each area (sufficient to be confident whether the thread is felt or not felt). It is best for the test sites to be stimulated in random order, each area being touched only once at a time; the examiner should return to a site after testing another site if there was doubt the first time. A single site should not be touched several times in quick succession. The patient, whose eyes are closed or covered, touches the point where he feels the thread; he is not informed of the moment when the stimulus is delivered.

Scoring. The softest touch consistently felt in each area will be recorded, and scored as in Table 3. For each nerve, 3 sites are stimulated. The maximum possible score for each nerve is therefore 12 points.

Table 3. Scoring for touch threshold

Force applied by softest bristle felt (gn)	Score
0.5	4
2	3
5	2
10	1
No bristle felt	0

Static two-point discrimination test

The stimulating object is the two blunt ends of a paperclip, or the legs of a blunt caliper. Stimuli should be applied with the legs 3, 6 and 12 mm apart. The caliper must be applied exactly vertical to the skin, with just sufficient pressure to blanche the underlying skin, and the pressure maintained for exactly 2 s before the caliper is removed. The patient must state whether he feels one touch or two. One to three stimuli are delivered in each area (sufficient to be confident of the result).

Scoring. The shortest distance consistently felt as two separate stimuli is noted, and scored for each site as in Table 4. The maximum possible score for one nerve is 9 points.

Note. There is considerable observer variation in the results of this test – careful training is required. In particular, because skin affected by leprosy is often abnormal, the correct pressure must be learnt using normal subjects.

Table 4. Scoring for static and moving two-point discrimination tests

Distance between legs of caliper (mm)	Score
3	3
6	2
12	1
Not felt or always felt as one touch	0

Moving two-point discrimination test

Use the same stimulating object(s), as for the static test. Apply the caliper lightly to the distal part of the test area and draw it gently 1 cm proximally. Perform the test one to three times in each area (sufficient to be confident of the result). Record the shortest distance between the caliper legs that is consistently felt as two stimuli, and score as in Table 4. The maximum score for one nerve is 9 points.

Table 5. Scoring for direction of movement test

Distance moved (mm)	Score
0–3	3
4–6	2
7–12	1
No movement felt or no stimulus felt	0

Direction of movement test

Draw a blunt metal probe lightly along the area to be tested, either disto-proximally or proximo-distally. Record the distance moved at which the patient appreciates the direction of movement. Perform the test one to three times in each area (sufficient to be confident of the result). Score as in Table 5. The maximum score for one nerve is 9 points.

Tuning-fork tests

Any pattern of tuning fork may be used for these tests: it should be brought into resonance by tapping one arm firmly on the knee (hard surfaces damage the instrument). For each test the vibrating arm is applied very lightly parallel to the skin of the area to be tested. The patient states whether or not he feels a momentary sense of vibration.

Scoring. For each site where vibration is felt, 1 point. Thus, for each tuning fork test, the maximum score for one nerve is 3 points.

Note. This technique differs from the usual method of testing for vibration sensitivity, in which the base of the tuning fork is pressed firmly on the skin and elicits deep sensation. In the test as described above, the vibration of the moving arm of the tuning fork is rapidly damped, however lightly the skin is touched. However, during a brief period (maybe 0.5 s) when vibration continues, a very distinctive superficial 'buzzing' sensation is felt, due to stimulation of the rapidly acting mechano-receptors.

Pin prick test

The pin/needle used for this test must be sterile and not too sharp; a slightly blunted surgical or hypodermic needle is suitable. The point should be lightly touched on the skin using about 5 g force; the test must not cause bleeding. The patient, if he feels the stimulus, states if it is sharp or blunt compared with the sensation when normally sensitive skin is touched in the same way. The result is recorded for each test site as in Table 6. The maximum possible score for one nerve is 9 points.

Table 6. Scoring for pin-prick test

Sensation elicited	Score
Sharp	3
Blunt	0
Nil	0

Thermoreceptors
No specific technique is suggested; hot or cold applicators must be of constant and known temperature and be applied for a standard time.

Voluntary muscle power tests

These are performed by standard methods, on selected muscles:
Ulnar (Superficial branch) – Abductor Digiti Minimi
Ulnar (deep branch) – 1st dorsal interosseous
Median – Abductor Pollicis Brevis
The grading system is the Medical Research Council scale, adapted for small muscles (Table 7).

Scoring
Ulnar – VMT score Abductor Digiti Minimi + VMT score 1st dorsal interosseous.
Median – VMT score Abductor Pollicus Brevis x 2.
Thus the maximum score for one nerve is 10 points.

Table 7. Scoring system for voluntary muscle power tests

Grade	Definition*	Score
5	Normal range of movement, normal power	5
4	Normal range of movement, less than normal power	4
3	Normal range of movement against slight or no resistance	3
2	Reduced range of movement when there is no resistance	2
1	Muscle flicker, no (or minimal) joint movement	1
0	Complete paralysis	0

*If there is restriction of passive movement, 'normal range' is taken to be the range of passive movement.

Nerve conduction velocity

The stimulating points (Table 8) are marked on the skin, and stimuli delivered that are sufficiently strong to elicit a maximal response from the recording electrodes which are sited in abductor digiti minimi (ulnar nerve) and abductor pollicis brevis (median nerve). The length of each nerve segment is measured, and the conduction velocity of the fastest motor fibres for each nerve segment

Table 8. Stimulating points for nerve conduction velocity tests

Stimulating point	Ulnar nerve	Median nerve
1	Wrist 5 cm proximal to the recording electrode	Wrist 6 cm proximal to the recording electrodes
2	4 cm distal to the medial epicondyle of the humerus	2 cm distal to the most distal elbow crease
3	6 cm proximal to the medial epicondyle of the humerus	In the axilla
4	In the axilla	

Table 9. Scoring of nerve conduction velocity tests

Conduction velocity (metres/sec)	Points
75–55	10
54–45	8
44–35	6
34–25	4
24–5	2
4–0	0

and for the whole length of the nerve determined. Correction to standard temperature is theoretically desirable, but in practice it seldom alters the grading of a nerve. The method of scoring is shown in Table 9: scores are allotted for the whole nerve and also to the most affected (slowest conducting) segment of each nerve. The sum of these scores (maximum is 20) is the nerve conduction velocity score for each nerve.

Additional information that could be optionally obtained includes:

1 The area of the action potential (the integral of the curve) which is proportional to the number of working motor units. When an integrator is not available the curve can be copied on paper, cut out and weighed.
2 The time interval between the start and the peak of the evoked action potentials.

Assessment of nerve pain

The presence and severity of pain will be recorded according to the definitions shown in Table 10. The maximum score for each nerve is 3 points.

Assessment of tenderness

Tenderness is present if the patient winces when the nerve is palpated. It will be recorded and graded according to the definitions shown in Table 11. The maximum score for each nerve is 3 points.

Table 10. Grading and scoring system for severity of nerve pain

Grade	Score
Absent	3
Mild (Only aware intermittently and does not limit activity)	2
Moderate (Sleep disturbed, activities diminished, work efficiency diminished)	1
Severe (Incapacitating)	0

Table 11. Grading and scoring system for severity of nerve tenderness. (If tenderness is present at more than one site of a nerve, the most tender site should be scored.)

Grade	Score
Absent	3
Mild (Absent if patients' attention is distracted)	2
Moderate (Present if attention is distracted)	1
Severe (Very tender and patient withdraws the arm forcibly)	0

Table 12. Grading and scoring system for stretch test

Grade	Score
Negative No pain even on full passive elbow flexion	3
Mild No pain on full active elbow flexion; pain only when elbow is passively flexed further	2
Moderate Pain on active flexion of the elbow, but can be flexed up to or even beyond 90°	1
Severe Cannot flex elbow up to 90° because of pain	0

Stretch test and compression tests

If positive these tests may indicate that the ulnar nerve has become shortened and tight during inflammation, or they may indicate the possible presence of sites of entrapment.

Stretch Test

First, fully dorsiflex the wrist with the elbow fully extended, then slowly flex the elbow. Record the angle at which elbow flexion is restricted by pain in the ulnar nerve at the elbow.

Compression Test

With the elbow extended, flex all fingers and dig the fingers into the palm. Then flex and ulnar deviate the wrist. Pain is felt in the ulnar nerve above and/or below the elbow.

Table 13. Grading and scoring system for compression test

Grade	Score
Negative (No pain)	3
Mild Pain present. Wrist and finger position can be maintained	2
Moderate Pain prevents wrist and finger position from being maintained	1
Severe Pain prevents full movement	0

Scoring

The grading and scoring systems for these tests are shown in Tables 12 and 13. For each test the maximum score for a nerve is 3 points.

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Appendix

METHOD OF FABRICATING STIMULATORS FOR TESTING FOR TOUCH THRESHOLD

A bicycle spoke or similar length of thick wire forms a suitable handle. The nylon thread may be attached to it by plastic bands – the insulation of electrical flex has proved satisfactory for this purpose.

The tip of each nylon thread should be rounded by passing it momentarily (about 0.25 s) through the flame of a spirit lamp. This procedure will remove the sharp irregularities from the cut tip, without forming a fused nylon blob.

Calibration of the threads is most readily achieved if they are already slightly bent. They should be pressed on the pan of a suitable balance so that they bend slightly more. The lengths of the threads are adjusted so that they bend when forces of 0.5 g, 2.0 g, 5.0 g and 10.0 g, respectively are applied.

Lepr Rev (1982) **53**, 131–132

Obituary

CASIMIRO B LARA MD
(1896–1981)

Dr Casimiro B. Lara was born on 4 March 1896 in Magsingal, Ilocos Sur, Philippines. While attending elementary school, he received private tutoring in Spanish, Latin and Religion.

He obtained his medical degree from the College of Medicine, University of the Philippines in 1919, after which he joined the Philippine General Hospital as Resident Physician and the Department of Medicine, College of Medicine, University of the Philippines as Assistant in Medicine (1919–1922). He was granted a fellowship at the Mayo Foundation, University of Minnesota, USA, where he spent two years (1924–1926) in experimental work and wrote 6 papers on the pharmacology of Chaulmoogra derivates (unpublished). He was appointed Supervising Physician, Culion Leper Colony in 1922, promoted to Chief Physician in 1924 and became Chief of the Colony in 1947, a position he held up to his retirement from government service in 1962. He was re-appointed consultant Leprologist (without compensation) on 27 December 1962 to continue his research work on leprosy in children up to the last moment of his life.

