

CURRENT LITERATURE

It is intended that the current literature shall be dealt with in this department. It is a function of the Contributing Editors to provide abstracts of all articles published in their territories, but when necessary such material from other sources is used when procurable.

KRAMCHANINOV, N. F. [On the history of the study on leprosy in Russia. The work of P. Simontovskii.] *Vestnik Dermatol. i Venerol.* **33** (1959) 61-62.

P. Simontovskii, in 1796, studied the leprosy situation in the town of Uralsk, where he found about 70 cases. His descriptions of these cases give us a rather detailed clinic picture of lepromatous leprosy, anesthesia, plantar ulcers, stenosis of the larynx, deformity of the nose, etc. He stressed the fact that leprosy is a contagious disease, and recommended the establishment of special houses in which to place the patients. His work "The Description of the Disease Elephantiasis" was received by the Medical Collegium, but was not published. The author of this article discovered this work in the archives of the Medical Collegium.—N. TORSUEV

INNES, J. R. Russian papers on leprosy. *Leprosy Rev.* **31** (1960) 278-282.

The author considers material supplied by Prof. N. A. Torsuev, of Rostov-on-Don. This consists, first, of Torsuev's own assessment of Russian literature, which contains information on the basis of leprosy work (dispensaries of the health service), and notes on special studies—including observation of the early reactions by Stein and Steperin in 1931 (antedating Fernandez by several years), and a paper on acute and chronic vaginitis of leprosy. The other is an analysis by subjects of a bibliography, which lists 1,975 items in Russian and 664 items in other languages.—H. W. W.

[KENYA] Medical Department, Colony and Protectorate of Kenya, Annual report for 1958. Nairobi: Government Printer, 1959.

Surveys in the Nyanza Province made in 1957 showed an incidence of 10 per mille, with approximately 10% lepromatous. This gives a total of about 20,000 cases in the province (Nyanza Province has the highest incidence of leprosy in Kenya). In 1957, 1,072 outpatients and 218 inpatients had started treatment; in 1958, the number were 813 outpatients and 349 inpatients. No figures are given for those under treatment nor for cured cases.—JOHN GARROD

[KENYA] Ministry of Health, Colony and Protectorate of Kenya, Annual report for 1959. Nairobi: Government Printer, 1960.

Consideration was given to the establishment of treatment villages. The first village built was burned down. The policy of building up a treatment and preventive program based on the normal health organization has been followed. There are 2 leprosaria, one at Alupe in Nyanza Province and one at Tumbe in the Coast Province. Surveys indicate a total of 25,000 cases, with 20,000 in Nyanza Province and 2,000 in the Coast Province, giving prevalence rates of 8.4 and 3.6 per 1,000, respectively. The incidence of lepromatous leprosy in Nyanza Province is .74 per 1,000 of the population. There were 1,071 new outpatients and 246 new inpatients.—JOHN GARROD

[UGANDA] Annual report of the Medical Department for the year ending December 31, 1957. Entebbe, Government Printer, 1958.

The estimated total of leprosy cases is 70,000. The prevalence varies from 13 to 43 per 1,000, being highest in the Eastern Province and in the foothills of the Ruwenzori

Mountains in Western Province. Treatment is mainly by oral sulfones, distributed through 5 leprosaria run by missions and 73 treatment villages run by communal effort with matching assistance from the territorial government. A total of 30,000 cases were under treatment. Investigations into epidemiology continued. District councils, missionary societies, the British Leprosy Relief Association, and the territorial government cooperated well. Assistance with drugs and equipment was received from UNICEF. Special grants for leprosy work from the territorial government for recurrent expenditure were £7,775 and £1,000 for capital expenditure.—JOHN GARROD

[UGANDA] Annual report of the Medical Department for the year ending December 31, 1958. Entebbe, Government Printer, 1959.

Of the estimated total of 70,000 cases of leprosy, 9% are considered lepromatous; 19% of all cases were children; 32,217 were attending for treatment; 14,549 were from Northern Province, 3,910 from Buganda, and 3,597 from Western Province. Accommodation was available for over 4,000 in 73 treatment villages, and for over 3,000 in 5 settlements run by missions. There were 9,959 new patients, and 1,764 had been discharged as cured. Special government grants for capital and recurrent expenditure totalled £8,942, a slightly greater amount than in 1957. Two treatment villages were closed because no longer needed, and 2 others were opened elsewhere. Missions, territorial government, local councils, UNICEF and BELRA continued in close cooperation. Investigations into epidemiology were continued, using a especially modified lepromin.—JOHN GARROD

[EAST AFRICAN INSTITUTE FOR MEDICAL RESEARCH.] Annual Report 1959-60. East Africa High Commission, 1960.

One thousand two hundred cases of leprosy in two leprosaria were examined especially for eye lesions, which were found in 111 cases, some of which had multiple lesions. The commonest conditions were keratitis (48 cases), iritis (35 cases) and lagophthalmos (21 cases).—JOHN GARROD

[ZANZIBAR] Health Department, Zanzibar Protectorate, Annual Report for 1958. Zanzibar, Government Printer, 1959.

——— Idem. Annual report for 1959, *Ibid.*, 1960.

There are two leprosaria, Walezo in Zanzibar, maintained by the Government and staffed by the local Roman Catholic Mission, and Makondeni on Pemba Island, which is a government institution. Each can accommodate approximately one hundred patients. In addition, outpatients are treated at rural health centers. The total under treatment at the end of 1956 was 180, at the end of 1957, 156; at the end of 1958, 83; and at the end of 1959, 100. The hope is expressed that it will soon be possible to close one of the leprosaria. In 1958 there were 55 new cases; in 1959, 44.—JOHN GARROD

[QUEENSLAND] Annual report of the Health and Medical Services of the State of Queensland for the Year 1959-60. Brisbane, Government Printer, 1960.

On August 5, 1959, the patients were removed from Peel Island, which had been in operation since 1907, and were housed in a specially converted building in the Chronic Diseases Section of the Princess Alexandra Hospital in South Brisbane. An outpatient clinic is also held there once a week. What with 5 patients discharged to "home isolation," there were only 6 regulars left—of which 3 were eligible for discharge but allowed to remain. At Fantome Island, the leprosarium for aborigines under the Franciscan Missionaries of Mary, the number is also reduced, from 23 to 17. Some of the patients have been temporarily transferred to Townsville General Hospital.—H.W.W.

[WESTERN AUSTRALIA] Report of the Commissioner of Public Health for 1958. Perth: Government Printer.

——— Idem, 1959.

(1) The usual table shows that of the total of 150 patients remaining in the leprosarium at the end of the year, 92 were males and 58 females. Of the 41 cases admitted (30 males and 11 females), 20 were readmissions (said by Davidson, in the special article noted below, to have been mostly from the earlier days of chemotherapy when the effects of the sulfones had been over-estimated, and when discharges were made earlier than now.) There had been no absconding, and no patients had been discharged "noninfectious," only "cured," of which there had been 59.

(2) With no discussion only the usual table is given, which shows the number remaining at the end of the year to have been further reduced to 126. Admissions had totalled only 24 (14 males and 10 females), of which 13 were readmissions. The number discharged (all "cured") was 45.—H. W. W.

DAVIDSON, W. S. Leprosy report. In Report of the Commissioner of Public Health [Western Australia] for the year 1958. Perth, Government Printer, 1959, pp. 60-62.

Chemotherapy being a post-war introduction, which has revolutionized treatment and also management and prevention, the last 12 years of work are reviewed. Introduced among the aboriginals about the turn of the century, leprosy is a comparatively new disease among a nonimmune population and therefore shows a probably truer picture than is seen elsewhere among semi-immune peoples. Defining lepromatous leprosy as bacteriologically positive, lepromin negative, and histologically with predominance of vacuolated histiocytes and lepra cells, and tuberculoid leprosy as bacteriologically negative, lepromin positive, and with tuberculoid structure of the lesions, then there are at least 3 lepromatous cases for every tuberculoid case. Furthermore, neural involvement is almost invariable in lepromatous cases and less prominent in tuberculoid ones. Cases regarded as tuberculoid have, after a number of years, become frankly lepromatous, whereas lepromatous cases under treatment have become lepromin positive concurrently with rapid improvement. Consequently, these classifications are not regarded as having any permanency or importance beyond the degree of resistance displayed at the time of examination, and there is seen no use in adopting the intermediary classifications which are useful in other countries where racial immunities have given greater stability to the type or progress of the disease. There is no suggestion of infant susceptibility. Several cases in whites have occurred after brief or cursory exposure, and the number of them is remarkably high in view of the few at risk and the opportunities for infection; and the L:T ratio is 2:1 [No data are given.] Therefore, any immunity the white man has is derived largely from his sanitary environment and is not due to an intrinsic racial factor. Susceptibility is regarded as dependent on some factor which, as suggested by lepromin reactivity or the lack of it, may not always be present in the same individual to the same degree. Chemotherapy began late in 1947, when a few patients were put on Diasone or Promin, and various other preparations have been employed since then. The effects are to be seen in the leprosarium data, with its decrease from a peak of 333 in 1951 to 150—in spite of the fact that since 1954 all bacteriologically negative neural cases have been admitted because of increasing doubts about the noninfectivity of such cases, and in spite of increase of the negative period required for discharge from 1 to 2 years. The lack of improvement of neural lesions under the sulfones has been discouraging, but the outlook is better with Ciba-1906. It is suggested that with DDS there may be a low-degree toxicity which is rarely noticed, but is brought out by the contrasting lack of toxicity of Ciba-1906. The effects of the present therapy are also seen in the attitude of the patients, who no longer hide in the bush; search by police has therefore been discontinued, and the cases are seen

earlier. Still another effect is on the help in the leprosarium; heretofore almost all work has been by inmates, but now the older ones, once skilled, are becoming helpless, and the younger are not in the place long enough to become skilled, so the time is soon coming when outside help will be needed. "Such labour can only be drawn with any measure of safety from previously discharged patients."—H. W. W.

