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.

ROWBERG, R. G. An evaluation of medical mission work in Africa. Arch. Intern. Med. **106** (1960) 591-595 (editorial).

To provide better understanding of medical missionary work, the author presents and evaluates five years' mission experience in East Africa, where he directed a small hospital and performed in diverse administrative and advisory capacities. Motivation for missionary undertaking is primarly the strong feeling of the individual that the Gospel command to heal is meant for him. Additional factors include desires for travel, broad personal experience, adventure, and personal satisfaction. Personal background may play a larger role than any rational decision. One must be capable and willing to adjust to relatively primitive conditions, and to enjoy so doing. It is stressed that it is not possible to be both minister and physician, since each is a full-time job if done at all well. Mission work is Gospel-centered, and its major efforts of evangelism, education, industrial arts, and medicine are similarly centered. Three stages seen in the medical portion of the missionary endeavor are: gaining the confidence of the native population, improving medical facilities and practice, and teaching. The goal of medical mission work should be, firstly, to aid the general mission effort to bring the Gospel to the people; secondly, to supplement governmental medical agencies; and, finally, to turn the work over to the nationals after adequate training. Problems arising in this effort because of social stratification are discussed. It is hoped that the stereotyped impression of the mission hospital as a thatched mud hut may be replaced with that of the picture of a modern hospital, although some missions refuse to recognize that the African can appreciate a soft mattress too. One can only criticize the failure of a mission to recognize that it must progress medically if it is going to witness in such a way that it need not be ashamed.—J. A. ROBERTSEN

TAMURA, P. Y. Some disease peculiarities in Hawaii. Hawaii Med. J. **20** (1961) 235-239.

About one-half of the 208 leprosy cases occurring from 1949 to 1959 were in Hawaiians and part-Hawaiians, one-fourth in Filipinos, and the remaining distributed among the other races. Most of the Filipino patients were born and reared in the Philippines. As compared with figures from the previous decade the incidences in these races do not appear to have changed much. However, there has been a very substantial decrease in the incidence of new cases over the past ten years, with only 10 in 1960 as compared with 32 per year in 1949-1950. The disease pattern has been altered considerably by therapy. The mortality is low, and today one hardly ever sees the former disfiguring, crippling, and destructive picture.—[From paragraph on leprosy.]

MONTESTRUC, E., GARCIN, D., BENOIST, J., BERDONNEAU, R. and MILLE, R. La lèpre à la Martinique en 1959. [Leprosy in Martinique in 1959.] Arch. Inst. Pasteur Martinique **13** (1960) 72-89.

The progress of the leprosy endemy in Martinique in 1959 agrees quite well with the findings that a considerable regression is taking place. The number of new cases found during the year was the lowest in many years, and the number of new lepromatous

cases, in absolute as well as in relative value, has equally decreased. On the other hand there has been a parallel increase in the number of tuberculoid cases, and the borderline ("frontière") cases have also become more numerous. From the epidemiologic point of view this is extremely significant, because it is proof that the patients have gradually lost the sense of indifference and negligence of skin lesions, making it possible to begin treatment earlier and thus to reduce the period of contagiosity. Another gratifying result is that the hospitalization of bacilliferous patients has progressively increased to 100% since the creation of the leprosy service, while the numbers of new patients of that kind have decreased from year to year. Lastly, the ages of the new cases further contribute to a certain optimism. On the other hand there are points which prevent complete satisfaction. First is the negligence of patients under treatment, which is a direct cause of clinical and bacteriologic relapses. Then there is that of the parents of contacts, who obstruct the surveillance of these contacts. Also the indifference of not a few persons to examination of slight skin lesions. Finally there are difficulties of properly treating and following-up patients residing far from Fort-de-France. However, the antileprosy prophylactic activity is progressively improving, and if it continues the leprosy endemy of Martinique, which has been in evident regression since 1954, will cease in a few years to constitute a social scourge.—AUTHORS' ABSTRACT