During all these years, Dr Lara selflessly devoted his life to leprosy work with the zeal of a missionary. His deep and solicitous concern for leprosy patients earned him their profound admiration, respect and love. Even after retirement, he stayed in Culion, continuing his research on the children born of leprosy parents – an original, extensive and intensive painstaking study of the evolution, progress and prophylaxis of leprosy in children. He authored some 50 papers and edited seven editorials or symposia on various medical subjects, the greater portion of them are on leprosy, published in various local and foreign medical journals.

In 1964, Dr Lara was first appointed member of the Leprosy Expert Advisory Panel of the WHO to serve for 5 years and reappointed in the same capacity 3 times, to serve for 2 years each time. In 1966, he carried out a study on DDS Chemoprohylaxis among contacts, still apparently non-leprous, children in Culion. This work was aided by the Sovereign Military Order of Malta under the recommendation of the WHO.

Dr Lara received several awards and citations, among them were: Orden

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de Merito Dr Carlos Finlay, Grado Official from the Cuban Government (1948); Outstanding Physician (1953) from Contribution to Leprology, by the Manila Medical Society; Most Outstanding Physician of Culion (1965) by the Philippine Medical Association; Bronze Thanks Badge Citation (1954) from the National Council, Boy Scouts of the Philippines. In 1968, he received from the President of the Republic of the Philippines, the Presidential Award of Merit (Medal and Plaque) in recognition for his outstanding achievements on leprosy work. In the same year, he was also honoured by the University of the Philippines Medical Alumni Society as Most Distinguished Alumnus and by the UP Alumni Association with a certificate of Distinguished Alumnus.

Dr Casimiro B. Lara died on 25 July, 1981 aged 85 years. He will long be remembered as an outstanding scientist in leprosy, an exemplary devoted physician loved by all patients and respected by his colleagues, a true and exceptional public servant whose footsteps may well serve as a beckoning light to inspire and guide all generations of the Filipino Nation.

FERNANDO A JOSE, JR, MD

Lepr Rev (1982) **53**, 133–139

Domiciliary and Field Work

DOMICILIARY REHABILITATION

(A 5-year follow-up study on self-employment of disabled leprosy patients)

J H Ranjit Kumar, S Sivasankaran & E P Fritschi, Schieffelin Leprosy Research and Training Centre, Karigiri, North Arcot District, Tamil Nadu, S India.

Introduction

This study is a continuation of a project started 5 years ago, a preliminary report of which was published in *Lepr Rev* (1976) **47**, 295–305.

One of the common definitions used for rehabilitation is the one given by the National Council of Rehabilitation 1942 'Restoration of the handicapped to fullest physical, mental, social, vocational and economic usefulness of which they are capable.' The entire project has this definition as its background. In an attempt to classify rehabilitation the following steps may be considered:

1. Job placement { Same job / Similar job }
2. Domiciliary rehabilitation (self-employment)
3. Sheltered work { Without residential facilities / With residential facilities }
4. Pension scheme
5. Care homes.

This paper reports on our inferences in the second category which helps the patient become self-sufficient in his own community.

The method of operation

1. There should be a specific request for help.
2. The request should be reasonable, specific and workable.
3. The proposition is then analysed by the workers in full by home visits, interviews, on-the-spot observations and, if needed, training and counselling.
4. The final decision on the production unit to be given is made jointly by the investigator and the patient concerned.

With the approval of a small committee the unit is then bought, obtained, or made by the combined efforts of the patient and the investigator and handed over to him after

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executing a bond. This bond specifies the person, unit given, cost involved, utilization and right of ownership until the cost is returned in full etc.

The follow-up work starts from the day the unit is given to the patient. For the first month the patient is visited every week, in the second month every fortnight and, unless more visits are indicated, from the third month onwards monthly. The visits are made with the specific intention of:

1. Observing and studying the improvement or change in the patient and his family's social and emotional status.
2. Making the patient realize that he is carefully observed.
3. Helping the patient in case of any avoidable deterioration.

The patient starts returning the capital investment after a pre-fixed period of time. Failure to make regular repayments is considered and dealt with firmly but sympathetically. However, only in the case of gross misuse may the option to withdraw the unit be exercised.

Material and results

The present study involved 60 patients who have been assisted during the period from July 1975 to June 1980. All these patients have been followed up for a minimum of 6 months and a maximum of 5 years.

MARITAL STATUS AND SEX

There were 13 female patients and 47 male patients, of which 32 were married, 21 unmarried, 1 widower, 5 widows and 1 separated.

DEFORMITY STATUS

Of the patients rehabilitated 80% had gross deformities. Some were without obvious deformities but had to be included because if no help had been given they could have become dependants of the general public (Table 1).

Table 1. Deformity pattern of the 60 patients

Deformity	No.	%
No deformity	4	6.7
WHO Gr. I (only anaesthesia)	8	13.3
WHO Gr. II (correctable deformity)	15	25.0
WHO Gr. III (un-correctable deformity)	33	55.0
Total	60	100.0

EDUCATIONAL LEVEL

Forty-five persons (75%) were either illiterates or had received only primary education, 15 (25%) were above secondary school level.

When rehabilitating patients, consideration must be given to the fact that certain occupations are done by specific castes, and neglect of this aspect has in some cases led to failure of rehabilitation because of the non-acceptance by the members of the caste concerned.

Table 2 explains the various types of trades given to the patients under this project and the cost of each unit.

Table 2. Hereditary occupation of the 60 patients rehabilitated

S. No.	Hereditary occupation	No.	%
1	Farming	22	36.7
2	Weaving	10	16.7
3	Unskilled wage labourer	5	8.3
4	Business (petty trades)	4	6.7
5	Sheep rearing	3	5.0
6	Pig rearing	2	3.3
7	Potter	2	3.3
8	Cobbler	2	3.3
9	Dhobi (village washerman)	2	3.3
10	Village priest (Hindu)	1	1.7
11	Basket maker	1	1.7
12	Smithy (artisan)	1	1.7
13	Non-specific*	5	8.3
	Total	60	100.0

*Includes 5 patients who had no specific hereditary trade.

Table 3. Assistance given through rehabilitation project

S. No.	Trade	No.	%	Total cost	Average cost
1	Milking cattle	14	23.3	10,378	741
2	Capital for petty trade	14	23.3	3,800	271
3	Looms and accessories	7	11.7	3,530	504
4	Petty shop and capital	6	10.0	3,341	557
5	Sewing machine	4	6.7	2,822	706
6	Goats and sheep (unit of 6 per person)	4	6.7	2,760	680
7	Capital for cultivation (own land)	4	6.7	2,350	588
8	Animal-drawn cart	2	3.3	1,280	640
9	Cycle rickshaw	1	1.7	1,000	1,000
10	Public address system	1	1.7	1,797	1,797
11	Silk-screen unit	1	1.7	900	900
12	Unit of 2 pigs	1	1.7	360	360
13	Typewriting institute	1	1.7	2,455	2,455
	Total	60	100.2	36,773	–

Milking cattle has been the most wanted aid, 23% in our area. This can be explained easily since the majority of people have farming as their hereditary trade.

A total of Rs. 36,773 was spent on 60 units which gives an average of Rs. 613/- per unit. The maximum amount spent on any one unit was Rs. 2,455/- and the minimum Rs. 50/-. So far 37% of the money spent has been repaid.

Of the 60 patients 32 (53%) have shown good progress towards becoming self-sufficient and come into the 'successful' group, Table 4. This was judged on 2 main criteria:

1 Changes in household articles such as clothes, utensils and type of house.
2 Regularity of replayments.

Changes in clothing are seen in the gradation of cotton, terry cotton and terene as they improve. In the same way utensils start from mud, to aluminium, brass, hindalium (a newly available alloy) and stainless steel. Houses start as mud huts with palmyra thatch which develop into grass thatch, later are replaced by country tiles, then factory tiles and finally concrete.

Another group of 9 patients (15%) come under the group 'fairly successful'. That is to say they have shown improvement in one of the criteria but failed in the other. The column 'no change' has 13% of the patients. These still have their units, but they have neither paid back the money nor shown any visible improvement in their living conditions.

Table 4. Period after rehabilitation and present status

Period (years)	Successful	Fairly successful	Change	Failure	Total	%
4–5	5	2	4	4	15	25
3–4	5	2	Nil	2	9	15
2–3	11	4	Nil	5	22	37
$\frac{1}{2}$–2	11	1	2	Nil	14	23
Total	32 (53%)	9 (15%)	8 (13%)	11 (18%)	60 (100%)	100

The column 'failure' has 11 patients (10%) who have shown further deterioration even after issue of a production unit.

Eleven patients who come under 'failure' were analysed further to see why they deteriorated, the following are the details of these cases.

1 The patient was evicted from his house by the Highways Department since he had built it on Highways property.

2 The patient was given a draught bullock and a cart which he could use for transporting vegetables, as he had done in the past, from villages to the town market. When he developed a foot ulcer, he left the cart and the bull at home and went away to a distant hospital and was admitted there for a number of months. During this time his wife and children, and also the bull, almost starved. On his return his cruel attempt to make the starved bull work killed it and the patient sold the remnants of the cart.

3 The third patient was a farmer by profession. After he developed leprosy he was trained as a weaver in a care home. On leaving he was given a hut and loom near the hospital and arrangements were made for him to have orders from the hospital for table mats. The hospital was also to supply the raw material. The patient was then able to sell the finished product to the hospital at the market price. But he was unable to adjust to the new discipline of weaving, probably because his hereditary trade was farming. (It is significant to note that in a similar case the patient who was a weaver by caste was given a house and the same facilities, and he was one of the 'successful' group.)

4 This patient was a small-scale smuggler of liquor etc, but now said that he wanted to settle down in life. He was given a capital of Rs. 50/- to buy some bundles of firewood and a few litres of kerosene oil. This he could sell to the slumdwellers, of whom he was also one. However, his decision to reform seems to have been halfhearted, he later disappeared and we lost contact.

5 The fifth patient after rehabilitation developed some heart complications and so he was advised not to use his unit, namely a sewing machine, so he returned the unit and now he is under constant medical care.

6 The sixth patient was given a jutka (passenger cart drawn by a single horse). He was not successful, apparently, because he had changed his religion from Hindu to Islam. He was rejected by both communities, which led to his downfall.

7 This patient was given 2 cycles for hire and some tools and spares for a cycle-repair shop. This was a second attempt to help him but the patient sold off the cycles and the spares once again. It was clear on analysis that he did not have the aptitude to become self-sufficient.