CARRANZA AMAYA, A. Estado actual de la lepra en El Salvador, C.A. [Present status of leprosy in El Salvador, C.A.] *Bol. Soc. cubana Dermatol. y Sifilog.* **17** (1960) 84-91.

In an article which has fully as much tabular matter as text, the author says that with the 178 known cases, and at least 400 not diagnosed, there should be a commission of 2 or 3 physicians to launch the basis of an integrated campaign. The disease affects 11 of the 14 departments of the republic, except Chalatenango, La Union and San Miguel. It is most common in the second and third decades of life, more in men than in women (129:49), and in poor day laborers who live under deplorable conditions.—H. W. W.

LEIKER, D. L. Leprosy in the Netherlands. *Leprosy Rev.* **31** (1960) 290-294.

Leprosy has been rare in the Netherlands, but since 1950 the known cases reached 264, and the estimated total lies between 300 and 350. The patients originate in overseas countries; the European patients were infected overseas. Patients receive free treatment at the dispensaries of the Gastmann Wichers Foundation in Rotterdam, and at university clinics, or by private doctors if they prefer, and a 40-bed sanatorium of the Gastmann Wichers Foundation is maintained for necessary institutional care. The Foundation also maintains a leprosy specialist and a full-time nurse-social worker. Segregation is not compulsory in the Netherlands, for the changes of infection of indigenous inhabitants is not thought to be serious. Because of various environmental factors, and because the entry of immigrants from infecting countries has declined, the outlook is good.—[From author's summary.]

LEIKER, D. L. Epidemiological and immunological surveys in Netherlands New Guinea. *Leprosy Rev.* **31** (1960) 241-259.

The history of leprosy in Netherlands New Guinea is described. In many parts of the country leprosy has been introduced only recently. The disease spread from the coast to the interior, and in several tribes it was studied from its introduction into the community. It was found that in tribes which have lived in relative isolation until recently, the disease follows a pattern which does not differ essentially from that described from Nauru, New Caledonia, and parts of Central and West Africa. This epidemiology has the following characteristics: (a) The disease spreads rapidly, and the leprosy index becomes very high. (b) Most cases are of a mild, minor tuberculoid type. (c) Cases are found in the majority of the houses in the village. (d) Adults are almost as susceptible as children. (e) Most of the patients did not have contact with lepromatous cases. This epidemiologic picture was found only in areas with a low tuberculin index. The differences in tuberculin index between these tribes and coastal tribes with a more common epidemiology were highly significant statistically, likewise in the tuberculin index of tuberculoid patients compared with healthy people from the same age group in the same area. The epidemiology is explained by the hypothesis that, in people who possess a potential immunity against leprosy, contact with tuberculosis produces an effective immunity, which prevents the development of tuberculoid leprosy symptoms in many people. It is improbable that tuberculosis contact gives any protection in people who possess a potential immunity against leprosy, contact with tuberculosis patients may act temporarily as a source of infection, it is possible that the reduction of the incidence of tuberculoid cases by tuberculosis contact, or by BCG vaccination,

may also have an indirect effect on the incidence of lepromatous leprosy. Therefore, although BCG vaccination does not guarantee individual protection against leprosy, it seems to be of definite value, especially in highly susceptible communities.—[From author's summary.]

CONTRERAS, F. Diferencias epidemiológicas de Madrid y Barcelona con las demás provincias españolas afectadas por la lepra. [Epidemiologic differences between Madrid and Barcelona with respect to the rest of the provinces in Spain affected with leprosy.] *Actas Dermo-Sif.* **50** (1959) 448-452.

Replying to a communication from Vilanova and Momfort, the writer admitted that there is a similarity in the situations in Madrid and Barcelona, in the sense that both have many patients coming from the provinces with high prevalence rates of leprosy, because in their attempts to evade health measures they find homes in the suburbs of the big cities, more in Barcelona than anywhere else. There are, however, great differences between Barcelona and Madrid, firstly, because in Madrid they can usually detect most of the cases, and the same is true with those who go to Valencia, whereas in Barcelona one can easily evade health regulations. Another quite evident difference between the two cities is the fact that Madrid is not situated in an endemic area, and all of the cases in the province where Madrid is located came from other sources, whereas Barcelona lies in the eastern focus of disease. In brief, the statistics of Madrid and Barcelona, as regards patients from other provinces, will serve to stimulate adoption of regulations to improve the surveillance of all patients, but not to utilize them to indict the entire prophylactic campaign in Spain, which is now beginning to show decrease of the incidence, prevalence and infectious potentiality of leprosy.—J. GUILLÉN

MALLAC, M. J. Aspects of leprosy control in the Gambia, B.W.A. (A 2-year assessment.) *Leprosy Rev.* **31** (1960) 12-18.

In Gambia, an enclave in Senegal about 300 miles long, the present scheme for leprosy control is sponsored by UNICEF. After two previous partial surveys it was estimated that there were between 6,000 and 8,000 persons with leprosy, in a population of 266,476. In the present survey 608 villages were examined, and 4,025 cases found. The prevalence varies considerably in the different races, being highest (33 per 1,000) among the Serahulis. It is calculated that there are 18 per 1,000 among females and 15 per 1,000 among males, which is the opposite of the usual finding that leprosy is more common among males; this is explained by the harder working day of the women. Only 220 lepromatous cases were found, but it is recognized that facilities for bacteriologic examinations might increase that number considerably. There is a disproportionately large number of deformed and disabled patients, and it is held that mass treatment with sulfones is not enough to control the disease unless at the same time facilities are made available for physiotherapy and reconstructive surgery. Patients become discouraged and leave off treatment when they find that their deformities are not benefited. "It is therefore manifestly clear that the Gambia needs a focal leprosarium whereby the estimated 20-30% of mutilation of the extremities and the estimated 15-20% of perforating ulcers of the feet could be properly attended to as well as all the reactive cases."—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 480-481.]

BROWN, J. A. K. Mass campaigns and the individual. *Leprosy Rev.* **31** (1960) 19-24.

The mass campaign in the control of any disease is as a rule an expedient where facilities for more individual treatment are not available. Since the advent of the sulfones it has become possible to apply mass treatment to leprosy. Good results have been obtained, but the author warns against complacency. Treatment must be continued for 3 or more years. "For one reason or another he [the patient] may decide to cease

treatment before he is cured and by this irregularity produce a drug resistant strain of bacillus. This may take years to develop in such a chronic disease, or years to discover, but there is evidence to suggest that it happens." It is therefore necessary that patients should feel better, look better, and be accepted by society as being better. The mass campaign in leprosy therefore must have a wide attack; its limitation is that the treatment of the individual becomes superficial and erratic. It should use every opportunity of discovering in what way those who contract leprosy differ from those who do not, and how those differences may be resolved.—[Abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 486-487.]

NIKITINA, N. V., STUDNICYN, A. A. and SHUBIN, V. F. [The tasks in leprosy study.] *Vestnik Dermatol. i. Venerol.* **34** (1960) 3-6.

Pointing out the great successes achieved in the U.S.S.R. in connection with the problem of elimination or considerable decrease of a number of infectious diseases, the authors note that although leprosy is widespread it is encountered especially in certain regions, mainly in the zone of the Aral and Caspian Seas. One-half of the total number of cases in the U.S.S.R. were found in this area. The numbers of new cases have been decreasing regularly since 1956, owing to the active participation of all kinds of physicians in antileprosy work, and wide use of ambulant therapy, as well to increasing efficacy of treatment. Of the total number of cases, 42% were permitted to leave the leprosaria and continue their treatment in ambulatory clinics at their places of residence, or were recommended to be under dispensary physicians' observation. The authors believe that the principal method of promoting the elimination of leprosy is the isolation of patients who can disseminate the disease-germ, systematic examination of all persons who have had close contact with leprosy patients, and mass control of the population in the leprosy foci. They advise paying maximum attention to the training of medical workers in the leprosy field, as well as persisting in attempts to cultivate *M. leprae*, elaborating the problems of preventive BCG vaccination and immunity, using efficiently preventive therapy with sulfone and Ciba 1906, as well as looking for more perfect methods for the treatment of the disease.—N. TORSUEV

TORSUEV, N. A. and GREBENNIKOV, P. S. Formy uchastia mestnykh lechebnoprofilakticheskikh ucherezdenii v bor'be s leproi. [The forms of participation of local medical and prophylactic institutions in the control of leprosy.] *Soverskaia Med.* **23** (1959) 138-143; also *Indian J. Dermatol.* **4** (1959) 95-99.

This article tells about the forms of participation of local medical and various prophylactic institutions in the control of leprosy in the U.S.S.R. Besides the leprosaria the skin and venereal disease dispensaries take part. In every such dispensary situated in an endemic zone, one of the physicians is singled out to be engaged in the leprosy control work. He organizes the mass medical inspections of the members of the families of leprosy patients, takes stock of leprosy cases and persons who are in contact with them, gives sanitary instructions, controls the dispensary service of the patients leaving leprosaria, and observes their treatment in ambulatories. Under his guidance all persons who were in contact with leprosy patients and have negative Mitsuda reactions get BCG vaccination. In case of the departure of any patient registered in his area, or any person being under dispensary control, this physician informs the dispensary of the region to which person removes, in order that he may be registered. The sanitary-epidemiologic stations participate in this inspection, in hospitalization of patients, and in case of necessity does the disinfection of his dwelling. The village and the district hospitals ensure the treatment of the dispensary patients following the instructions and recommendations given by a physician of a regional skin and venereal diseases dispensary. The medical cadres working in the field of leprosy are trained in the Institute of Leprosy Study, in leprosaria, at the chairs of skin and venereological

diseases, in the institutes of medicine and in the institutes of postgraduate studies.—
AUTHORS' ABSTRACT

COHN, E. La lepra como problema social en América Latina. [Leprosy as a social problem in Latin America.] *Medicina (Mexico)* **40** (1960) 25-32; also *Aerzt. Fortbild.* **53** (1959) 1246-1247 (in German).