HAUZEUR, A. C. Vers l'éradication de la lépre? Influence du traitement ambulatoire de la lépre, a la D.A.D.P.S., sur la progression de l'endémie lépreuse et ses résultats (1953-1959). Note additionnelle concernant les rapports existant entre la lèpre et l'allergie a la tubereuline et la valeur prophylactique du B.C.G. [Toward the eradication of leprosy? Influence of ambulatory treatment with DDS on the progression of the leprosy endemy and its results (1953-1959). Additional note on the relation between leprosy and tuberculosis allergy, and the prophylactic value of BCG.] Ann. Soc. belge Med. trop. **40** (1960) 115-167.

The endemic area studies was the Bosobolo Territory, N.W. Belgian Congo. Mass treatment with DDS (25% suspension in ethyl chaulmoograte) was begun in 1953. Isolation of multibacillary cases, rare in this area (3%), coincided with the beginning of mass therapy but only in certain sectors. Isolation had been practiced for years in other areas without notable effect. Results of mass treatment are detailed; the endemy had still progressed, from 40 per thousand in 1954 to 44 in 1959, the number of known cases increasing from 2,733 to 3,030. This progression is much slower, however, than before the mass treatment. Stabilization has been striking since 1956, the second year after mass treatment was begun. The index of new infections, previously increasing (8.5 per thousand in 1951, 7.3 in 1952, 9.1 in 1953, and 11.1 in 1954), dramatically fell to 3.5 per thousand in 1955, and more slowly but steadily since then (3.2 in 1956, 2.6 in 1957, and 1.2 in 1958). The results of treatment of a group of 3,015 cases (reduced by emigration and deaths to 2,448), the treatment of which started in 1955 or before, had been investigated. Lepromatous cases proved to be the most resistant to DDS and were submitted to combined therapies. But, including relapses, 8% remained in treatment in 1958 (T, 6%; I, 8%; B, 39%, and L, 88%). The remaining 92.2% were "apparently cured," the interval between completion of treatment and last examination varying from less than 1 year to more than 4 years. The duration of the treatment varied from 6 months to 2-3 years (69% of the cases) to—including the relapsed cases—more than 3 years. Relapse seems to be independent of the length of the treatment, with a peak in the second year after the completion of treatment; it is expected in all groups to remain under 5%. The mortality rate was not significantly higher than in the nontreated population. (Details of treatment are given.) The Mantoux reaction showed no significant difference between healthy individuals and the leprosy groups. The prophylactic value of BCG appears to be low, lowering the new-infection index but not abolishing it, with no significant difference in that respect between the areas in which it was used and those where it was not. In fact,

BCG does not seem to be recommended. The study ends with a consideration of spontaneously-cured cases (abortive cases, "A." leprosy). In conclusion, mass treatment of leprosy with fortnightly injections of DDS is effective in reducing the new-infection index.—[From English summary.]

De Menezes, D. Comentários e sugestões de uma campanha anti-leprótica baseados em nossa experiencia de 21 anos no dispensário de Uruguaiana. [Comments and suggestions on an antileprosy campaign based on 21 years' experience of the dispensary at Uraguaiana.] Rev. brasileira Leprol. **27** (1959) 144-153.

Out of 101 leprosy patients enrolled at the dispensary in Uruguaiana (Southern Brazil) from 1939 to 1959, the source of infection was discovered in only 33. Of the patients, 65% were found by the skin disease service, and 23% by examination of contacts. Of 316 contacts who were vaccinated with BCG, only 1 has developed leprosy (3 per 1,000), while of 134 who had not received BCG, 32 have become patients (239 per 1,000). None of 246 contacts who were lepromin-positive has shown the disease during a period of 10 years, while of 181 contacts on whom the lepromin test was not made, 14 have become patients during that period.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 817.]