8 The eighth patient was given capital for seasonal business. He was doing well and within a year had a running capital of Rs. 1,000/- but then he became too ambitious and took a 'short cut' to double his capital. He was cheated and lost everything.

9 The ninth patient failed because he used up the capital he was given for his shop instead of using the income. He was originally a paid employee who did not have any business experience, but as he was insistent he was given the opportunity of running a shop on a trial basis.

10 The tenth patient who was also assisted in business failed due to a conflict with his siblings in his large joint family. Seven family units lived in the same house, enmity developed and he was finally thrown out.

11 The eleventh patient died 5 weeks after rehabilitation and so did not get a chance of improving. He was put under failure because this was a wrong selection. He was over 60 years old when he was assisted.

This analysis shows that there cannot be any general rule to give reasons for failure but it does offer some guidelines in selection. It would appear from the analysis that age is a risk factor to be considered.

Discussion

Domiciliary rehabilitation, followed up for a period varying from 6 months to 5 years, shows that there is a chance of about 68% of patients becoming self-sufficient and independent or at least substantially improved. Patients thus rehabilitated are able to retain their place in the society.

There are a number of government projects which give assistance to such causes, e.g. loans for cultivation of lands, starting a small poultry unit, purchase of cows for small farmers, but these facilities could not be used in our project because the patients we assessed were found to be in such desperate and urgent need that they could not wait for the time it would take to obtain government aid.

Rehabilitating a patient in a light-engineering workshop which makes precision tools under a sheltered situation, comes to *c.* Rs. 40,000/–50,000/- per workplace. But these small self-employment schemes in a rural area cost an average of Rs. 600/- per workplace. Against this of course it could be argued that the former category are materially better off, but often are not well integrated into the local community. Domiciliary rehabilitation avoids the possibility of patients being colonized in artifical groups.

Once patients are successfully rehabilitated, especially if they remain in their own village, they are no more dependent on the institution or anyone else, and so are able to retain their self-respect and be useful citizens of the country.

Conclusion

This project gives us an insight into the minor details of practical problems and advantages of organizing a self-employment scheme in a rural area. It demonstrates how important certain aspects like hereditary trade, previous experience and aptitude are in making rehabilitation successful. It also explains how financial stability correlates with the so-called stigma attached to leprosy. It is interesting to note that patients who were on the verge of becoming outcasts from society due to 'stigma' become well-adjusted and accepted in the same society, once they are able to earn sufficient money. Financial independence would appear to be a most important factor in reducing the stigma.

We feel we must stress the importance of the factor of careful selection of the type of assistance given, and very meticulous follow-up home visits by members of the rehabilitation team. Indiscriminate handing out of aid can only result in large losses and an increased number of failures.

ETHIOPIA: PERSONAL REGISTRATION CARD AND PHOTOGRAPH

W J O Beaumont, All Africa Leprosy and Rehabilitation Training Centre, (ALERT), PO Box 165, Addis Ababa, Ethiopia.

In view of the continuing difficulty of correctly registering and following up outpatients, particularly in diseases such as leprosy and tuberculosis, where long periods of treatment may be needed, it may be of interest to record information about a personal card system which is coming into general use in Ethiopia, especially in the towns and cities.

Since 1975, the new administration in Ethiopia has insisted on the development of a registration card system, which consists of a photograph and written details of the individual's name, age, sex, occupation, address, telephone number of his 'town unit' office and date of issue. The size of the card unfolded is approximately 140 × 100 mm, which corresponds closely to the international paper size A6 on the ISO-A series, though in fact the next size down, A7, (105 × 74 mm) could also be used.

Each town or city unit (kebele) has a number and within the kebele each house has its number. The kebeles are doing a great deal to see that individuals carry such a card at all times. The system has yet to be established throughout Ethiopia. People travelling or moving to another place need a letter from their kebele or farmers' association mentioning name, address and reason for travelling.

Both in Addis Ababa, and also in the leprosy control area of Shoa Province, we are already finding this card of considerable help. We do not register a patient's address unless he has shown his card or letter. This is repeated yearly to check the present address. It is of value in reducing the use of false or 'alternative' names and addresses, and in the rapid identification of patients when they return to clinic, or move to another area. It could perhaps be compared with the use of an address card in tuberculosis control in South India, already reported[1] to be helpful in both illiterate and literate patients.

Our purpose in writing is to suggest that such a simple and inexpensive device may be worth considering in some leprosy control schemes where large numbers of patients are involved. In view of the availability and fairly low cost of machines for laminating and sealing cards in plastic,* some agencies may even consider the use of cards bearing not only the personal details above, but also basic information on diagnosis, classification, basic disability, grading and treatment.

Reference

Radhakrishna S, Statagopan MC, Krishnaswami KV, Tripathy SP, Vaidyanathar B, Fox W. A study of the accuracy and factors influencing accuracy, of home addresses of patients obtained by registry clerks and address cards in four large towns in South India. *Tubercle*, 1980, 61, 197–206

*These machines are becoming fairly widely available in various countries, but it may be helpful to record here the name and address of one (of Japanese manufacture) which is used in the UK, and known to be satisfactory. It is the Codor Lamipacker, and details are available from Mr K B Farrington, Exportential Services, Silk House, Park Green, Macclesfield, Cheshire SK11 7QW. It is our understanding that sales rights have been granted to this company from Dorned BV, Herengracht 331, Amsterdam, Holland, to whom enquiries may also be addressed.

(*Editor*)

COLOUR TRANSPARENCIES

Disease from the Tropics; Sets 1 and 2. Balliere's Medical Transparencies, 35, Red Lion Square, London WC1R 4SG. 23 transparencies in set 1, 24 in set 2, with introduction and legends. A D M Bryceson and V E Ansdell

Set 1 includes – international travel; malaria; blackwater fever; anaemia; nephrotic syndrome; hepatosplenomegaly; jaundice; chronic liver disease; amoebic liver abscess; amoebic dysentery; schistosomiasis; malabsorption; giardiasis. Set 2 includes – tuberculosis; hydatid disease; tropical pulmonary eosinophilia; typhoid; tick- or mite-borne typhus; leprosy; loaiasis; onchocerciasis; cutaneous leishmaniasis; chronic lymphoedema; phagadaenic ulcer; madura foot; myiasis; larva migrans; sore throat; rabies; monkey pox; sickle cell disease.

Paperback with slides mounted in plastic wallet; £18.50 plus VAT £1.78 UK (not sold singly).

[Despite the relatively high price, compared with some other transparency teaching sets, the pictures are excellent and the written text highly informative. The 2 sets should be of great value, perhaps particularly to teachers who wish to quickly lay hands on a good illustration of one of the many diseases and conditions noted above].

Leprosy I and II. Colour transparency sets from the Medical Education Department of Glaxo Laboratories (India) Ltd, Worli, Bombay, 400 025, India

These excellent sets have recently been received by the Editorial Office from Glaxo in India; they were assembled by Dr V D Parekh (Grant Medical College, Bombay), Dr R Ganapati (Bombay Leprosy Project) and Dr Chetan Oberai (Grant Medical College, Bombay). Using 48 colour transparencies, they cover virtually all aspects of the disease and there is a full written text. Some of the recommendations on chemotherapy, such as the use of isoniazid, may not be universally acceptable, and it is possible that the sections on treatment generally will have to be revised soon in view of current WHO advice on multiple drug regimens for paucibacillary and multibacillary cases. Slide 44 and page 10 in Section II would also benefit from a clearer distinction between the two main types of adverse immunological reaction in relation to treatment. These are, however, minor comments on material which will greatly benefit leprosy work in India and elsewhere, and we congratulate the authors and the Glaxo Laboratories on this initiative.

The following lecture sets are available, post free, at the rates given below:

1	Diabetes Mellitus	3 parts (72 colour slides & text)	Rs. 150/-
2	Cerebrovascular diseases	3 parts (72 colour slides & text)	Rs. 150/-
3	Scabies	(24 colour slides and text)	Rs. 50/-
4	Ringworm	(24 colour slides and text)	Rs. 50/-
5	Viral Infection of the skin	(24 colour slides and text)	Rs. 50/-
6	Venereal Diseases	(24 colour slides and text)	Rs. 50/-
7	Leprosy	2 parts (48 colour slides & text)	Rs. 100/-
8	Ischaemic Heart Disease	(24 colour slides and text)	Rs. 50/-
9	Acute Myocardial Infarction	(24 colour slides and text)	Rs. 50/-

Payment may be sent by demand draft payable to Glaxo Laboratories (India) Ltd, on receipt of which the set(s) will be despatched together with an officially stamped receipt acknowledging payment.

NB These slide–lecture sets are the copyright of Glaxo Ltd and are to be used for teaching purposes only.

Lepr Rev (1982) **53**, 140–147

Reports, News and Notes

XII International Leprosy Congress, 21–26 November 1983, New Delhi, India

Venue. Vigyan Bhawan, under the aegis of the Hind Kusht Niwaran Sangh. Forms have already been issued to record an 'intention to register', together with brief outlines of the programme of events. Further details from Dr R H Thanaraj, Organizing Secretary, XII International Leprosy Congress, 1 Red Cross Road, New Delhi 110 001, India.

China Leprosy Conference, Guang-zhou, November, 1981

The Second National Leprosy Conference took place in Guang-zhou, November 1981. This is the second national meeting on leprosy control convened by the Ministry of Health of the People's Republic of China since its foundation in 1949. Representatives from 26 provinces, municipalities and autonomous regions including some 150 leprologists and dermatologists attended the conference. Dr Huang Shuze, Deputy Minister of Health, presided over the meeting and gave the keynote address in which he asked the delegates to consider the eradication of leprosy by the year 2000. Dr Ma Haide (George Hatem), leprologist and Adviser to the Ministry of Health, made a special report on leprosy in China in which he noted the successful control of leprosy in the last 30 years. The incidence and prevalence of the disease have significantly dropped in many parts of the endemic areas and in some places spread of the disease has been arrested. He proposed a plan of leprosy control for the next 20 years in which emphasis is particularly laid on the need for extensive and intensive popular health education for the public and training of the basic health workers in the prevention, treatment and rehabilitation of leprosy.