Leprosy affects many peoples, especially in economically undeveloped countries. In Mexico, Gonzales Urueña established, in 1930, the Servicio de Profilaxis Contra la Lepra. In the last 25 years the number of cases has increased, for various reasons, so that at present there are more than 50,000. These are found especially in the central part of the country, the great majority being mixed-bloods, and more than 96% of the lower income group. From the social point of view, contributory to the spread of the disease are: the very poor living conditions, and the prejudice which makes the campaign against leprosy very difficult since it drives the patients into hiding while their disease advances. Fortunately, in the last few years the old concepts have changed. This is due to various factors, such as the present classification, and the awareness that leprosy is of low contagiousity which requires close and prolonged contact with an infectious patient as well as a certain predisposition. The greatest advance was the introduction of the sulfones. Promin was first used in Mexico in the later part of 1946, but at present DDS is used. As regards the management of the patients, the Mexican leprologists are opposed to the establishment of colonies, believing that the treatment should be given at dermatologic centers as is done with other diseases. Also mentioned are the social assistance given to the patients and their families, and the importance of training courses for young doctors.—M. MALACARA

DINIZ, O. and FONTE, J. Importância do controle sistemático das comunidades militares para o descobrimento precoce dos casos de lepra. [The importance for systematic control of leprosy of military assistance in the early discovery of cases.] *Bol. Serv. Nac. Lepra* **18** (1959) 302-309.

The four fundamental means of leprosy control are early diagnosis, mass treatment, health education, and prevention of exposure to infection. These can be accomplished by the following steps. (1) Reporting of cases. This frequently fails from failure of reporting or because the authorities take no action; thus only about 25% of patients are registered. (2) Epidemiologic census. To find out the actual amount of leprosy, and where the chief foci exist. (3) Control of contacts. Enquiries showed that among people living in contact with leprosy there were only 2.8 cases per thousand. (4) Periodic examinations of selected areas of the population. An analysis of 33,198 patients registered in Brazil showed that signs of leprosy appeared in 70% under the age of 30, evidence that the disease shows itself mostly in the most productive period of life. Out of 27,898 patients, 63% were male and 37% female. It is suggested that in the campaign against leprosy the help of the medical services of the armed forces should be sought.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 379.]

SCHUJMAN, S. Nuestros puntos de vista sobre las nuevas orientaciones en la profilaxis antileprosa. [My points of view on the new trends in the prophylaxis of leprosy.] *Semana Méd.* **115** (1959) 1077-1082.

(1) I do not share the tendency of many leprologists to depreciate the prophylactic value of isolation or to relegate that measure to the last level. (2) I agree that compulsory isolation is prejudicial to prophylaxis, but I believe that voluntary isolation of almost all of the cases can be achieved with persuasive methods. (3) Along with the abolition of compulsory measures of isolation, persuasive methods should be intensified, and the patients offered all the possible aid and facilities for his segregation. (4) I believe it would be very useful to intensify certain preventive measures, such as: location

of foci, early diagnosis and treatment, and supervision of contacts. If these measures do not accompany the segregation of contagious cases, the success of the campaign will be endangered. Only a complete antileprosy campaign, in which each of the prophylactic measures is carried out completely, including voluntary segregation of positive cases, can be hoped to succeed.—[From author's summary.]

✓ ALLEN, J. H. and BYERS, J. L. The pathology of ocular leprosy. I. Cornea. *Arch. Ophthalm.* **64** (1960) 216-220.

In the first of a series of reports on a study correlating the clinical and pathologic ocular findings in leprosy, the authors discuss specific, typical, or pathognomonic lesions of the cornea. Included are transitory opacities of corneal nerves, avascular keratitis, pannus formation, interstitial keratitis, and corneal lepromata. A concise description of the clinical manifestations of each is followed by a discussion of its pathology, histology, and where possible, its pathogenesis. Typical involvement of the cornea in leprosy occurs with sufficient frequency to warrant the use of a simple method for classifying the extent and type of lesion, and the authors offer one which facilitates description and record keeping. It is strongly advocated that leprologists, and especially those interested in making early diagnoses, be trained in the use of the higher-power magnifying loupe, or the slit lamp and corneal biomicroscope, since only by these means can the earliest lesions be recognized.—J. A. ROBERTSEN

KING, J. A. and MARKS, R. A. Pregnancy and leprosy; a review of 52 pregnancies in 26 patients with leprosy. *American J. Obstet. & Gynecol.* **76** (1958) 438-442.

Fifty-two pregnancies in 26 women with active lepromatous leprosy are reviewed by the authors, who obtained their data from records of the U.S.P.H.S. Hospital at Carville and in New Orleans, Louisiana. The onset of leprosy apparently occurred during or shortly after menarche or pregnancy in 14 patients, although it was noted that it is difficult to say exactly when leprosy begins, because of the frequently insidious onset, delay in diagnosis, and the chronicity of lesions. Aggravation of the disease occurred in 18 of 23 pregnancies during which the leprosy was not treated, whereas aggravation occurred in only 5 of 23 pregnancies during which the patients were treated with one of the sulfone drugs. Aggravation was noted in 6 pregnancies of patients who received forms of treatment other than sulfones. It is important that obstetricians and gynecologists be aware of the effect of pregnancy on the course of leprosy. The fairly common onset at puberty, during or shortly after a pregnancy, and aggravation during pregnancy should be borne in mind. If an obstetric patient should present herself with chronic skin lesions and a positive serologic test for syphilis, especially if there is loss of sensation, she should be thoroughly investigated for the possibility of leprosy. The child born to an affected individual is not infected at birth, and if reared in a healthy environment is no more likely to contract the disease than other children residing in the community. The disease, even when active, seems to have no effect on the course of the pregnancy. The efficacy of the sulfones in preventing aggravation of leprosy during pregnancy was well illustrated by this study.—J. A. ROBERTSEN

CAMACHO PAZ, H. Embarazo y enfermedad de Hansen. [Pregnancy and leprosy.] *Rev. colombiana Obstet. Ginec.* **11** (1960) 267-287.

Relationship of pregnancy and leprosy is discussed on the basis of observations made in a series of 217 cases (83% lepromatous, 14% indeterminate, and 3% tuberculoid). Leprosy seems not to affect pregnancy, but pregnancy frequently aggravates the pre-existent leprosy. It has also been noticed that lepromatous leprosy tends to produce cervical dystocia.—[From abstract in *Bol. Centro Doc. Cient. y Tec. Mexico*, Sect. 4, **9** (1960) 764D.]

MUKERJEE, N., GHOSH, S. and KUNDU, S. Palmar lesion in a case of leprosy of the tuberculoid type. *Indian J. Dermat.* **3** (1958) 94-95.

A Hindu female, aged 44 years, had initially a hypopigmented patch over the right knee. This slowly increased in size and extended over the adjoining part of the right thigh and leg. Four years later she noticed erythematous, slightly raised, well-defined lesions over the left knee, left elbow and right palm. There was no lesion over the dorsum of the right hand. All the lesions were anesthetic and analgesic. The case was bacteriologically negative, and lepromin reaction was positive. There was no definite history of any reactive episode. Such a palmar lesion is regarded as unusual.—AUTHORS' ABSTRACT

PFALTZGRAFF, R. E. Factors associated with reactional states in leprosy, with special reference to malaria. *Leprosy Rev.* **31** (1960) 283-285.

1. Intercurrent infections are important factors in the inciting or reactional states in leprosy. 2. The wide endemicity of malaria in the tropics makes it an especially important inciting disease. 3. Malarial suppression with pyrimethamine has proved of significant value in reducing the incidence of reactional states in leprosy.—[Author's summary.]

FUKUSHI, K., YUKAWA, T., IIDAKA, K. and TAKANO, K. Two autopsy cases of erythema nodosum leprosum and its experimental formation in murine leprosy. *Acta Path. Japonica* **8** (1958) 845-855 (suppl.).

Two autopsy cases of ENL were reported, and it was concluded that the Koeh phenomenon was the etiology of ENL. A histologic finding similar to human ENL was formed in murine leprosy.—[Author's summary.]

CONTRERAS, F., GUILLEN, J., TERCENIO, J. and TARABINI, G. Tratamiento de la lepra con difenil-tiourea (DTU). [Treatment of leprosy with diphenyl thiourea (DPT).] *Rev. Leprol. Fontilles* **5** (1960) 31-35.

The authors have treated, for a period of 2 years, 11 leprosy patients (10 positive lepromatous and 1 negative tuberculoid) with diphenyl thiourea, observing great clinical improvement in all of the cases and negativization of the nasal mucosa in 5 of them, although their skin examinations were still positive but improving. Tolerance was perfect to doses of 3 mgm., and the appearance of reactional phenomena was rare.—[From authors' summary.]

MARIANO, J. Primeiros resultados do emprêgo de un novo produto ensaiado no tratamento da lepra. (Nota previa.) [First results of the use of a new drug in trial treatment of leprosy. Preliminary note.] *Arq. mineiros Leprol.* **20** (1960) 22-36.