Litalien, F. and Nguyen-Van-Ai. Contribution du dispensaire antilepreux de l'Institut Pasteur de Saigon a la lutte contre la lèpre au Viet-Nam. [Contribution of the antileprosy dispensary of the Institut Pasteur de Saigon to the campaign against leprosy in Viet-Nam.] Bull. Synd. Méd. Viet-Nam (1960) Sp. No. pp. 13-28.

Since the creation of the antileprosy dispensary of the Institut Pasteur of Saigon the number of cases recorded has increased to 6,263 in October 1959. Each year since 1956 more than 2,100 patients have attended regularly for treatment, an average of about 600 new cases have been detected each year. This report is an attempt to gather epidemiologic data based on the statistics of the dispensary. Among patients attending, males predominate 3:1. The tuberculoid form is not much more common than the lepromatous (T, 47%; L, 41%; I, 7%). The borderline form is apparently exceptional in Viet Nam (4%); it is seen specially among the Chinese, who are more often lepromatous than the Vietnamese. Leprosy in the country is expected to begin to decline. Leprosy in children, 0-15 years, is decreasing (18% new cases in 1948, 14% in 1959); also in young adults from 16-25 years (from 36% to 25%), while the reverse trend is seen in older adults (from 46% to 50%). The frequency of bacillus-positivity in the nasal mucus has decreased by one-half (from 56% to 28%), this indicating that the patients' environment is less severely contaminated. The ever-increasing faith held by the patients in the dispensary is evidence of the efficacy of the dispensary method of treatment.—[From authors' summary.]

De Campos, E. C. Correlação e antagonismo lepra-tuberculose. Alguns aspectos estatísticos observados no Estado do Rio Grande do Sul. [Correlation and antagonism between leprosy and tuberculosis. Statistical aspects observed in the State of Rio Grande do Sul.] Rev. brasileira Leprol. **27** (1959) 117-128.

Statistics are given of the new cases of leprosy, and of the new cases of tuberculosis and deaths from that disease, registered during the quinquennium 1954-1958 in each of the 11 regions of the state. It is observed that, in general, in those regions where the incidence of tuberculosis is highest, that of leprosy is low, and where leprosy is most intense there is less tuberculosis. Thus the coefficient of morbidity from tuberculosis in Campanha is 168.8 with a mortality of 40.2, and the leprosy coefficient is 2.3; whereas in Missões, with a tuberculosis morbidity of 29.6 and mortality of 16.3, the incidence of leprosy is 7.5. Although it cannot be scientifically proved that the presence of tuberculosis in greater measure is the cause of the lower incidence of leprosy, yet this evidence and similar evidence from other countries points in that direction; and, supposing this to be

at least an important factor, it should be possible by means of vaccination with BCG to increase resistance to leprosy in those patients who are at present anergic.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 814-815.]

KLOEPFER, H. W. Genetic signposts of preventive medicine. Genetics Quart. **7** (1960) 69-76.

After briefly reviewing past accomplishments in the field of genetics, the author states five reasons why medical research now is being directed to the study of hereditary diseases. The first is that, in contrast to the past years, these conditions are high on the list of most dreaded diseases and can no longer be ignored. The second is that the development of atomic energy necessitates study in genetics. Third, the discovery by biochemists that the gene has a molecular structure places it in the realm of the tangible. A fourth is the recent realization that irregularities in specific human chromosomes may be observed to occur in individuals with specific congenital anomalies. A fifth reason is the realization that the gene can be an important etiological factor in the causation of all human diseases, including those caused by metabolic errors and communicable agents. The author quotes, as an example of his fifth point, a recent preliminary report on the genetics of leprosy by Belknap and Hayes (1960) which shows that a dominant gene with possibly three-fifths penetrance could be a prerequisite to an infection by the Hansen bacillus. About one in every 20,000 individuals in the population studied, he goes on to quote, seemed to carry this dominant gene, and 3 out of 5 of these carriers get a clinical diagnosis of leprosy if they live until 80 years of age. The author concludes his discussion by suggesting that greater efforts should be made to simplify and extend tests which can be used to identify genetic carriers, and that more concern should be directed toward the use of these tests to prevent symptoms from occurring in potential sufferers. He feels that progress in medical genetics could now be swift, and that the passing of signposts toward the control and prevention of various hereditary diseases may be quite rapid and exciting.—J. A. ROBERTSEN

BELKNAP, H. R. and HAYES, W. G. A genetic analysis of families in which leprosy occurs. Bull Tulane Univ. Med. Fac. **19** (1960) 236 (abstract).