During the conference Dr Li Huanying of the Research Institute of Tropical Medicine, Beijing, gave a talk on her impressions from a recent study tour in India and Burma on leprosy control and on leprosy research activities in the USA and England. Dr Ye Ganyun, Deputy Director of the Research Institute of Skin Diseases, Chinese Academy of Medical Sciences, reported on the discussions that took place at the Study Group on Chemotherapy of Leprosy convened by WHO in Geneva, which he recently attended.

At group discussion and panel meetings a free exchange of experience in leprosy control took place among the participants and a number of regulations for conducting and managing leprosy control work were revised.

Several control projects were formulated and approved with a view to eradicating leprosy by the end of the century.

At the conference the 23 units and 45 individuals cited for meritorious services in leprosy control work were given awards and prizes.

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Chinese Medical Journals

We acknowledge with thanks receipt in the Editorial Office of the following medical periodicals from the People's Republic of China:

1 *Chinese Medical Journal*; monthly; published by the Chinese Medical Association; address for exchange – Chinese Medical Journal, 42 Dongsi Xidajie, Beijing.
2 *Chinese Journal of Orthopedics*
3 *Tianjin Medical Journal*
4 *Journal of Clinical Dermatology*
5 *Chinese Journal of Dermatology*

Address for exchange:
Exchange Section, Tianjin Medical Library,
167 Cheng Da Road, Tianjin,
The People's Republic of China

Those on medicine and dermatology frequently carry articles on leprosy, 'Clinical and Experimental Studies on Sulfone Resistant Leprosy' in the *Chinese Journal of Dermatology*, **14**, No 2, 1981, being a good example. These journals display an extraordinary range of clinical and scientific interest from contributors in different parts of China.

The following three items are from a recent issue of the *Chinese Medical Journal*:

Medical Science Encyclopedia

Compilation of the Chinese Encyclopedia of Medical Science is well under way with over 4,000 specialists at 33 research institutes and hospitals taking part throughout China, according to a Health News report.

The encyclopedia, which contains pertinent medical science information, covers basic medicine, traditional Chinese medicine, clinical medicine and preventive medicine. Compilation started in 1978 and the encyclopedia will be published by the Shanghai Science and Technology Publishing House.

Volumes are divided according to subject matter. The toxicology, psychiatry, immunology, forensic medicine and urosurgery volumes have been sent to press. An additional 40 volumes are being examined and approved.

Tuberculosis Rate Down

China's tuberculosis rate has dropped by 80–90% in urban areas and about 50% in rural areas since 1949.

A 2 year national survey to establish the incidence and epidemic characteristics of pulmonary tuberculosis completed not long ago, shows that TB as a cause of death has declined from first place in the early 1950s to eighth place.

The nationwide random sampling was carried out by the Ministry of Health and provincial Health Bureaux. The survey involved nearly 900 survey units, usually formed by a village or neighbourhood committee, with between 1,000 and 2,000 people in each unit. More than 1.3 million people were examined, including people of all ages and in a wide variety of jobs.

The prevalence of tuberculosis before liberation helped earn China the nickname 'Sick man of the East', but since the founding of the People's Republic in 1949 the government has established a nationwide TB control network and trained more than 200,000 special medical workers to combat the disease.

The efforts against TB include a publicity campaign on the disease, its control and treatment, regular mass physical check-ups and BCG vaccinations.

It is estimated that China has about 6.63 million patients with active TB, 0.717% of the population, and another 1.66 million, or 0.187% of the population under observation because of sputum TB bacilli.

More rural people suffer from the disease than urban people and the incidence rises with age.

A Health Ministry official said it has set up a TB centre to oversee efforts by provincial and regional authorities to eradicate the disease.

Production of Medicine; The Pharmaceutical Industry

China's pharmaceutical industry has developed at a rapid pace since liberation in 1949, thanks to the Party and government. Numerous factories have been built and the technique of production and drug quality have been constantly improved.

Nearly 1,000 kinds of medicine using chemical materials and more than 3,000 preparations are being produced today. In addition, over 500 pharmaceutical factories in China produce nearly 3,000 kinds of traditional Chinese medicines.

Many efficacious drugs produced in China have aroused the attention of medical circles abroad. In producing traditional Chinese medicines, methods are constantly being perfected by the introduction of modern technology. As a result, quality has improved and variety increased.

A relatively comprehensive system has been set up to carry out scientific research and manufacture of biological products. At present, more than 5,000 people are working in this field and about 100 kinds of products, including vaccine, serum, toxoid and preparations for diagnosis are being turned out.

As a precaution against the manufacture and sale of inferior drugs, the State Council recently adopted a decision stipulating that all medicines and medical equipment produced must be up to state standards. The State Council has also decided to set up a pharmacologic research institute to research western and traditional Chinese herbal medicines.

The principle of meagre profits is practised in pharmaceutical departments and whatever losses are incurred are subsidized by the state. Since 1949, the state has reduced the prices of drugs on occasions with the result that they are now 80 percent less expensive than in the early postliberation years.

Rural Health in the People's Republic of China

This is a 207 page paperback, published in November 1980 by the John E Fogarty International Center for Advanced Study in the Health Sciences, at the US Department of Health and Human Services, National Institutes of Health, Bethesda, Maryland 20205, USA. It is a report of a visit by the Rural Health Systems Delegation in June 1978 under the auspices of the Committee on Scholarly Communication with the People's Republic of China. The chapter headings read – Overview of rural health in China; common disease patterns; community health; financing medical care; ambulatory care; hospital care; barefoot doctors; traditional doctors; traditional medicine; training and education of nurses; training and education of doctors; surveillance and anti-epidemic work; birth planning; diffusion of health and birth planning innovations; mental illness; summary and conclusions. This important publication will be considered in greater detail in the next number of this journal, which is to be devoted to the subject of 'Leprosy and Primary Health Care'.

ILEP: XXVIth Working Session

Bonn, December 1981

The International Federation of Anti-Leprosy Associations (ILEP) which comprises 25 member-associations from 21 countries in Europe, North America and Australasia, held

its 26th working session in Bonn from 10 to 13 December 1981. The meeting was also attended by guests from WHO and the International Union for Health Education.

New drug regimen for leprosy

The ILEP Medical Commission endorsed the recommendations now being put forward by WHO for a new treatment regimen for leprosy patients.

It is proposed that multibacillary cases should be treated with at least two other drugs in addition to dapsone for a period of 2 years, continuing wherever possible to smear negativity, and that paucibacillary cases should be treated with one other drug in addition to dapsone for 6 months. Thus, it is hoped, leprosy sufferers will no longer have to face the prospect of treatment over many years, often for the rest of their life. It is also anticipated that the new regimen will alleviate the problems of drug resistance and patient compliance, two of the major problems besetting leprosy control today.

WHO and ILEP continue to co-operate, especially in the fields of research and training.

Primary health care in India

ILEP is joining efforts with OXFAM in order to promote primary health care programmes in five states of India (Tamil Nadu, Kerala, Karnataka, Andhra Pradesh and Maharashtra).

A number of leprosy projects organizers in these areas have been approached and invited to attend a seminar organized by OXFAM during February 1982. It is hoped that ways will be found to integrate the treatment of leprosy into a primary health care approach.

'The Social Dimension of Leprosy'

This ILEP publication will be distributed in 1982 to training centres, senior health workers and universities in endemic countries. The manual deals with the social aspects of leprosy as they affect case-finding, patient compliance and the re-integration of leprosy patients into the community.

ILEP members extend their activities

The following countries have been added to those in which ILEP members are active: Maldives, Guyana-Georgetown, Guinea-Conakry, Uruguay and Jamaica, plus 10 countries in the Pacific area following the affiliation of Leprosy Trust Board (New Zealand). Several members are also keen to resume work in Vietnam in the very near future.

WHO. Model List of Essential Drugs. *World Health*, May 1981, pages 16–17

The introduction reads: 'The number of marketed pharmaceutical products varies widely from country to country. It may soar to a quite absurd figure of 30,000 proprietary brands in some places or be as low as 2,000 elsewhere. WHO's Expert Committee on the Selection of Essential Drugs met in 1977 and again in 1979, and has drawn up a range of just over 200 active substances which can cover the health needs of the majority of the population. These substances can of course be compounded to form several hundred pharmaceutical products. Several complementary drugs were also suggested as possible alternatives when infectious organisms develop resistance to essential drugs, or in cases of rare disorders or exceptional circumstances; a few are included here as examples. The list is extracted from

WHO's Technical Report Series No. 641, which gives much more detail, including route of administration, pharmaceutical forms and strength.'

Anti-leprosy drugs are dapsone, clofazimine and rifampicin. Anti-tuberculosis drugs are ethambutol, isoniazid, rifampicin and streptomycin.

World Health Forum: a new international journal of health development

WHO Press Release WHO/11 of 6 March 1981 introduces this new journal as follows: 'WHO today announces the publication of a new quarterly international journal of health development, *World Health Forum*.

The *Forum* is unique not only in content but in distribution. Published in Arabic, Chinese, English, French, Russian, and Spanish, this 160-page journal will reach a broader audience than any other health publication in the world. It will deliberately avoid the dry academic approach of so many scientific and technical journals. Instead it will attempt to cater for the busy reader by presenting new ideas in such sections as In Focus and Forum Interview, and by giving information in concise and lively form in such features as Condensed Book, Forum Selection, and Health 2000. Another key aspect of this new journal will be the encouragement of discussion on highly controversial topics. It intends to be a true forum for debate on health and development in the widest sense; its contents will be provocative, designed to stimulate argument and help generate new ideas.'

WHO: *Students learning from Students* Document HMD/80.3. English only

This guide to 'ways of using students in the instructional process' is an experimental issue for field testing, written by Fred Abbatt of the Department of International Community Health in the Liverpool School of Tropical Medicine, Pembroke Place, Liverpool, L3 5QA, 24 pages in length. It deals essentially with the idea that students can help each other to learn and covers their potential role as teaching aides and demonstrators, producers of teaching materials, organizers, curriculum planners and mutual assessors.

The Philippine Journal of Dermatology and Leprosy

We are delighted to see a revival of this semi-annual publication of the Dermatology Research and Training Service of the Ministry of Health, Manila and to receive a composite Volume VI–IX, followed by a separate Volume X, both of 1979. The latter includes some of the *Proceedings of the 2nd Dermatology Convention in Cooperation with the Philippine College of Tropical Dermatology, Inc., May 1978*. We look forward to further issues of the Journal which is dedicated 'to the control of leprosy and other dermatological diseases'.