In general evaluation of the observations reported [on the use of diphenyl thiourea] it can be said that: (a) tolerance of the medication is satisfactory; (b) the maximum average daily dose is 4 tablets; (c) patients with lepra reaction were greatly benefited by its use; and (d) bacteriologically positive patients became persistently negative in a reasonable period of time. The observations are being continued.—[From author's summary.]

MUKERJEE, N. and GHOSH, S. Preliminary report on D.P.T. in the treatment of leprosy. *Bull. Calcutta Sch. Trop. Med.* **6** (1958) 166.

A comparative study was undertaken on two groups of leprosy cases with DPT and DDS for about 9 months. Each group consisted of 12 cases containing equal numbers of lepromatous and nonlepromatous cases. The maximum dose for DPT was 1 gm., and that for DDS was 100 mgm. per day. With DPT, clinical subsidence was observed in all cases to some extent, but bacteriologic improvement was noticed

in 4 of the 6 lepromatous cases; while with DDS, the lesions subsided in all cases, and all of the 6 lepromatous cases improved bacteriologically.—AUTHORS' ABSTRACT

✓ ROSS, C. M., TELFER, J. F. and HILTON, D. D. An account of the use of Etisul in the treatment of leprosy in the Northern Region of Nigeria. *Leprosy Rev.* **31** (1960) 260-264.

Etisul was tried as the treatment in 38 patients, both outpatients and a few inpatients, for a 6-month period in separate regions of Northern Nigeria. Excellent results were obtained, the administration in injection clinics being well within the competence of trained auxiliary leprosy workers. Clinical improvement was good, and the bacterial index fell markedly, viz., 1.6 to 0.6 in one group, 2.0 to 0.8 in another group, 3.5 to 0.8 in a third group. Etisul has a useful and practical part to play, even in outpatient treatment. In regions like Northern Nigeria, where the rate of endemicity is high, the rapid decline under Etisul of the bacterial index of bacilliferous cases is of vital importance to the control of leprosy. With Etisul, hope begins to appear for the satisfactory treatment of the malign forms of leprosy such as show intolerance to standard treatment.—[In part from author's summary.]

✓ MUKERJEE, N. and GHOSH, S. Preliminary trial of Etisul in the treatment of leprosy. *Leprosy Rev.* **31** (1960) 275-277.

During the 6 months' trial with this drug alone on three active lepromatous cases, under a method which began with a limited injection over the right arm and forearm, no appreciable improvement was noticed. Etisul alone was unsuccessful in the treatment of these cases.—[From authors' summary.]

✓ TERENCIO, J. and TARABINI, J. La dexametasona en el tratamiento de las leprorreacciones. [Dexametazone in the treatment of lepra reactions.] *Rev. Leprol. Fontilles* **4** (1959) 665-676.

The problems still posed by relapsing and continued lepra reaction, called by some authors as "reactional status," and its possible causes are discussed. Ten lepromatous cases (7 men and 3 women) in state of lepra reaction were studied. They were treated with dexametazone (Millicorten, Ciba) in maximum doses of 4 mgm. The results were excellent as regards remission of the clinical condition, the drug being considered more active and less toxic than other corticosteroids; like them, it prevented relapses in cases of "reactional status."—F. CONTRERAS

✓ TERENCIO, J. Tratamiento de la leprorreacciones con el dimetilisopropilazuleno. [Treatment of lepra reaction with dimethylisopropilazulene.] *Rev. Leprol. Fontilles* **5** (1960) 37-48.

The author has treated 10 lepromatous patients in lepra reaction with Azulene (AZ-8). In 2 of these cases this drug was associated with monosemicarbazone of adrenochrome. The dosage employed was 100 mgm. parenterally, and 40 to 80 mgm. orally. In 80% of the cases complete remission of the reaction was observed, and in the 2 patients with whom Azulene was combined with the Chromixin the improvement was more rapid. Tolerance in these patients was excellent.—[From author's summary.]

✓ BARBA RUBIO, M. and PEREZ SUAREZ, G. El P-1133 (nialamide) como tratamiento de la reacción leprosa. Nota previa. [P-1133 (nialamide) as treatment of lepra reaction; Preliminary report.] *Medicina (Mexico)* **40** (1960) 145-147.

Lepra reaction is an old problem for the leprologist because of its various etiologic factors, from which—and from the dermatologic and general disturbances presented—it could be considered as an adaptation disease. The authors divide the condition into (1) frank lepra reaction and (2) subclinical lepra reaction; and the former is subdivided into (a) acute, (b) subacute, and (c) typhoreaction. The acute

frank form is manifested by cutaneous and general symptoms of maximal degree; the subacute form has the same symptoms but in less marked degree; and both have the tendency to regress, although both have also the tendency to reappear periodically. The typhoreaction is a frank lepra reaction the symptoms of which are more or less tolerable, but which do not disappear, i.e., the patient remains in a constant reactional state. On the other hand, subclinical lepra reaction shows only febricula, algias and slight disturbances. From the foregoing, it is seen that to combat this syndrome there can be no specific drug; beneficial are all the pharmaceuticals which improve the adaptation capacity of the patient, quieting him down or invigorating him with psychoanalytic drugs. The authors have studied 6 cases of typhoreaction treated with nialamide in doses of 50 to 150 mgm. given 3 times daily for 6 weeks. Physical examination, blood sedimentation rate, blood-cell counts, and blood pressure were determined every 5 days. The first manifestations to disappear were the erythema nodosum lesions, which happened in all the cases after 1 to 1½ weeks of treatment. The temperature became normal in 2 to 3 weeks, except in 1 case with iridocyclitis with evident infection. Slight euphoria was noted in 2 to 3 weeks. In 2 cases the blood pressure decreased with 75 and 150 mgm. doses, but it became normal again after reducing the dose. Slight gastrointestinal disturbances were also observed, which disappeared in like manner on reducing the dose. In no case was there diminution of the leucocyte count or the blood sedimentation rate. Although the number of observed cases was small and the time of observation limited, the authors believe that nialamide in doses of 75 and 100 mgm. daily is useful in the treatment of typhoreaction in depressed patients who need psychoanalytics and who have no complicating infection.—M. MALACARA

COOK, J. Some aspects of reconstructive surgery in leprosy. *East African Med. J.* **36** (1959) 410-413.

Disabilities following neuritis cripple many of the 70,000 persons with leprosy in Uganda. One-half of those with hand disability can be adequately served by physiotherapy. One-quarter of the patients need surgery after preliminary physiotherapy. One-quarter can hardly be helped because of mutilation. Preoperative physiotherapy is important and simple. Bunnell's transplantation of the split sublimis tendon has been most used. Brand's operation is easier and gives good results. Attempts to activate the thumb are always worthwhile. Arthrodesis of phalanges may be necessary, but requires longer immobilization. Operations on the hands should be done by a specialist, and often in stages. In the foot, excision of trophic ulcers, sequestrectomy, rest and elevation secure healing. Grafting is less satisfactory than healing from the edges of the ulcer. Foot-drop may be corrected by tendon transfers, or subtaloid arthrodesis, the Lambrinudi fusion being preferred. Polyvinyl chloride molded to the foot makes a good insole for a shoe.—JOHN GARROD

MARTINS, M. G., FILHO. Contribuição para o estudo de abrasão da pele da face em lepromatosos. (1º da Série). [Contribution to the study of abrasion of the face of lepromatous patients. (First of a series.) *Rev. brasileira Leprol.* **28** (1960) 33-38.

It is too early to draw definite conclusions regarding the process of skin abrasion in lepromatous patients, since the number of cases so treated is small. In the meantime the process has been used on other patients and these are recorded for future comparison, it being noted that a new instrument has been used, with new indications and technique. The results obtained in 2 female patients with large lepromatous lesions of the face can be considered very good. We are interested in broadening the indications for abrasion, besides the lepromas of the face, and in all forms of leprosy.—[From author's summary.]

FAGGIN, J. E. Estudo para um serviço de reabilitação experimental para hansenianos no Departamento de Profilaxia da Lepra. [Study for an experimental rehabili-

tation service in the Department of Leprosy Prophylaxis.] *Rev. brasileira Leprol.* **28** (1960) 3-16.

The author proposes that work for the rehabilitation of leprosy patients, on an experimental basis, be included in the work of the leprosy department of São Paulo. Reviewing the problem in Brazil, he states that in June 1959 the State of Santa Catarina took great interest in the subject, making a study of a similar organization called a "Rehabilitation Center for Lepers." The author defines rehabilitation on the international concept, which is called "readaptation," divided into 4 phases: recovery, reeducation, readaptation, and relocation or reemployment—which in fact are difficult to separate in practice. The experimental service of rehabilitation has to be the work of a team, and for such it is necessary to have a minimum of trained persons, if results are to be obtained, and adequate accommodations.—[From author's summary.]

SILVA, C. and TUMA, M. Polisacárides séricos nos diferentes tipos e fases da lepra. [Serum polysaccharides in the different types and phases of leprosy.] *Rev. brasileira Leprol.* **28** (1960) 17-21.

The authors determined the amounts of polysaccharides in 17 normal sera, in 11 sera from cases of tuberculoid leprosy, and in 60 from lepromatous patients, 23 of them within different stages of lepra reaction. The method of Seymour Cohen with tryptophane-perchloric acid was used. The question of the probable origins of the circulating polysaccharides is discussed briefly, and it is concluded that the amount of serum polysaccharides in cases of leprosy is slightly increased in relation to normal sera, but that there is no difference between the lepromatous and tuberculoid types. During lepra reaction, however, the polysaccharide content is largely increased, and oscillates in parallel with the intensity of the syndrome.—[From author's summary.]