A review of the literature indicates the need for a thorough genetic study of families in which leprosy occurs. The objectives of such a study are stated to be the extension of knowledge concerning the possible role of a major gene for susceptibility to leprosy and the determination of the mode of transmission, penetrance, and frequency of the gene if evidence of its existence is found. The methods and procedures employed in a pilot study by the authors are presented, showing how genealogical data were compiled on white Roman Catholic leprosy patients from seven adjacent parishes in Southeastern Louisiana. The methods of genetic analysis are discussed, and it is shown that a single dominant gene with approximately 62.8% penetrance could account for the observed familial patterns of infection. Rather rough calculations for gene frequency are presented. It is estimated that about one in every 20,397 births in the area under study was susceptible, making a gene frequency of approximately 1/40,794. A discussion of those factors which influenced the gathering of genealogical data and the results of an analysis of the data are presented along with suggestions for future studies of leprosy.

DUNGAL, N. Is leprosy transmitted by arthropods? Leprosy Rev. **32** (1961) 28-35.

The author's summary follows: The author points out the unsatisfactory state of knowledge of the mode of transmission of leprosy, and thinks that insects cannot be ruled out. He reviews work which makes it possible that some of them are at least worth considering, and discusses in this respect fleas and body lice and scabies. He suggests the advisability of planning a field experiment based on the extermination of ectoparasites by modern insecticides.

JOB, C. K. and GAULT, G. W. Bullous type of reaction in leprosy. Leprosy Rev. **31** (1960) 41-45.

From India, where lepromatous cases with diffuse infiltration are frequent but are not known to develop hemorrhagic and ulcerative lesions, the authors report a fatal case which presented bullae and deep ulcerations of the extremities which they relate to "lazarine" leprosy. This is evidently done in the belief that it represents the so-called Lucio form of the disease, although that term is not used. The patient was a 40-year-old man who had a hypopigmented patch on the right thigh 16 years before and, 6 years later, many hypopigmented, shiny macules all over the body. Eight months before admission he began to have bullous lesions which ulcerated, each time more severe. There was generalized diffuse infiltration of the face and trunk, and extensive deep ulcerations of the extremities. Death occurred after 14 days, and an autopsy was performed. The most striking features were the ulcerations, extending to the upper arms and thighs, in places having a superficial appearance of gangrene; and a few bullous lesions present on the arms. As a measure of the distribution of bacilli in the body, they were found in—besides the liver and spleen in large numbers—the endothelial cells of the capillaries of the alveolar walls in lungs and of the glomerular tufts in the kidneys. The most conspicuous histopathologic change of the skin, besides lepromatous infiltration, was vascularities of small arteries and veins of the cutis, some with thromboses. [In the discussion it is recalled that Rodriguez, in 1935, reported an actively ulcerating ("lazarine") case from the Philippines, but histologically the lesions had been reported tuberculoid. It can hardly be gainsaid that, essentially, the case here reported resembles Latapi's "diffuse lepromatosis" with the Lucio phenomenon, although with differences from cases reported from Mexico.] —H. W. W.

PRICE, E. W. Studies on plantar ulceration in leprosy. VI. The management of plantar ulcers. Leprosy Rev. **31** (1960) 159-171.