Leonard Wood Memorial Announces New Leadership 1981

The Leonard Wood Memorial (American Leprosy Foundation) has recently elected Mr John Whitmore as its new President and Chairman of the Board. Mr Whitmore, who is President of Bessemer Trust in New York and a long-time active board member of the Memorial, announces the appointment of Dr Jay Sanford, Dean of the School of Medicine, Uniformed Services, University of the Health Sciences in Washington, DC, as the new Chairman of the Leonard Wood Scientific Advisory Board.

Mr Whitmore in his announcement said, 'the Leonard Wood Memorial is embarking on

an enhanced scientific effort to find the ultimate solution to Hansen's Disease. Under Dr Sanford's leadership, the Scientific Advisory Board will carefully develop and maintain an outstanding programme in leprosy research'. Additional new members of the Board include: Baruch S Blumberg MD, PhD, Kenneth S Warren, MD, John P Utz, MD, Philip K Russell, MD, Wayne Myers, MD, Ward E Bullock, MD, David J Drutz, MD, and Michael M Frank, MD. A working symposium is planned for early summer, 1982.

Additional new staff members are Michael Delaney, Executive Director, and Dr James Kvach, Associate Microbiologist, who was formerly active in leprosy research at John Hopkins University in Baltimore, Maryland.

The Leonard Wood is intensifying its overall research efforts at its laboratory facility at the George Washington University School of Medicine in Washington, DC, and at the laboratory facility at the Eversley Childs Sanitarium in Cebu, Philippines. The new office of Leonard Wood is at 11600 Nebel Street, Suite 210, Rockville, Maryland 20852.

GLAXO: Guide to Dermatology No. 1 *Pigmented Skins* by L G Millard

This is a booklet of 15 pages by L G Millard, Consultant Dermatologist, University Hospital, Queen's Medical Centre, Nottingham, UK and produced by Glaxo Laboratories Ltd, Greenford, Middlesex UB6 0HE, which goes with a filmstrip and sound commentary lasting 15 min. There are 60 colour prints in the booklet and the same number of transparencies on the strip, which illustrate extremely well some of the problems of clinical interpretation and diagnosis of various lesions in the dark-skinned patient. The filmstrip requires an appropriate projector which may not be easily obtainable but, failing this, the booklet itself is of considerable teaching and reference value, both in the UK and abroad.

GLAXO: Lecture on 'Tuberculosis; the comparative antituberculous effects of *Mycobacterium avium-intracellulare* and BCG'

We are grateful to Professor D W Smith of the University of Wisconsin, USA for permission to print the following summary of a lecture given at GLAXO Laboratories, Middlesex, UK.

Field trials of bacille Calmette-Guerin (BCG) vaccine have shown protective efficacies ranging from 0 to 80%. The 7.5 year results of an ongoing BCG field trial in south India (SI trial) provide a recent example of a negligible protective effect. Ninety percent of the SI trial population are reported to have been infected with *Mycobacterium avium-intracellulare* (MAI) by age 14. One hypothesis to explain the SI trial results is that widespread infection influenced or masked the protective effects of BCG vaccination. In order to test this hypothesis we obtained isolates of MAI, the low virulence south India variant of *M. tuberculosis* (reportedly responsible for the majority of the cases of tuberculosis in the SI trial area), high virulence strains of *M. tuberculosis* from the SI trial area, and the laboratory strain of *M. tuberculosis*, H37Rv.

Male and female Hartley strain guinea-pigs were injected with BCG, MAI, or placebo via the intradermal route and then reinjected with BCG, MAI, or placebo 6 weeks later to give all possible combinations of double vaccination treatments. Groups of animals were tuberculin tested with mammalian tuberculin (PPD-S) or intracellularin (PPD-B) 5 weeks after the first or second vaccination, and were challenged 6 weeks after the second vaccination with an aerosol of one of the three strains of *M. tuberculosis*. Each animal inhaled a mean (± SE) of 7.7 ± 0.7 viable units capable of initiating primary lesions in the lungs. The number of tubercle bacilli recovered from the primary lesions, primary lesion-free lung lobes and spleen were used as separate measures of protection. Our data indicate that MAI and

BCG protect equally well against the south India variant of *M. tuberculosis*. Moreover, MAI infection did not adversely affect the capacity of BCG to induce tuberculin sensitivity or to protect against the south India variant. Accordingly, with respect to the south India variant our data support the hypothesis that widespread MAI infection may protect against tuberculosis in the south India trial. With regard to the high virulence strain of *M. tuberculosis* and H37Rv the evidence is less clear, but generally the data suggest that MAI infection may protect as well as BCG against these strains. In addition, we found no evidence to support the hypothesis that MAI adversely affects the capacity of BCG to protect against high virulence strains of *M. tuberculosis*.

Country or regional reports on leprosy control

We gratefully acknowledge receipt of the following reports:

1 *Tanzania*; Mara Region Tuberculosis/Leprosy Control Scheme; Annual Report 1980; from Dr Glen Brubaker, Shirati Leprosy Control Centre, Private Bag, Musoma, Tanzania.
2 *Liberia*; National Leprosy Control and Rehabilitation Program, Ministry of Health, and Social Welfare, Monrovia, Liberia. From Dr J C Johnson, Director.
3 *Indonesia*; Leprosy Control Project. Sulawesi–Maluku. ILEP No. 4.24.05.08 (RBD). Report for 1 January 1979–30 June 1980. From Dr B Zuiderhoek, WHO Leprologist.
4 *Sierra Leone*; National Leprosy Control Program in Sierra Leone. Report January–December 1980. Ministry of Health and Voluntary Agencies, PO Box 673, Freetown, Sierra Leone.

***One to One*: a handbook for the health educator**

This 36-page booklet by Linda Ewles and Pieter Shipster, East Sussex Area Health Authority, County Hall, St Anne's Crescent, Lewes BN7 1NB, England focuses 'on the everyday situation in which one person, the health professional, gives information and advice to another person on maintaining, improving or recovering health and well-being'.

The whole approach is geared to UK medical problems, but there is an important, yet deceptively simple, message which is relevant to leprosy, namely the potentially great importance of talking to the patient as an individual, preferably on the occasion of the first visit and diagnosis. Ten minutes of kindly conversation and explanation might make a significant difference to attendance and compliance rates. The final pages reads: 'This handbook has examined a small but important aspect of the whole enormous subject of "communication" in health education. Many other aspects, such as non-verbal communication and counselling techniques, have been omitted. Readers who would like to pursue these and other aspects of communication should enquire at their local Health Education Unit or the Health Education Council, 78 New Oxford Street, London WC1A 1AH, for information about any local courses, particularly Certificate of Health Education courses.'

TDR; the Special Programme for Research and Training in Tropical Diseases

Publications resulting from special programme-supported activities: as of 30 June 1981 TDR has registered a total of 1,101 different publications resulting from TDR supported projects. This document has 91 pages and the main headings are as follows – malaria; schistosomiasis; filariasis; African trypanosomiasis; Chagas' disease; leishmaniasis; leprosy (IMMLEP and

THELEP); biomedical sciences; biological control of vectors; director's initiative fund. There are also entries under 'research capability strengthening'.

Strategy on Control of Leprosy

A Workshop organized by the National Leprosy Organization of India at Wardha, India, June 1981. We acknowledge with thanks receipt of the final recommendations from this Workshop, which had a fair representation of '. . . medical scientists, leprologists and leprosy workers'. The main points are recorded under the following headings: organizational set-up; implementation of the National Leprosy Control Programme; training; research activities; medical care; health education; voluntary leprosy institutions. There are some penetrating and forthright comments on the need for expanding and intensifying education in leprosy in medical and para-medical schools. The report is well worth reading in the original by those interested in the strategy of leprosy control. (A spare copy is available in the *Leprosy Review* editorial office.)

The Bureau for Overseas Medical Service

The Bureau for Overseas Medical Service (BOMS) was recently formed as a co-ordinating agency for registered doctors keen to serve in the Third World. BOMS will notify doctors of a wide range of opportunities for employment in hospitals, clinics, general practices, missions and refugee camps for periods from a few weeks to several years. Posts are available in general medicine and a variety of specialities in areas of South America, the Caribbean, Africa and Asia. An advisory panel is on hand to offer guidance on conditions of employment and to help doctors re-settle on return to the UK. If you would like to work in a refreshingly different environment where your skills are vitally important, or can notify us of vacancies for doctors to serve in developing countries, please contact:

Colin Jacobs
Bureau for Overseas Medical Service (Registered as a Charity)
London School of Hygiene and Tropical Medicine
Keppel St, London WC1.
Tel: 01-636 8636 ext 232 (messages: 01-455 6332)

Lepr Rev (1982) **53**, 148–153

Letters to the Editor

POSSIBLE INCOMPATIBILITY OF DAPSONE WITH CLOFAZIMINE IN THE TREATMENT OF PATIENTS WITH ERYTHEMA NODOSUM LEPROSUM

Sir,

During the last 5 years we have investigated the effects of the anti-mycobacterial drugs dapsone and clofazimine (Lamprene (R) or B663) on cellular and humoral immune functions. We have formed the impression that clofazimine and dapsone may be antagonistic in the treatment of the condition erythema nodosum leprosum (ENL). We wish to emphasize, however, that our investigations relate only to the possible inhibitory effects of dapsone on the anti-inflammatory activity of clofazimine in individuals with ENL.

Starting in 1972, a study was made of a group of BL and LL patients (9 males, 7 females) who were suffering from severe recurrent ENL and had been treated with dapsone and clofazimine for an average of 21 months. In addition to dapsone 5 patients needed 500 mg of clofazimine, 6 needed 400 mg, 3 needed 300 mg and 2 needed 200 mg daily. Despite these rather high doses of clofazimine the ENL was not controlled and 14 patients required additional therapy with corticosteroids. When dapsone was discontinued these patients responded to clofazimine alone. The high doses of clofazimine were gradually reduced to 300 mg weekly and in cases where ENL re-occurred it was controlled by an increase in the clofazimine dosage. Under this regimen corticosteroids were unnecessary.

The results of this trial were never published because the study group was small and uncontrolled. However, in a letter to Ciba Geigy Ltd (7 May 1980) one of us (FMJHI) expressed doubts about the efficacy of the combination of dapsone and clofazimine in controlling patients with ENL. Recent laboratory evidence adds substance to these doubts. Table 1 shows the effects of the dapsone–clofazimine combination on the *in vitro* migration of neutrophils from leprosy patients. In these studies the leucoattractant used was endotoxin-activated autologous serum (EAS) and the solvent for clofazimine was dimethyl sulphoxide for which control systems were included. It can be clearly seen that clofazimine inhibits neutrophil motility and that 10^{-3} M dapsone overcomes the clofazimine effect.