MAYAMA, A. Immunological studies with serum lipoprotein fractions isolated from leprosy patients. *La Lepro* **29** (1960) 100-103 (in Japanese; English abstract).

Low-density lipoprotein fractions were obtained from the sera of leprosy patients by preparative ultracentrifugation at 40,000 r.p.m. (107,000 Xg) and solvent 1.063 g. per cc. for 8 hours. The effect of the fractions on phagocytosis of leucocytes from leprosy patients against tubercle bacilli was investigated. The phagocytic activity of the leucocytes in the medium containing the serum lipoproteins was stronger than in the medium containing the serum itself. The antigenicity of the lipoprotein fractions isolated from the sera of lepromatous or tuberculoid leprosy patients was also examined. Antisera for these fractions were produced in rabbits or chickens in usual manner. The techniques of agar diffusion and agar immunoelectrophoresis were then applied to the study. There was a marked difference in antigenicity between the fractions obtained from tuberculoid patients and those from lepromatous patients. The antibodies were not demonstrated in the antisera against lepromatous serum lipoprotein fractions. It was apparent that the fractions isolated from the sera of tuberculoid leprosy induced formation of antibodies against the sera and the serum lipoproteins of leprosy patients.—[From abstract.]

FREITAS, U. A prova de azul de metileno na lepra. (Introdução ao seu estudo à luz da patologia analítica.) [The methylene blue test in leprosy. (Introduction to its study in the light of analytic pathology.)] *Bol. Serv. Nac. Lepra* **19** (1960) 297-311.

This is said to be a preliminary study of the methylene blue test in leprosy, from the point of view of analytic pathology. The principal physical, chemical, immuno-allergic, neurologic and histologic factors capable of interfering directly or indirectly with the test are discussed. Emphasized are the problem of the lipids in the Virchow cells, the liposolubility of the basic stains, the dominant autooxidations at the level

of certain lepromatous lesions (Meny Bergel), the pH, and the cellular enzyme systems; and also the importance of the reticuloendothelial system and the so-called "diffusion factors." The author believes that the study of this test can result in interesting conclusions with respect to the lesions of the borderline group.—[From author's summary.]

TSUTSUMI, S. Studies for the improvement of antileprous drugs. I. Antibacterial activities of 4-aminophenylsulfone derivatives (with special reference to 4-amino-4'-hydrazinodiphenylsulfone). *La Lepro* **29** (1960) 75-79 (in Japanese; English abstract).

——— Idem. II. Antibacterial activities of 4-aminophenylsulfone derivatives (with special reference to 1-[p-aminophenylsulfonyl]-2-[p-alkoxyanilino]-ethane). *Ibid.* pp. 80-87.

1. This study is the first of a series occasioned by the fact that the chemotherapy of Promin-resistant patients is now a serious problem in the leprosaria in Japan. Because compounds of the hydrazine series do not antagonize PABA, the author synthesized a new sulfone compound, 4-amino-4'-hydrazinodiphenyl sulfone (AHDS), and representative compounds of 4'-substituted-4-aminodiphenyl sulfones. The former, and a 4'-hydroxy derivative were found to have strong antibacterial activities, markedly influenced by the nature of the radicals at the 4' position.

2. Because p-butoxyaniline shows considerable antituberculosis activity, the author synthesized some new sulfone compounds of that substance in which their amino radical was substituted by the 4-aminophenylsulfonyl ethylene radical. They had specific antituberculous activity *in vitro*. It is the author's purpose to find out whether it is possible to expect the diverse mode of action of sulfones with the derivation of alkoxyether such as in the case of p-alkoxyaniline, which may be different in its mode of antimicrobial action from the compound with 4-aminophenylsulfone radical, and also whether it is possible to find out some sulfone drugs with chemical skeleton entirely different from that of 4,4'-diaminodiphenyl sulfone, more neurotropic than DDS, by the use of various amines instead of p-butoxyaniline.—[From abstracts.]

FUKUSHI, K. Histopathological studies on the mechanism of the formation of leprous foam cells. *Acta Path. Japonica* **9** (1959) 361-422.

Biopsy material from 50 cases, including 36 samples of skin lepromas ranging from 10 days to 10 years old, and the general lepromatous material from 45 autopsy cases, were studied histologically. It became clear that the mechanism of leprous foam-cell formation is lipophagy by the lepra cell, i.e., phagocytization of fat from outside the cell. The sources of fat to be phagocytized are: (1) in the skin, mainly fat released by the destruction of the argyrophilic fibers of the subcutaneous fat cells, due to pressure from the leproma enlarging into the subcutaneous fat tissue and other factors; (2) the injected hydnocarpus oil; (3) in the subcutaneous lymph glands, the fat released from the skin and the hydnocarpus oil; (4) in the liver, the fatty degeneration of the liver cells; (5) in the adrenal glands, the cortex cells; (6) in the testes, the interstitial cells (Leydig's cell); (7) in the peripheral nerve trunks, the interstitial fat cells and the myelin sheath; (8) the fat of lipemia; and (9) the lipophanerosis resulting from necrosis within the leproma. The lipid which has been absorbed into the lepra cell envelops the bacillary bodies within its cytoplasm, blocking their metabolic system until they degenerate, decrease, and finally disappear. The decrease of bacilli within the lepra cell and the increase of fat is a parallel phenomenon, a manifestation of the natural healing process. Foam cells similar to those of human leprosy were formed in the rat leproma by injecting fat into the periphery of the lesion, and natural formation of foam cells in this kind of leproma was also confirmed. Furthermore, a condition similar to that of human leprosy was produced in rats infected with human-type tubercle bacilli, foam cells being formed. In both cases it was proved that there was lipophagy by the histiocyte. Leprosy foam cells were grouped into 6

kinds, according to the process and degree of their lipophagy. The formation of leprosy foam cells has no connection with either the age or the size of the leproma, or with the amount and destruction of the lepra bacilli, nor is it due to the degeneration of the lepra cell itself.—[From author's summary.]

HASHIMOTO, M. and KOZUMA, A. Bone marrow of autopsy cases in leprosy. *Kyushu J. Med. Sci.* **11** (1960) 65-75.

The marrow of the femoral, humeral, sternal, lumbar vertebral, and iliac bones of 46 autopsy cases of leprosy, aged 22 to 79 years, was examined from various aspects, and x-ray photographs of the femur and humerus were made. (1) The femoral bone marrow was as a rule hematopoietic in a more limited part of it, and apparently weaker in this activity, in leprosy than in a normal or quasi-normal condition. (2) Cells in the bone marrow, such as erythrocytes, granulocytes, megakaryocytes, reticulum cells, plasma cells, eosinophiles, macrophages, fat cells and sinus epithelial cells, showed no change characteristic of leprosy. (3) A number of lymph nodules were formed in the bone marrow in 9 of the 46 cases. (4) Visceral leprosy was identifiable in 6 of the 46 cases, and lepromas in the bone marrow in 3—all serious lepromatous cases of over 25 years course. (5) The lepromas were produced in the distal and the proximal end portions of the humeral and femoral marrow, and in the sternal marrow, but not in any other bone in any of the cases. (6) These lepromas, isolated or aggregated, were in contact with the cortex of the bone, and not in the diaphyseal marrow or in the core of the marrow in any case. (7) Histologically these lepromas, of millet-to-rice-grain size, were composed mainly of large numbers of large foamy cells and of oval or elliptical large cells and smaller numbers of plasma cells and lymphocytes, with still fewer eosinophiles and Langhans' giant cells mingled with them. The bone-marrow lepromas were devoid of fat cells, sinuses and marrow cells, and contained a large amount of cell debris. (8) Nearly all of these lepromas contained arterioles. (9) There were fairly marked signs of plasma-cell infiltration in the surrounding tissue. (10) The x-ray picture and histologic examination of femur and humerus revealed bone atrophy in a considerable number of cases; and, particularly in the cases in which the bone marrow was positive for lepromas, the atrophy was very marked.—[From authors' summary.]

TARABINI, J. and TERCENIO, J. Investigaciones histoquímicas de la sustancia fundamental amorfa en ancianos curados de lepra. [Histochemical investigations of the basic amorphous substance in aged patients cured of leprosy.] *Rev. Leprol. Fontilles* **4** (1959) 677-683.

With the modern therapy it is now possible to cure a great many patients, and it is of interest to know the morphologic evolution of these cures. The authors have carried out histochemical studies with hematoxylin and eosin, PAS, methylene blue extinction, and toluidin blue. By these means they could demonstrate the sclerotic transformation of the collagen, partly due to the process of healing of the disease and also to the process of aging as is observed by means of hematoxylin and eosin, and especially with the ALPAS reaction, which appears strongly positive because of the irregular disposition and coarseness of the collagen fibers. Also in young patients cured of lepromatous leprosy the chemical constitution of their dermal morphous substance was found to be greatly modified. The acid mucopolysaccharides, in a state of considerable polymerization, are gradually transformed, becoming neutral, as is seen in the MBE, which from pH below 4 became higher, and the metachromasia with toluidin blue, which changes from gamma to beta.—F. CONTRERAS

CONTRERAS, F., TERCENIO, J. and TARABINI, J. Calcificación del nervio cubital. [Calcification of the cubital nerve.] *Rev. Leprol. Fontilles* **4** (1959) 723-729.

In continuation of a review of literature of cases with nerve calcification, there is reported a case of tuberculoid leprosy in regression who showed both cubital nerves

to be intensely calcified, which gave the impression of a bony tissue and shredding off of particles which seemed to be veritable sequestrae. After the histologic report the authors comment on the pathogenesis, prognosis and treatment of such cases.—AUTHORS' ABSTRACT

TERENCIO, J. and CONTRERAS RUBIO, F. Cirrosis de Laénec en enfermos de lepra. [Laénec's cirrhosis in leprosy patients.] Rev. Leprol. Fontilles **4** (1959) 653-664.