This last of a series of studies deals with the management of the pre-ulcerative stage, plantar ulceration, and healed ulceration. To prevent ulceration there should be regular and systematic examination of the patients' feet, with records of anesthesia, plantar damage, loss of skin and deep tissues, and x-ray examination. The frequency of examinations should be in direct proportion to the degree of damage or anesthesia. In the management of ulcers it is to be remembered that "the healing of a large ulcer by scarring will not support the strain of walking in the best feet." Antibiotics can speed healing, but the best aid is the application of a walking plaster, after infection and edema are controlled. Skin loss must be made good by plastic surgery. In the management of healed ulceration, the healing must be considered as only a stage in the treatment. The use of wooden soles with a sponge-rubber insole is recommended. Rigid-sole footwear is indicated both for threatened and for healed plantar ulceration. The author surmises that as long as anesthesia persists it may be necessary to wear special footwear, perhaps permanently; but he is confident that odor and hospitalization can be averted by the methods he advises.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 1179-1180.]

LANGUILLON, J., BOURREL, P., BOISSAN, R. H. and PICARD, P. Contribution a l'étude des perforants plantaires lépreux. Distribution, étiologie, pathogénie. Complications et traitement. [Contribution to the study of perforating ulcers of leprosy; their distribution, etiology, pathogenesis, complications and treatment.] Méd. Trop. (Marseilles) **20** (1960) 219-255.

This long article is based on a study of more than 3,000 cases of leprosy. Out of 403 patients with perforating ulcers only 22 were lepromatous, the rest being tuberculoid or indeterminate. In 77% the ulcers occurred in the front of the sole, related to the points of pressure on the sole and liability to injury in walking. A radiologic study of the foot showed that in 71% of patients there is subjacent osteoarthritis, proportionately more in men than in women. A study of the neurologic factors deals with the innervation of the

dorsal and plantar aspects of the foot, and the various forms of anesthesia. Plantar anesthesia is not always a necessary condition, as sensation was retained in 19% of patients with ulcers, and there was total anesthesia in only a quarter of the cases. There was no evidence of calcium or phosphorus deficiency. Various forms of treatment are discussed. Most of them have very limited effects, the two most important factors for healing being immobilization and the removal of subjacent osteoarthritic lesions. Lastly, various surgical procedures are considered: removal of bone, planting of grafts, amputations, etc. There is no clear evidence that surgery of the sympathetic is of value. The reparative work of Brand and Fritschi for deformities by tendon transplantation is mentioned, and its secondary beneficial effect on perforating ulcers.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 815.]

ANDERSON, J. G. Plantar ulcers in leprosy. Their pathogenesis and natural history, and their therapy and prevention. Leprosy Rev. **32** (1961) 16-27.

This is an excellent, comprehensive review of the subject, divided into two sections: (1) pathogenesis and natural history, and (2) therapy and prevention, including surgical intervention. The original article should be read by anyone interested, for a detailed abstract is hardly possible; indeed, the author's summary simply states that ". . . an attempt has been made to present a concept of the natural history of plantar ulcers in leprosy with the main stress on factors dependent on anaesthesia of the foot. A rational therapy based on these findings has been described."—H. W. W.

MONTESTRUC, E. Fréquence et classification des infirmités chez les malades atteints de lèpre à la Martinique. Considérations sociales, thérapeutiques et épidémiologiques. [Frequency and classification of infirmities in leprosy patients in Martinique. Social, therapeutic and epidemiologic considerations.] Arch. Inst. Pasteur Martinique **13** (1960) 90-98.

In 589 leprosy patients, hospitalized or under dispensary treatment, the distribution and extent of deformities and mutilations has been studied. (1) In 385 cases, or 65%, there were no such lesions, and the patients were capable of leading a normal social life. (2) In 115 cases, or 20%, there were such lesions, but they were capable of being socially rehabilitated. (3) In 89 cases, or 15%, the lesions were irreversible, definitely not capable of rehabilitation. (4) The most frequently or most severely affected parts are: (*a*) the hands (82%), (*b*) the feet (65%) and (*c*) the head (46%). It is concluded that (1) About 20% of our patients were definitely beyond recovery, and they should be placed in an asylum for incurables and not in a treatment hospital. (2) The percentage of deformities and mutilations that can be ameliorated is sufficiently large to give an important place in the overall treatment to reparative and orthopedic surgery, electrotherapy and physiotherapy.—AUTHOR'S ABSTRACT.