We have previously shown that dapsone can stimulate neutrophil motility by mediating

Table 1. The effects of co-incubation of clofazamine with migration-stimulatory concentrations of dapsone on the migration of neutrophils from leprosy patients to autologous EAS

Test system	Migration responsiveness to EAS
Neutrophils + HBSS (control)	$76 \pm 26^{*}$
Neutrophils + 10^{-4} M lamprene	$36 \pm 14^{\dagger}$
Neutrophils + 10^{-4} M lamprene + 1×10^{-3} M dapsone	$131 \pm 40^{\ddagger}$

*Results as mean neutrophils/HPF with standard error of five separate experiments.
†$P < 0.05$ for inhibition of migration.
‡$P < 0.05$ for stimulation of migration.

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inhibition of the peroxidase – H_2O_2 – halide system *in vitro*.[1] Clofazimine would appear to have the opposite effect to dapsone.

The results shown in Table 1 suggest that dapsone may decrease the anti-inflammatory activity of clofazimine and therefore possibly necessitate the use of high clofazimine dosages to control ENL. This theory pre-supposes a role for the neutrophil in the pathology of ENL, which is probably a type III immunological hypersensitivity reaction (immune complex or Arthus type). The neutrophil has been demonstrated to contribute to the inflammation and tissue damage in these reactions by releasing toxic oxygen radicals (superoxide anion and hydroxyl radical) and proteolytic enzymes.[2] It therefore seems reasonable to suggest that agents such as clofazimine which inhibit neutrophil migration may control the inflammation by decreasing the numbers of neutrophils in regions of inflammation. On the other hand agents such as dapsone which potentiate neutrophil migratory responsiveness may nullify the anti-inflammatory effects of clofazimine.

Finally we wish to stress that these observations relate only to the possible inhibitory effects of dapsone on the anti-inflammatory activity of clofazimine and must not be confused with the beneficial effects of the combination of clofazimine and dapsone in the treatment of cases with drug-resistant *Mycobacterium leprae*.

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2 Sacks T. *et al.* J Clin Invest 1978; **61**: 1161–7.

BRACHIAL PLEXUS BLOCK FOR UPPER LIMB SURGERY IN LEPROSY

Sir,

For nearly 10 years I have been using a technique for brachial plexus block, which I have found extremely satisfactory, and which may be of interest to your readers.

Until about 1973 I was using, for surgery on the arm in leprosy patients, a block in the axillary space that attempted to inject the anaesthetic into the area around each of the 3 nerves. This requires a circular block proximal to the tournequet. The use of this technique resulted in only moderate success, with a number of patients not getting fully satisfactory anaesthesia.

In 1971 an article appeared in the Journal of the *American Medical Association,*

22 March, **215**, No. 12, pp. 1953–5 by Wen-hsien Wu, entitled '*Brachial Plexus Block; a double-needle technique via the axillary route*'. Its summary reads as follows:

> A new double-needle technique for brachial plexus block via the auxillary route has been used in 30 patients. The results have been evaluated against those of a control group in which the classic method for the block was used. Simplicity in performance, high success rate, and a reduced chance of traumatizing the neurovascular tissue stand out as advantages of the new technique.

The technical details are fully described in this publication, but I would like to record the following observations, based on my own series in Nigeria:

1. The site for injection is relatively easy to determine. I have tended to err by going too high in the axilla. It should be about 5–7 cm from the apex of the axilla and the site is just postero-medial to the deltoid.
2. At this point the vessels and nerves can be palpated, and usually the pulse can be felt in the axillary artery. Directly over the artery make a wheal of a small amount of procaine with a fine needle. Through this wheal insert the large-bore needle. Then with the blunt needle on the syringe pass the needle through the larger needle moving at an angle of about 45° to the skin toward the artery. As the needle passes through subcutaneous tissues there is little resistance until it meets the axillary sheath. Here there is usually quite a definite resistance, and a distinct pop is heard, or at least a sudden lack of resistance as the needle perforates the sheath. If the puncture is made higher in the axilla there is less resistance and the time the sheath is perforated is not as readily determined.
3. After the needle has gone into the axillary space it is possible to locate the arterial pulsation transmitted through the needle, or elicit paraesthesias on moving the tip of the needle about. I do not think these necessary, but it is essential to aspirate to assure that a vessel has not been entered. Then the entire 20 ml of procaine can be rapidly injected in the sheath where it readily moves to encircle the artery and all the nerves. Frequently, one can see the swelling of the sheath proximally just as the injection is made.
4. Only a few patients have complained of discomfort due to the tournequet when the surgery was nearly completed, and I never felt that it was serious enough to remove the tournequet. I had to do this occasionally prior to using this technique.

Using this technique for over 100 intrinsic replacements, I have found this procedure both successful and safe and there have been no significant failures.

R PFALTZGRAFF

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Editorial note. Dr Kenneth Seal (Plymouth, UK) very kindly mentioned the development of a project between the *University of Illinois,* the *University of Cincinnati,* the *University of New Mexico* in the USA, and *Chiang Mai University* and the *McKean Rehabilitation Institute* in Thailand. In reply to our letter of enquiry, Professor Victoria Schauf has furnished a great deal of information on what should be a potentially very important research activity, and with her permission we here extract the most relevant sections of her letter.

THE IMMUNOBIOLOGY AND EPIDEMIOLOGY OF LEPROSY; A COLLABORATIVE PROJECT BETWEEN UNIVERSITIES OF THE USA AND THAILAND

Sir,

Thank you for your interest in our programme project grant, 'The Immunobiology and Epidemiology of Leprosy', which is supported by an award to the University of Illinois by the National Institutes of Health. The institutional collaboration is between the University of Illinois College of Medicine, the University of Cincinnati, the University of New Mexico in the USA and Chiang Mai University and the McKean Rehabilitation Institute in northern Thailand.

The overall objectives of this programme are to further understanding of the immunopathology, epidemiology and genetic susceptibility to leprosy and its complications. The US–Thai collaborative research programme consists of four interrelated projects, namely: a study of the epidemiology and seroepidemiology of leprosy infection and disease (Project 1); an HLA genetic study of leprosy susceptibility (Project 2); a study of the immunoregulatory abnormalities and immunopathology of leprosy and its complications (Project 3); and a study of phagocytic cell abnormalities in leprosy (Project 4).

The goals for the current year were to develop detailed epidemiologic protocols and data collection forms for use in the field, to develop serologic assays for the specificity and sensitivity in the detection of *Mycobacterium leprae* infections and to characterize the study population by detailed review of McKean records.

A modification of the Fluorescent Leprosy Antibody-absorbed (FLA-abs) test described by Abe has been developed in Chiang Mai and in Chicago. Results from preliminary studies are being evaluated for sensitivity and specificity.

The records of 568 patients seen at McKean Hospital in the past 5 years were reviewed to begin to develop a data base for the epidemiologic studies and the studies of HLA haplotypes. At least one 'close' blood relative of 228 index cases (40.1%) of these leprosy patients also had leprosy. It appears from this review, that the population of readily available patients and families will be quite adequate for the proposed epidemiologic and genetic studies.

Instruments have been developed for the uniform collection of data on leprosy patients and patients undergoing leprosy reactions. Detailed clinical, biochemical, immunological and epidemiological data have been obtained from patients who will be followed prospectively and studied according to protocols developed in the project.

Instruments have been developed and pre-tested for the collection of epidemiologic and clinical data in the field surveys. These forms have been modified based upon their pretesting in the field (Chiang Dao) and have been translated into Thai. Surveys of two New Life Leprosy Villages in Thailand (about 1,000 persons) have been completed.

We are studying patients with various forms of leprosy and their families to document an association of leprosy with genes in the major histocompatibility complex. We shall determine if genes in this region influence susceptibility to or the clinical outcome of *M. leprae* infection.

At the University of Illinois, we are performing HLA-A, B and DR determinations and mixed lymphocyte cultures on immigrant leprosy patients, family members of leprosy patients and leprosy project personnel. Two Thai co-investigators are trained, equipped and prepared to carry out these activities in Chiang Mai.

We plan additional studies of families in the US. Study of Chicago patients allows us to develop methods for export to Thailand, to anticipate difficulties which may arise in Thailand, as well as to collect data from several racial groups not available in Chiang Mai.

Determination of a strong major histocompatibility complex (MHC) association with the polar forms of leprosy would provide further evidence that susceptibility to leprosy is in

part determined genetically. Such an association is expected from twin studies and family studies of leprosy which have already been reported in the literature and from knowledge of the function of the MHC in man and mouse. Studies of the HLA-A and B locus of unrelated individuals with leprosy have not been revealing. Family studies of haplotype and the HLA-D, -DR locus are expected to be more productive. Such data might provide an explanation for the dichotomous immunologic, bacteriologic, morphologic and clinical findings in the two polar forms, tuberculoid and lepromatous leprosy. Demonstrations of an HLA-D association with lepromatous leprosy would lend support to the hypothesis that immune response genes linked to the HLA complex determine, in part, immunologic reactivity to *M. leprae* and colour the clinical picture of *M. leprae* infection. Association of depression of non-specific or *M. leprae* specific parameters of cellular immunologic reactivity or increased serologic activity with prevalent HLA-B and HLA-D alleles in lepromatous leprosy patients would strengthen the hypothesis that the course of leprosy is partially determined by immune response genes linked to HLA genes.

The goals for the current year included standardizing basic clinical immunology laboratory tests to be used in evaluating leprosy patients in Chiang Mai, to initiate work on immunoregulatory cell populations in patients with leprosy and in controls, and to train Dr Sanit Makonkawkeyoon, Head of the Department of Clinical Immunology at the Faculty of Medical Technology and the director of the laboratory aspects of the Leprosy Research Project in Chiang Mai, in these procedures and to initiate studies of immune complexes in blood and other tissues of leprosy patients.

Dr Ward Bullock initiated the research on immunoregulatory cell population in year one by making a site visit to Chiang Mai with Drs Nelson and Schauf where research protocols of this project could be developed and the needs of the project in the field could be assessed. Subsequently, Dr Bullock has recruited to his faculty, Dr Susan Watson, a cellular immunologist who is very active in the investigation of regulatory disturbances associated with chronic mycobacterial infections.