This is a clinical, autopsy and histopathologic report of a case of Laénec's cirrhosis of the liver in a lepromatous patient who, after he was cured of his leprosy infection—as verified by the postmortem examination—died of cirrhosis of the liver. The possible etiologic causes are discussed, ruling out alcohol, yaws, malaria, sulfone toxicity, and attributing the possible origin to virus infection.—F. CONTRERAS

DE ANDRADE, L. M. C. O *Mycobacterium leprae* no interior de células epiteliais cutaneas. [*Mycobacterium leprae* in the interior of the cutaneous epithelial cells.] Bol. Serv. Nac. Lepra **19** (1960) 217-222.

The author records an unusual histopathologic feature of a lepromatous case, in which there were infrequent alterations of the epidermis and the presence of acid-fast bacilli within the cells of the various layers of the epithelium. Although recognizing the rarity of such findings, the author considers them of sufficient interest to be recorded, as they may constitute the basis for a study of the physiopathology, or of the epidemiology of leprosy.—[From author's summary.]

BACCAREDDA-BOY, A., CHELI, R., DODERO, M., FARRIS, G. and OLIVA, L. Données biopsiques, endoscopiques, radiologiques, sécrétoires et bactérioscopique de l'estomac au cours de la lèpre lépromateuse. [Results of biopsy, and endoscopic, radiologic, secretory and bacteriologic findings in the stomach in the course of lepromatous leprosy.] Acta Gastro-Enterol. belgica **22** (1959) 527-535.

After reviewing the rather scanty literature on the subject, the authors report their findings in 10 cases of lepromatous leprosy whose stomachs were studied by modern methods including biopsy. The patients, all treated, were without bacilli in the nasal mucus, but they showed nodulation of the skin (bacteriologic findings there not stated). Histologically, Virchow cells were found in 6 cases, and by gastroscopy of the same cases small papules were seen in the antral canal, and a larger formation in one of them (2 good pictures). They do not question the true nature of the Virchow cells (4 good pictures). [It must, however, be noted (a) that many of the cells shown look like fat cells (big vacuoles; situation between glands and muscularis mucosae in the connective tissue); (b) that there is very little or no cellular infiltration (the cells may be isolated in a quite normal connective tissue); that no bacilli were found, either in sections or in smears of the stomach juice. Interesting as they are, these findings need confirmation.]—A. DUBOIS

PEREIRA, A. C. Resultados da imunização do contato Mitsuda negativo pelo BCG. [Results of the immunization of Mitsuda-negative contacts by means of BCG.] Rev. méd. Juiz de Fora **5** (1959) 569-573.

The results obtained in 8 years with BCG vaccination in an adequate group for such an experiment have confirmed the efficacy of BCG vaccination in the prophylaxis of leprosy. The observations were carried out in the Carlos Chagas Preventorium wherein contacts removed from leprous sources were collected, and also those removed at birth from the leprosy colonies. We succeeded by means of BCG vaccination in oral dosage of 20 mgm. given monthly, in the concurrent method of 6 doses, in converting the negative contacts; about one-third of the children in the preventorium were negative

before the vaccination. The results obtained in the regional leprosy dispensary confirm those achieved in the preventorium. It is concluded that this technique of vaccination is necessary for the Mitsuda-negative contacts: (a) to immunize them against the infectious form of leprosy, (b) to remove from them the stigma of the disease due to the repudiation of the prophylactic aims of the preventorium, and (c) to support, as a preventive measure, the acceptance of home treatment.—[From the author's summary.]

CHATTERJEE, K. R., SOUCOU, P. and SAINTE-ROSE, M. Prophylactic value of BCG vaccination against leprosy; a preliminary report. *Bull. Calcutta Sch. Trop. Med.* 6 (1958) 164-166.

This is the retrospective study on the incidence of leprosy in two groups of children, aged 0-15 years, residing in Pondicherry (India). One group was given BCG vaccination 5 years ago, and the other group had no such vaccination. Five years later, 5 of 678 vaccinated children (0.74%) were found to be suffering from leprosy, and 283 of 1,651 nonvaccinated children (17%). Of the vaccinated children, 168 had contact with a lepromatous case in the family, and 4 of them were found to have acquired leprosy subsequently—all of them of nonlepromatous type. Of the nonvaccinated children, 292 had similar contact in the family, and 156 of them were found to have leprosy—nonlepromatous in 146, and lepromatous in 10. It is concluded tentatively that BCG vaccination may have some prophylactic value in leprosy.—N.MUKERJEE

CONTRERAS, F., TARABINI, J. and CONTRERAS, F., JR. Acción lepromino-positivizante del BCG intradérmico en hansenianos. Estudio clínico e histológico. [Lepromin-positivizing effect of intradermal BCG in leprosy patients; clinical and histologic study.] *Rev. Leprol. Fontilles* 4 (1959) 469-480.

In an attempt to evaluate the effects of BCG in lepromatous leprosy, the authors selected 20 proved lepromin-negative patients, including 1 indeterminate case. These patients were retested with lepromin (Mitsuda-Hayashi) and with tuberculin, the Fernandez and Mantoux readings being made after 48 and 72 hours, respectively. On the 5th day they were injected with BCG in the scapular area, and the reading was made on the third week. On the 112th day after the BCG vaccination, they were again subjected to the lepromin test. On the 31st day afterward the nodules of the 5 patients who were found positive were biopsied. The findings described, with photomicrographs, can be summarized by the statement that in no case was there a typically tuberculoid tissue reaction, despite the presence of some histiocyte conglomerates simulating groups of cells with epithelioid aspects, and some giant elements very similar in form to Langhans' cells. The structure of the Mitsuda nodules in lepromatous patients is neither typically tuberculoid nor typically lepromatous. One can find in them a great many lymphocytes, complete lack of polymorphonuclears, connective-tissue proliferation with a tendency to sclerosis, and an enormous formation of capillaries, a structure which has nothing in common with tuberculoid leprosy nor with the structure of frankly Mitsuda-positive nodules of tuberculoid patient.—AUTHORS' ABSTRACT

OLMOS CASTRO, N., ARCURI, P. B., CONEJOS, M., USANDIVARAS, R. L., BONATTI, A. A. and LEBRON, E. J. Hipersensibilidad leprolínica y formación acelerada del tubérculo a la lepromina en lepra tuberculoide. [Hypersensitivity to leprolin and accelerated formation of the nodule by lepromin in tuberculoid leprosy.] *Leprológia* 4 (1959) 123-127.

The lepromin test (with total proteic leprolin) and the lepromin test (with integral Mitsuda-Hayashi lepromin) were made simultaneously on a group of 53 adult tuberculoid patients, cured or with active lesions. The following conclusion was arrived at: The formation of the accelerated nodule, provoked by the intradermal injection of lepromin, may occur in the absence of hypersensitivity to leprolin, although the latter,

when present, tends to increase its intensity and its tendency to ulcerate.—[From authors' summary.]

- ✓ OLMOS CASTRO, N., ARCURI, P. B., USANDIVARAS, R. L., BONATTI, A. A., CONEJOS, M., and LEBRON, E. J. Período de incubación de la hipersensibilidad leprolínica provocada por lepromina en personas sanas de lepra. [Period of incubation of the hypersensitivity to leprolin in healthy persons.] *Leprológia* **4** (1959) 128-131.

A group of 13 adult insane women, without leprosy antecedents, negative to the Fernandez test with total proteic leprolin (TPL) antigen, received an intradermal injection of 0.1 cm³ of integral lepromin (Mitsuda-Hayashi), and were tested for hypersensitivity to TPL on the 2nd, 4th, 7th, 9th, 11th, 16th and 23rd days. It was found that the time of the appearance of hypersensitivity—induction or incubation time—is variable, depending on the sensitivity of the individual. Of the 13 cases studied, 1 became positive in 4 days, 2 in 9 days, 2 in 11 days, 3 in 13 days and 3 in 23 days, while 2 still remained negative at that time. The greater number—7 cases—became positive between the 9th and 13th days. They found that the minimum period of 9 days incubation, or induction of hypersensitivity, is important in the investigation of latent hypersensitivity, since the later control of hypersensitivity to the resensitizing injection of the dead bacillus should not exceed the 7th day.—[From authors' summary.]

- ✓ OLMOS CASTRO, N., ARCURI, P. B., USANDIVARAS, R. L., CONEJOS, M., BONATTI, A. A., LEBRON, E. J. and TORANZOS, L. B. Resensibilización de leprolínicos negativos. [Resensitization of patients negative to leprolin.] *Leprológia* **4** (1959) 132-135.

The authors selected a group of 6 tuberculoid patients and another of 5 contacts, who years before had received an intradermal injection of Mitsuda-Hayashi lepromin (MHL), all of whom were Fernandez negative with total proteic leprolin (TPL). They gave a new intradermal injection of the former (MHL), and afterwards, at intervals varying between 2 and 7 days, they found that in most cases the Fernandez reaction had become positive to TPL. This phenomenon is regarded as similar to that known in tuberculosis work as the "Rich anamnestic reaction," latent allergy, residual allergy, or the Willis-Sayé phenomenon. It is concluded that the lepromin injection may act as a resensitizing agent, suggesting the necessity of further investigations to verify the role of the repeated lepromin injections, and hypothetic reinfection, in the evolution of tuberculoid leprosy.—[From authors' summary.]

- ✓ SILVA, C., TUMA, M., DOS SANTOS, E. M. and RISI, J. B. Confronto da reação de Mitsuda com as intradermoreações feitas com frações de micobactérias. [Comparison of the Mitsuda reaction with reactions caused by intradermal injections of fractions of mycobacteria.] *Bol. Serv. Nac. Lepra* **18** (1959) 310-316.