Specimens of frozen skin biopsies of patients with various types of leprosy and its complications and serum samples were sent from Thailand to the laboratory of Dr Kenneth Tung, University of New Mexico, for assays of circulating immune complexes and tissue-bound immune complexes.

The major goal of the coming year is to make certain that our assays have, in fact, been well established in Thailand and are capable of providing reliable data for the study of leprosy patients. Normal values will be established by studying the peripheral blood leucocytes of healthy Thai volunteers, and studies of leprosy patients will begin. Some of these patients who appear to be more reliable will be entered into a 4-year longitudinal study of their immunoregulatory cell functions.

In the second year of the grant, we plan to obtain cross-sectional data from leprosy patients for circulating immune complexes (CIC). We will also study patients with various types of leprosy and reactional states for the presence of tissue-bound immune complexes. The ultrastructural characteristics of the tissue injury associated with immune complexes in patients with leprosy and its complications will also be studied by electron microscopy.

In addition to the cross-sectional studies described above, a group of patients will be studied longitudinally for the sequential appearance and disappearance of circulating and tissue-bound immune complexes.

The goals for the current year included development of assays to examine the effects of *M. leprae* infection on the phagocytic and metabolic properties of macrophages and neutrophils. Utilization of these assays for study of cells from leprosy patients requires a standardized source of *M. leprae* or *M. leprae*-derived antigens.

Although progress in studies of phagocytic cells from leprosy patients has been hampered by lack of a readily available source of standardized *M. leprae*, development of

assays which can be applied to cells from leprosy patients has been undertaken in the laboratories of Dr Burton Andersen and Dr Paul Gudewicz. Dr Andersen's efforts will be concerned primarily with the role of neutrophils in leprosy. Dr Gudewicz's research interests centre on the function and metabolism of macrophages in a variety of pathophysiologic states. Dr Gudewicz has established the following assays of activity by macrophages: (1) phagocytic uptake of ^{125}I gelatin-coated latex particles; (2) radiolabelled leucine incorporation into TCA precipitable material; (3) radiolabelled uridine incorporation into TCA precipitable material; and (4) radiolabelled glucose oxidation by macrophages. Mr Sichon Songsiri, from Chiang Mai, Thailand began a 6–8 month training period in the laboratories of Dr Andersen and Dr Gudewicz in July 1980. Arrangements have been made to develop some of the phagocytic cell assays in the mouse *M. lepraemurium* model in the US, as greater availability of the mycobacteria and cells from controlled sources will speed progress in the earlier phases of this study. Experiments for standardization of assays for phagocytic and metabolic functions with use of normal cells are currently being done. Mr Sichon will participate in all phases of animal and human cell experiments in the US and then apply techniques learned to study the larger patient population identified in Chiang Mai, upon his return there.

Goals for the remainder of 1980 and 1981 included: (a) transfer of the mouse *M. lepraemurium* model from Lexington to Chicago and (b) collection of cells from selected leprosy patients for study of phagocytic and metabolic properties of neutrophils and macrophages during the course of the disease process and treatment. Study of the mouse model in both early and late stages of the infectious process will allow evaluation of any progression of cellular defects in phagocytic and metabolic responses to leprosy.

The results from these studies should contribute significantly to the understanding of most defence mechanisms (and failures thereof) operative in leprosy. In this research programme, the efforts of multiple investigators in both the US and Thailand, who are focusing on special aspects of immunology, immunogenetics and epidemiology, are being co-ordinated by establishment of (a) core programmes to identify a well-characterized patient population for study and (b) a central data file, so that information obtained by any investigator is available to others. Results are expected to further define populations at risk, to augment studies of vaccine development and to lead to new strategies of treatment and control of the disease. Moreover, the results should lead to increased definition of cell–cell interactions and some other aspects of regulation of immune responses during natural infection by an intracellular micro-organism.

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Lepr Rev (1982) **53**, 154–155

Book Reviews

Handbook of Ophthalmology for Developing Countries, by G G Bisley. Oxford University Press, Oxford, 1980, 170 pp, £4.50 UK. English Language Book Society Edition available only in the Third World £1.50.

Ophthalmic textbooks may be divided broadly into two groups: those which present facts and those which present guidance, and this small handbook by G G Bisley happily falls into the latter group. This is the second edition of a book first published in 1973 and originally designed for undergraduate medical students in developing countries. There have been a number of additions both on clinical and scientific subjects and there are more illustrations. The result is a very readable, instructive book, drawing considerably on the author's wide experience as an ophthalmologist in East Africa. Some of these conditions described have a local flavour but the book is comprehensive enough to cover the whole field of ophthalmology and provide ample information not just for undergraduates, but also for postgraduates wishing to expand their knowledge of ocular problems.

The illustrations consist mainly of simple line diagrams together with black-and-white photographs of ophthalmic practice in Africa. The section on leprosy is small and has not been updated as much as some of the other sections, but the ocular complications are described and the need for early prevention of the disease and co-operation with leprologists is emphasized. Within its context the author has provided a useful handbook which can be recommended for all those interested in working in ocular disease in developing countries and it should be essential reading for those concerned with East Africa.

T J FFYTCHE

The Membrane Pathobiology of Tropical Diseases; Tropical Diseases Research Series, Number 2, Schwabe & Co AG, Basle, Switzerland.

Proceedings of the meeting held in Titisee, Federal Republic of Germany, 4–8 October 1978. Published on behalf of UNDP/World Bank/WHO; Special Programme for Research and Training in Tropical Diseases.

The chapter headings are: plasma membranes and eukaryotic cells; malaria; leprosy; leishmaniasis; Chagas' disease; African trypanosomiasis; schistosomiasis; filariasis. That on leprosy includes sections on clinical aspects, immunology, efforts to control leprosy, model systems, ultrastructural study of cellular response to *Mycobacterium leprae*, physiologic properties of *M. lepraemurium*, selective uptake of a host's protein during the parasitic cycle of the micro-organisms *Bdellovibrio bateriovirus*.

The *in vitro* Cultivation of the Pathogens of Tropical Diseases; Tropical Diseases Research Series Number 3, Schwabe and Co AG, Basle, Switzerland

Proceedings of the Workshop held in Nairobi, Kenya, 4–9 February 1979. Publications details as above.

The chapter headings are: cultivation of malaria parasites; cultivation of Theileria parasites; cultivation of African trypanosomes; cultivation of *Trypanosoma cruzi*; cultivation of leishmaniasis *spp.*; cultivation of leprosy pathogens; cultivation of schistosomes; cultivation of filariae; nutritional requirements; virulence.

[These valuable publications contain a

great deal of information for the specialist in these fields and a wealth of references at the end of each chapter. It is our understanding that *bona fide* applicants may obtain copies on formal application to the TDR programme. *Editor*]

Erythema Nodosum, with special reference to sarcioidosis; a clinical study of 343 Finnish adult patients, by Matti Hannuksela, from the Department of Dermatology, University Central Hospital, Helsinki, Finland, 1971.

Although somewhat dated, this monograph of 63 pages (available on request from the Editorial Office of this journal) contains many interesting observations relating to studies on sarcoidosis and erythema nodosum in general. It was published as supplement number 7 to Volume 3 of the *Annals of Clinical Research* in 1971 and the study was supported by a grant from the Yrjo Jahnsson Foundation in Finland. The author sets out with the idea of finding answers to the following questions: '(1) In how many cases of EN is it possible to find aetiological factors? (2) How often are there two or more probable or possible/aetiological factors in a single case? Can one ascertain the most important cause of EN in these cases? (3) Do the cases of various aetiological groups differ from each other, taking into account the patients' age and sex, the clinical picture and the course of the eruption, and the results of the X-ray and laboratory examinations? (4) Are there differences between typical erythema nodosum and erythema nodosum migrans, having regard to the aetiological factors of the eruption, various clinical data, and the results of the X-ray and laboratory examinations? (5) What are the possibilities for the pathomechanisms of EN?'

Main headings include: definition of EN; historical review; purpose of the study; materials, methods and diagnostic criteria; results and discussion; general discussion; summary and references (192 in number). The concluding pages, particularly 54 and 55, contain some interesting observations of the likely pathogenesis of EN in sarcoidosis.

A C McDOUGALL

Lepr Rev (1982) **53**, 156–158

Abstracts

CAO SONGNIAN, WU QINXUE, LIU QI & JIANG BAOLAN (1981) **In vitro cultivation of *M. leprae*.** *Chinese Medical Journal* **94** (10), 699–704

This report is from the Chinese Academy of Medical Sciences, Taizhou, Jiangsu. Forty-four skin biopsies from 36 leprosy patients were studied and three kinds of culture media were used, liquid, solid, and diphasic liquid–solid. Liquid medium consisted of egg albumin, acetylcholine, noradrenaline, and a homogenate of rat peripheral nerve in a phosphate-buffered saline (pH 6.9–7.0), and solid media consisted of a modified Löwenstein–Jensen medium enriched with glucose and peptone, or Ogawa's 1% egg yolk medium modified by the addition of glucose.

Nineteen biopsy specimens and 23 of 91 cultures studied gave mycobacterial growth, and the characteristics of the growth are described. Although primary cultivation on modified L–J medium gave no growth, subcultures on this medium were positive, and the authors are justifiably hesitant about drawing any firm conclusions at this stage. However, they say that 'the persistent positive findings and the 55.6% positive results in 27 cultures with suitable inoculum should be given due consideration . . . the study of the characteristics and identification of our organisms is still under way'.

Adverse Reactions to Dapsone, Leading Article, *Lancet* 1981; ii: 184–5

After a brief account of the introduction of dapsone into the treatment of leprosy in the late 1940s – and its value in the treatment of bullous dermatoses, particularly dermatitis herpetiformis – the article stresses that toxic reactions to the compound are uncommon. Apart from two common side-effects – cyanosis due to methaemoglobinaemia and sulphaemoglobinaemia, and anaemia of the Heinz body haemolytic type – the following are rare: marrow suppression, megaloblastic anaemia, cutaneous reactions (including toxic epidermal necrolysis), peripheral neuropathy, nephrotic syndrome, renal papillary necrosis, a hypersensitivity reaction termed DDS syndrome (fever, exfoliative dermatitis, hepatitis, lymphadenopathy, leucopenia, and mononucleosis) which in an incomplete form may appear as hepatitis or exfoliative dermatitis, and a slow but relentless development of hypoalbuminaemia beginning 3–11 years after instituting treatment of dermatitis herpetiformis. References are given to the literature on all these conditions.