Fractions of *M. tuberculosis* (BCG) were prepared: phospholipids, waxes and polysaccharides. Intradermal inoculations were made for comparison with lepromin given at the same time. When tested on 6 lepromatous patients and 2 healthy, lepromin-negative children, there was a reaction of the tuberculin type at 24 to 48 hours with the polysaccharide fraction, but not with the other 2 fractions. This reaction disappeared in a few days and there was no further reaction up to the fourth week. None of the 3 fractions caused late nodular reactions in tuberculoid leprosy cases. Tests on 38 healthy, lepromin-positive persons gave the following results: 6 out of 12 with phospholipids showed nodules within 3-4 weeks, as did 3 out of 15 with waxes; and 2 out of 11 with polysaccharides reacted slightly. The authors consider that because of the complete absence of late reactions with phospholipids and waxes in lepromin-negative individuals and lepromatous cases these substances should be studied more fully with a view to possible use as a base for an artificial lepromin.—[In part from abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 377-378.]

- ✓ HORIUCHI, T. The skin reaction and tuberculostatic activity in the whole blood of rats and mice inoculated with tubercle, murine lepra bacilli or both. Experimental studies on the relationship between tuberculosis and leprosy. I. Immunobiological study (1). *Sci. Rep. Res. Inst. Tohoku Univ. C*, **8** (1959) 389-398.
- ✓ ——— Enumeration of living tubercle bacilli in organs of the rats and mice inoculated with tubercle, murine lepra bacilli or both. Experimental studies on the relationship between tuberculosis and leprosy. I. Immunobiological study (2). *Ibid.* pp. 399-419.
- ✓ ——— Mutual influence between tuberculous and leprosy infections in the organs of the rats and mice. Experimental studies on the relationship between tuberculosis and leprosy. II. Histopathological study. *Ibid.* *C*, **9** (1959) 34-53.

(1) No specific sensitiveness to tuberculin or to suspension of murine leprosy was obtained in rats and mice by inoculation with tubercle (TB) or murine lepra (ML) bacilli or both. (2) Tuberculostatic activity of blood, examined by means of the slide-cell culture, was strongest in rats infected with TB bacilli and slightly stronger in rats infected with ML bacilli as compared with normal animals. The same activity caused by the simultaneous inoculation of both the TB and ML bacilli did not surpass the activity produced in rats infected with the TB bacilli alone. A rise of the activity, although slight in degree, was obtained by inoculation with heat-killed ML bacilli. (3) When injected intravenously, TB bacilli first multiplied and then were almost entirely destroyed in the lung, liver and spleen. A low-virulence strain, "Bovine 10," was destroyed first in the liver and then in the spleen in the large-dose group, and vice versa in the small-dose group. Destruction of a high-virulent strain, H37Rv, took place first in the lung and then in the liver. When inoculated into leprosy animals, proliferation of TB bacilli was strongly inhibited. Only small numbers of bacilli were cultivated from the liver. Murine leprosy exerts some preventive influence upon the tuberculous process. (4) The inoculation with avirulent or low-virulence TB bacilli beforehand caused no marked difference in the development of lepromas after inoculation with ML bacilli, as compared with the development of lepromas in animals having received no inoculation with TB bacilli previously. (5) Lepra cells can be found occasionally very early in tuberculous foci when both TB and ML bacilli are inoculated simultaneously, or one after another at a well-timed interval. (6) When animals with mild leprosy are inoculated with low-virulence TB bacilli, the formation of tuberculous nodules is delayed somewhat, whereas the inoculation with high-virulence TB bacilli caused nothing different from the development of tuberculosis in normal animals. When rats with high-grade leprosy are inoculated with low-virulence TB bacilli intravenously, the formation of tuberculous nodules is prevented. (7) In case of simultaneous inoculation with both TB and ML bacilli, the tuberculous lesions are surpassed and replaced by the leprosy lesions. In fields which show both tuberculous and leprosy changes, there are often seen polymorphonuclear leucocytes, Langhans' and foreign-body giant cells, and eosinophilic cells—a finding more marked than in the control animals infected with TB bacilli alone or with ML bacilli alone. This may be explained as being of allergic nature.—AUTHOR'S

ABSTRACT

- NISHIMURA, S., KOSAKA, K. and YASUKAWA, T. Immunological relationship between leprosy and murine leprosy. I. Antigenicity of leprosy bacillus and murine leprosy bacillus in the skin reaction in guinea pigs. *Biken's J. (Osaka)* **3** (1960) 173-182.

The problem of the immunologic relationship between leprosy and murine leprosy is important in appraising results of experiments using the murine bacillus. Guinea-pigs were sensitized with the leprosy bacillus, the murine bacillus, and BCG, and the lepromin, murine lepromin and tuberculin reactions were determined. Cross-immunization [sensitization] was found to occur, showing the presence of an immunologic interrelationship

between these three types. Animals sensitized with the murine bacillus and BCG gave the strongest reactions with the homologous antigen, and lepromin gave values closer to the murine lepromin than to tuberculin.—[From authors' summary.]

FIGUEREDO, N. and MARTINS, A. B. The genesis of leprosy lesions. *Indian J. Med. Res.* **47** (1959) 622-635.

The authors, as the result of the study of about 4,000 contacts over a period of 10 years, have concluded that in the evolution of leprosy there are 3 phases: "an initial transient pre-sensitized phase (non-reactive to lepromin), the sensitized phase (infected and reactive to lepromin up to the tuberculoid stage), and the desensitized phase (lepromatous stage), the transitional stage between the sensitized and the desensitized phase being the dimorphous or intermediate stage." They conclude also that the lepromin reaction indicates sensitivity to the lepra bacillus, and not resistance. The negative reaction to lepromin in lepromatous leprosy is due to the multiplication of bacilli beyond a certain limit in subjects whose resistance is not sufficient to prevent it. In tuberculoid patients the resistance has been sufficient to prevent multiplication beyond this limit, and they therefore remain sensitized, lepromin positive.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 377.]

HAI-TEH, MA, LIEN-CHIEH, FAN and CHAO-HSIANG, MA. [The biological pseudo-positive serologic test for syphilis in leprosy.] *Vestnik Dermatol. i Venerol* **34** (1960) 54-59.

The sera of 1,016 leprosy cases were tested with a battery of four serologic tests for syphilis. The results show a 5.9% false-positive rate, the largest number occurring in lepromatous cases and most frequently encountered in reaction cases. The results are compared with those in the literature. The false positive reactions occurring in leprosy sera tend to be weak or dissociated. Antileprosy treatment does not seem to affect the BFP rates, but sex and duration of the disease play a certain role.—N. TORSUEV

PINEIRO, R., BISHOP, R. C. and KAHN, R. L. Universal serologic reaction in plasmacytic myeloma. *J. Lab. & Clin. Med.* **53** (1959) 755-764.

The Kahn universal reaction, it is pointed out in the introduction to this study, is unique in several respects. "Although universally positive, the reaction is readily differentiated on the basis of differences in serologic patterns. These differences are based on the intensity of the flocculation reactions which may be weak, moderate, or strong, and also on the arrangement of the flocculation pattern. In health, these patterns tend to be constant. For example, a person showing a given pattern of strong flocculation gives the same pattern on repeat examinations at different intervals. In the chronic diseases studied thus far, including syphilis, tuberculosis, malaria, and leprosy, the universal reaction increases in intensity over the normal flocculation level. Exceptions are forms of tuberculosis or leprosy in which the disease is widely disseminated, when the reaction is generally weak—due presumably to inability of the patients to produce antibodies. Kahn believes that the universal reaction in health is the result of an auto-antigen-antibody reaction to lipids. His theory is that lipids liberated in the course of normal metabolism undergo such conjugation with protein as to become autoantigenic, calling forth autoantibody formation to lipids. Under conditions of tissue breakdown, especially in chronic diseases, the increase in lipid liberation leads to a corresponding increase in autoantibody formation and to universal reactions of increased intensity." [Inquiry was made of the authors about the matter of weak reactions in widely disseminated leprosy. Kahn's reply appears as a Letter to the Editor in this issue.] —H. W. W.

McFADZEAN, J. A. and VALENTINE, R. C. The examination and the determination of the viability of *Mycobacterium leprae* by electron microscopy. *Leprosy Rev.* **31** (1960) 6-11.

The authors compare their findings in previous work on the examination of *M. leprae murium* by electron microscopy with their findings in the similar examination of *M. leprae*. In both organisms they found two forms: a normal one and a degenerate one. The normal forms show the protoplasm filling the whole cell wall, whereas in the degenerate forms the protoplasm has shrunk away from the cell wall and appears to be shrivelled. The average percentage of degenerate forms of the rat leprosy organism was only 5, compared with 56 in the samples taken from untreated human leprosy, with a range of 20 to 96. It was questioned whether the method of preparation influenced the findings, whether the part of the patient's body from which specimens were taken made any difference, and whether the results with the electron microscope correspond with the appearances of the bacilli when the ordinary staining methods were used. In none of these was a significant difference detected when experimental comparisons were made. The authors consider that the degenerate appearance of the mycobacteria is an indication that they are dead, and that therefore in the methods employed we have a means of testing the viability of mycobacteria. They were puzzled by the fact that after about 12 months of DDS treatment they should have failed to find any more degenerate bacilli, although they were present in ordinary smears. They suggest that treatment may have made the bacilli friable, and that they are then broken up by the extraction processes.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 481.]

REES, R. J. W., VALENTINE, R. C. and WONG, P. C. Application of quantitative electron microscopy to the study of *Mycobacterium lepraemurium* and *M. leprae*. *J. Gen. Microbiol.* **22** (1960) 443-457.

The standard methods for assessing viability of microorganisms are not applicable to rat and human leprosy bacilli since neither organism can be grown *in vitro*. McFadzean and Valentine (1958, 1959) suggested that the electron microscope might provide a quantitative guide to the viability of these organisms by allowing dead forms to be identified. This technique has been shown to be valid and reasonably accurate for *Escherichia coli*, provided the organisms are not morphologically fixed by the killing agent. It is concluded that the method can assess death of leprosy bacilli in the host when this occurs either naturally or aided by bacterial drugs, and also loss of viability on storage, but not sudden killing by more violent chemical or physical means. The method has been found useful following the survival of *M. leprae murium* in tissue cultures. It is suggested that death in the host, but not death occurring on storage, can be measured by a simple classification of the bacilli seen with the light microscope after the conventional carbol-fuchsin stain. It is indicated that many of the bacilli obtained from untreated human cases of leprosy are dead, while from rats the proportion which are degenerate is low. The significance of various features of the leprosy bacilli seen with the electron microscope is discussed. There is no evidence that the bacilli form spores or capsules.—[From authors' summary.]

MALFATTI, M. Aplicación de la técnica del sombreado al estudio del *Mycobacterium leprae*. [Application of the shadowing technique to the study of *Mycobacterium leprae*.] *Semana méd.* **115** (1959) 948-957.

This was an investigation into the significance of granulations which appear in lepra bacilli. The author quotes 3 theories: that they are resistant forms, that they are an ultravirus, and that they are degenerate forms of the bacilli. The author himself puts forth the hypothesis that they are a more or less obligatory phase in the life of the bacilli caused by their subjection to various agents, namely the "L" phase which is able to give rise to new bacillary or to persist in filtrable form. The object of the present enquiry was to see what further light the electron microscope would throw on the matter, especially after metal shadowing.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 711.]

CHATTERJEE, K. R., DAS GUPTA, N. N. and DE, M. L. Electron microscopic observations on the morphology of *Mycobacterium leprae*. *Exper. Cell Res.* **18** (1959) 521-527.

A study of bacilli from lepromatous patients who had been treated for a year or more with DDS is reported. The finely minced tissue was fixed by exposure to the vapor of 2% OsO₄ for 10 minutes and then macerated with distilled water (time not stated). The membrane was found to consist of a double layer, with condensations here and there on the outer surface. One of the bacilli pictured is homogeneous, but most of them show evidence of polar condensations. Bacilli were found in three types of association: (a) parallel arrangement, (b) star formation (multiplication by budding?) and (c) end-to-end with connection by a constriction of the cell wall (multiplication by fission?). One group pictured in globus formation is surrounded by a wide zone of gloeal substance, which in another picture appears coarsely granular after shadowing. Bacilli or group of bacilli found within Virchow cells lie in vacuolar spaces with varying amounts of what is taken to be cell debris. [Nothing is said of the effects of the DDS treatment, or of the very brief exposure to the osmium vapor and the maceration.] —H. W. W.

SHINOHARA, C., FUKUSHI, K., SUZUKI, J. and SATO, K. Mitochondrial structure of *Mycobacterium tuberculosis* relating to its function. *J. Electronmic.* **6** (1958) (Annual Ed.) 47-52.

In ultrathin sections of *M. avian* and *M. tuberculosis* var *hominis* H37Rv there were demonstrated—following up previous work—mitochondrion-like structures. Study of particulate fractions of the avian bacillus revealed enzyme activities which led to the conclusion that they were corresponded to the mitochondria of plant and animal cells. [Not emphasized is the fact that the bacterial cells were fixed in osmic for 2 and 5 days, and the particulate fractions for 36-48 hours.] —H. W. W.

FUKUSHI, K. Electron microscopic studies of tubercle bacilli. V. Studies on fixation in ultrathin sectioning. *Sci. Rep. Res. Inst. Tohoku Univ. C*, **9** (1959) 1-17.

The fine structures of tubercle bacilli as seen in the thin sections are highly variable, perhaps because of differences of fixation procedures. The author has investigated the matter, with the cultured human, BCG and avian strains, fixing with a 1% osmium fixative in a phosphate buffer at different temperatures and for different times. Best results—compact cytoplasm with minimal vacuolization, and demonstration of intracellular bodies—were obtained at room temperatures, for 5 days with the human bacillus, 2 days for the avian bacillus, and for 4-9 days with BCG (best at 37° for 9 days). Particularly demonstrative are the 2-day and 5-day micrographs of the H37Rv strain, the cytoplasm of the former badly shrunken and vacuolated [because of the effects of the post-fixation processing of improperly fixed bacilli?], whereas that of the latter fills the bacilli. The "slime layer" seen surrounding the outer layers of unsectioned bacilli, and made distinct by metal shadowing, was not seen in these sections, having apparently disappeared during the processing. The cell wall consists of 3 layers—denser outer and inner layers and a less dense middle layer; and inside these layers a very thin membrane "which might be interpreted as a cytoplasmic membrane." The use of permanganate as a fixative is to be reported later. [This matter of fixation—of incomplete penetration of mycobacteria in the times sufficient for fixation of tissue cells—would seem to be of importance in connection with study of the morphology of the leprosy bacillus in its natural habitat (as pointed out by Chapman, Hanks and Wallace [see *THE JOURNAL* **28** (1960) 347], who described the same structures of the cell walls of *M. leprae murium*), it being recognized that the cells of the tissue may be harmed by such prolonged fixation.] —H. W. W.

MUROHASHI, T. Application of malachite green-fuchsin staining to the evaluation of the therapeutic effect of kanamycin administration on the rats with murine leprosy. *Acta Tuberc. Scandinavica* **38** (1960) 18-23.

By grinding and digesting a small portion of lepromas from rats injected subcutaneously with *Mycobacterium leprae* murium, and by making a standard-size smear with a loop that delivered 0.005 cc., the author claims that the total number of bacilli in the leproma and the proportion of viable to dead bacilli can be determined by staining with the malachite green-fuchsin method. [With this stain living tubercle bacilli stain green and dead ones pink.] Quantitative and qualitative comparisons of the bacilli in homogenates of the lepromas of 5 rats, treated with 5 mgm. of kanamycin subcutaneously daily for 3 months from the 3rd month after infection, with those of 5 untreated rats showed that the total number of bacilli per mgm. of leproma in the treated group was 1/10th to 1/100th of that of the control group, and the proportion of green (i.e., living) bacilli ranged from 6 to 60% in the treated group and from 88 to 96% in the control group. The weights of the lepromas of the untreated rats ranged from 400 to 730 mgm., average 574 mgm., and those of the treated rats from 10 to 630 mgm., average 206 mgm. This method of staining is therefore regarded as of value for comparing the therapeutic value of drugs or vaccines in this infection. [Details of the staining method and the calculation for estimating the number of bacilli present in the homogenates, from the number of bacilli per microscope field, are given.]—[From abstract by S. R. M. Bushby in *Trop. Dis. Bull.* **57** (1960) 603-604.]

PERIASWAMY, W. Differentiation of tuberculoid reaction, borderline and lepromatous cases bacteriologically. *Leprosy in India* **31** (1959) 103-106.

Three types of leprosy lesions, tuberculoid in reaction, borderline, and infiltrative lepromatous may sometimes resemble each other. From 10 such cases smears were taken from (a) apparently normal skin, (b) periphery of the lesion, and (c) about 3 mm. outside the periphery. All smears were positive in the 4 cases diagnosed as lepromatous but were negative in the normal skin of the 6 others. Of them, all positive at the periphery of the lesions, 2 were negative a little away, and these were diagnosed as tuberculoid. All diagnoses were confirmed histologically. [Ten cases is a very small number with which to establish such a differential procedure, but the suggestion is interesting.]—H. W. W.

WALLACE, J. H. and HANKS, J. H. Agar substrates for study of microepidemiology and physiology in cells in vitro. *Science* **128** (1958) 658-659.

Certain shortcomings of monolayer cell and tissue cultures when used in the study of infectious disease can be overcome by using agar substrates. Combinations of infectious agents with cells or cell colonies on agar provide a contiguity of cells closer than in animal tissues; extracellular inhibitors are of less concern; neither the agent nor the cells can escape the experimental arena. This is an advantage in the study of microepidemiology and cell physiology, and, at the same time, permits the maintenance of cell cultures for extended periods with minimal care. Substrates are prepared by combining, at 50°C, double-strength nutrients with equal volumes of 2 to 4% purified agar in BSS just prior to preparation of plates and slants. A third form of substrate is prepared by impregnating filter paper (previously extracted twice with boiling distilled water) with the agar mixture. Reservoirs of renewable, slowly available liquid nutrients are made possible by filling cup-like wells in the agar in plate preparations or by adding small amounts of media to the slants and filter paper preparations in the vertical position, limiting the contact of liquid to a small area of the substrate. Cells can be removed quantitatively by application of pancreatin. Tissue fragments (bone marrow, embryonic chick, embryonic human) can also be studied in these systems. Data and references to media composition and cultivation techniques are given.—J. A. ROBERTSEN

BROWN, J. A. K. and REES, R. J. W. A simple apparatus for the transport of leprosy tissue on ice. *East African Med. J.* **36** (1959) 495-499.

The apparatus, described with two photographs, consists essentially of a vacuum flask inserted in a canvas bag, suspended on springs in a light wooden crate. A special plastic cartridge holds one large or two small screw-capped bottles. The cartridge is charged with the material to be transported, and then placed in the thermos flask with ice. The cartridge provides protection against leakage or contamination of the tissue.—

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