The final paragraph reassures the reader that this formidable list of adverse effects must be seen in perspective; only 3 deaths have been attributed to dapsone in the UK over the past 17 years.

W H Jopling

Mycobacterial Infections and Leucopenia. Leading Article, *Lancet* 1981; ii: 184

This leader describes various haemapoetic complications of miliary tuberculosis and the subject matter is in general more pertinent to tuberculosis than to other mycobacterial infections. That anaemia, neutropenia and pancytopenia occur in miliary tuberculosis is a well-documented fact but the basis

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of these complications is not well understood. Hypersplenism may be involved, as splenectomy has been shown to resolve the pancytopaenia in some patients. Both the mycobacteria and the ensuing host inflammatory response may be able to suppress granulopoiesis. Exactly how this is achieved is not understood yet, but lymphocyte-mediated suppression has been shown to be involved in certain types of anaemia (*Lancet* 1976; 669–71, *New Eng J Med* 1977; 296: 10–13).

Of interest to people working with mycobacterial diseases is the demonstration of the capacity of PPD (*Scand J Immunol* 1979; 10: 171–8) as well as *M. leprae* (*J Immunol* 1979; 123: 1813–17) to induce suppressor cells. In leprosy, some of these cells have been shown to be activated *in vivo* by virtue of carrying a certain phenotype, OKT-5^{+}Ia^{+} (*J Immunol* 1980; 125: 1183–5). If these cells were to non-specifically suppress granulopoiesis, then one would expect a much higher prevalence of granulocytopenia in lepromatous leprosy but a review of the literature does not bear this out. Furthermore, the normochromic type of anaemia seen in leprosy patients was more frequently associated with albuminuria, suggesting a renal origin (*Int J Lepr* 1952; 20: 1399). The role of suppressor cells in haematopoietic disorders of mycobacterial infections has to be accepted cautiously but if they are indeed established, manipulations of the immunoregulatory circuits offer a new and more rational way of management.

Although leucopenia and anaemia do not seem to be major problems in leprosy, understanding their pathogenesis might shed light on the immunobiology of chronic diseases.

R Mshana

FARNARIER G, MOULY A MORRISVIDAL D **Les Lesions Cornéenes de** la **Lèpre (Corneal changes in leprosy)** *Médecine Tropicale* 1981; 41 (5)

This is a case report of a male patient aged 47, born in Toulon and never having left France, who presented with lepromatous leprosy in 1977. There were typical signs of active lepromatous disease, confirmed on histopathological examination of skin, but the authors draw particular attention to the ophthalmological findings, which consisted of 1, diminution of visual acuity in the right eye of rapid onset; 2, gross oedema of the cornea, mainly central and affecting the deeper posterior layers; 3, conjunctival hyperaemia, mainly at the limbus; 4, marked reduction in the size of the anterior chamber; and 5, normal pupil and iris. They comment that in the past 50 years, only about 30 cases of leprosy have been notified in metropolitan France, but they consider that the number might in reality have been greater were it not for official measures which are set in motion by the public health services on receipt of notification. No source of infection was identified for the patient reported, but it is suggested that he may have acquired leprosy from contact with an unknown lepromatous case, following repatriation into France of such a case at the end of the 'colonial era'.

SANSONETTI P, LAGRANGE P H **The immunology of leprosy: speculations on the leprosy spectrum.** *Reviews of Infectious Diseases* 1981; 3(3)

The summary reads: Leprosy is a chronic infectious disease caused by *Mycobacterium leprae*. The disease presents a wide spectrum of clinical manifestations, ranging from lepromatous to tuberculoid leprosy; each form may be punctuated by episodes of acute exacerbation, called reactional states. These polar forms and reactional states appear to be determined by immunologic interactions between the host and the micro-organism. This review describes the different measurable parameters that permit the classification of a particular form according to clinical, bacteriologic, histologic, and immunologic spectra. Secondly, the current

state of knowledge on essential immunologic features of leprosy is presented, with a description of the various alterations of cellular and humoral immune responses that can be tested by specific and nonspecific methods. The last part of the review is devoted to an analysis of the leprosy spectrum and to speculations about a number of possible factors that may influence the immune response of the host in a manner analogous to that observed in experimental models.

The main subject headings in the text are: cell-mediated immunity; leprosy – a disease with a spectrum; immune responses of patients with leprosy; reactional states during leprosy; analysis of the leprosy spectrum; experimental approach to hypotheses on the immunology of leprosy; other infections of intracellular parasites, and conclusions. The text runs to 40 pages and there are no fewer than 274 references. Even including textbook accounts, this must be one of the most comprehensive reviews of this aspect of leprosy in print. Although it does not in fact break much new ground, it could be of considerable value to anyone approaching the immunology of leprosy for the first time and who seeks an extremely comprehensive view.

A C McDougall

The Abstracts which follow are reprinted from the *Tropical Diseases Bulletin* through the courtesy of the Director, the Bureau of Hygiene and Tropical Diseases, London.

2. Immunopathology

HAN S H, KUO S L, HU S C, LU S T **The granulomatous response of leprosy patients to lepromin and killed BCG.** *Chinese Journal of Microbiology and Immunology* 1980; 13(2); 7–13

Seventeen leprosy patients (6 polar tuberculoid, 11 polar lepromatous) all developed typical tuberculoid granulomas in response to intradermal injections of heat-killed BCG. The reaction of the tuberculoid cases was a little stronger than that of the lepromatous cases. The reaction of the former to BCG was stronger than that to lepromin, though all were lepromin positive. Most of the patients gave a previous history of tuberculosis, and all except 2 were tuberculin positive.

D S Ridley

PARVEZ M, SHARDA D P, JAIN A K, BHARGAVA N C, MISRA S N **A study of serum protein in leprosy.** *Leprosy in India* 1980; 52(3): 374–82

'Total serum protein albumin, globulin and A/G ratio were determined in 50 patients of different types of leprosy and 15 healthy controls. A significant elevation of total serum proteins ($P < 0.001$) was observed in 25 patients of lepromatous leprosy and 10 patients of lepra reaction. No statistically significant alteration in total serum protein ($P < 0.05$) was observed in 15 patients of non-lepromatous leprosy.

A significant fall in serum albumin with concomitant rise in serum globulin level ($P < 0.001$) was observed in non-lepromatous leprosy, lepromatous and patients having lepra-reaction.'

LAWRENCE D N, BODMER J G, BODMER W F **Distribution of HLA antigens in Ticuna Indians of Brazil: results of typing a leprosy-affected family.** *Tissue Antigens* 1980; 16(2): 152–60

This paper is primarily concerned with the distribution of HLA–A, B and C locus antigens among Ticuna Indians of Brazil, but contains one pedigree including 4 HLA-typed leprosy patients. 2 male sibs with lepromatous leprosy were HLA-identical (w 31, w 39/w 24, w 44, w 5) and 2 sibling tuberculoid cases shared one (w 31, w 39) haplotype.

P E M Fine

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Antileprosy drug with anti-inflammatory[1] properties

effective in the prevention[2] and treatment[3] of lepra (ENL) reactions

indicated as a part of combined therapy for the prevention and treatment of dapsone resistance in lepromatous and borderline leprosy[4].

1. Browne, S. G.: Lepr. Rev. 37, 141 (1966)
2. Azulay et al.: Lepr. Rev. 46 (Suppl.) 99 (1975)
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CONTENTS

EDITORIAL

M. HAIDE and Y. GANYUN. Leprosy Work in China 81

ORIGINAL ARTICLES

E. M. S. GATNER, R. ANDERSON, C. E. VAN RENSBURG and FLORENTINE M. J. H. IMKAMP. The *in vitro* and *in vivo* Effects of Clofazimine on the Motility of Neutrophils and Transformation of Lymphocytes from Normal Individuals 90

A. SOENDJOJO, M. I. ILIAS and H. HUDIONO. Leprosy Control in Surabaya . . 91

C. R. REVANKAR, B. DUDHALKAR, GIRIJA DEENU RAJU and R. GANAPATI. Leprosy Surveys in Urban Slums—Possibilities for Epidemiological . . 99

LINDA DORRINGTON: Information Sources for Leprosy, with Particular Reference to Developing Countries 105

E. FEKETE, P. A. SAROJINI and B. MOCK. BT Leprosy in Reaction Presenting as Photodermatitis 115

SPECIAL ARTICLE

J. M. H. PEARSON. The Evaluation of Nerve Damage in Leprosy 119

OBITUARY

CASIMIRO B. LARA 131

DOMICILIARY AND FIELD WORK

Domiciliary Rehabilitation, J. H. R. KUMAR, S. SIVASANKARAN and E. P. FRITSCHI . 133

Ethiopia: Personal Registration Card and Photograph, W. J. O. BEAUMONT . . 138

Colour Transparencies: Disease from the Tropics, Sets 1 and 2. Leprosy I and II . 139

REPORTS, NEWS AND NOTES 140

XII International Leprosy Congress, 1983, New Delhi, India

China: Leprosy Conference, Guang-Zhou, 1981; Chinese Medical Journals; Medical Science Encyclopedia; Tuberculosis Rate Down; Production of Medicine; the Pharmaceutical Industry; *Rural Health in the People's Republic of China*

Report of the ILEP Meeting, December 1981, Bonn

WHO: Model List of Essential Drugs; *World Health Forum*; Students learning from Students

The Philippine Journal of Dermatology and Leprosy

Leonard Wood Memorial Announces New Leadership, 1981

GLAXO: *Guide to Dermatology No. 1. Pigmented Skins*; Lecture on '*Tuberculosis: the comparative antituberculous effects of* Mycobacterium avium-intracellulare *and BCG*'

Country or Regional Reports on Leprosy Control

Strategy on Control of Leprosy, Workshop, Wardha, India 1981

LETTERS TO THE EDITOR

FLORENTINE M. J. H. IMKAMP, R. ANDERSON and E. M. S. GATNER. Possible Incompatibility of Dapsone with Clofazimine in the Treatment of Patients with Erythema Nodosum Leprosum 148

R. PFALTZGRAFF. Brachial Plexus Block for Upper Limb Surgery in Leprosy. . . 149

VICTORIA SCHAUF, K. E. NELSON and W. E. BULLOCK. The Immunobiology and Epidemiology of Leprosy: A Collaborative Project between Universities of the USA and Thailand 151

BOOK REVIEWS 154

ABSTRACTS 156

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