DE SOUZA-ARAUJO, H. C. Evolução de um caso de lepra em 40 anos; auto-observação de L.A.C. [Evolution of a case of leprosy in 40 years.] Rev. brasileira Med. **17** (1960) 710-714.

This report is an entertaining summary description by a patient of his vicissitudes with leprosy—at first of his vicissitudes with its diagnosis—beginning in 1918 when he had a severe attack of the "Spanish influenza" then prevalent. Names of physicians consulted are given, including those who in the first years declared him negative. The author's contribution is a 3-line note to the effect that in his 44 years of experience this patient was the only one who had ever supplied so complete an auto-observation.—H. W. W.

BALZER, R. J., DESTOMBES, P., SCHALLER, K. F. and SÉRIÉ, CH. Leishmaniose cutanée pseudolépromateuse en Éthiopie. [Pseudolepromatous cutaneous leishmaniasis in Ethiopia.] Bull. Soc. Path. exot. **53** (1959) 293-298.

Report of a case of diffuse cutaneous leishmaniasis with greatly thickened lesions

of the face and ears, which might readily be mistaken for lepromatous leprosy except for lack of affection of the superciliary regions; the massive lesions of the feet resembled mycetoma. Histologically also, under low power, the lesions resembled lepromas with massing of vacuolated histiocytes, but these were loaded with leishmania. Therapy was difficult because of reactions.—H. W. W.

DESTOMBES, P. Application du concept de "systématisation polaire" aux leishmanioses cutanées. [Application of the "polar system" concept to cutaneous leishmaniases.] Bull. Soc. Path. exot. **53** (1959) 299-301.

The histologic observations in the case reported (see preceding abstract) lead to the proposal, as a working hypothesis, of a polar systematization of the lesions of leishmaniasis, as of leprosy. The habitual localized form tends to cure; the appearance of tuberculoid structure is evidence of a progressive acquisition of tissue resistance, which ends in progressive scarcity of the leishmania; the Montenegro intradermal reaction is positive—all comparable to tuberculoid leprosy. In the rare diffuse nodular form, there is a histiocytic granuloma, as in lepromatous leprosy, the cell a veritable Virchow cell which harbors great numbers of the organisms, and—according to Convit—in Venezuela the intradermal reaction is negative, again as in lepromatous leprosy.—H. W. W.

DAVEY, T. F. Some recent chemotherapeutic work in leprosy: with a discussion of some of the problems involved in clinical trials. Trans. Roy. Soc. Trop. Med. & Hyg. **54** (1960) 199-206; discussion pp. 207-211.

This paper is mainly concerned with results obtained in the trial of two drugs, Ciba-1906 and Etisul, but general problems related to therapy experiments are discussed first. It is pointed out that, to compete with DDS, a new drug must be acceptable to patients, be relatively free from toxic action, be at least comparable in activity with DDS and capable of use in combination with that drug, and for mass use be of low cost. The morphology of the bacilli may have an important bearing on drug trials, granular bacilli showing a stage in resolution. Progress under treatment may be considerably influenced by type of the disease, the capacity of the body to induce spontaneous improvement. There are problems in connection with the selection of patients, and the matter of controls. Regarding the latter, using DDS as a standard it is wise to match controls as accurately as possible, especially in small pilot trials, although in larger trials random selection may be used. Regarding the bacterial index, it had been found best to use, not individual controls, but a graph representing accumulated experience with large numbers of DDS-treated patients. This provides a standard against which one new drug can be compared with another. Referring to already-published reports on trials with Ciba-1906, it is recalled that up to the 36th month the group-decline in the bacterial index was better than the DDS standard, after which time it is necessary to combine DDS with the Ciba-1906. Its lack of toxicity allows its full dose (2 gm. daily) to be used from the beginning. The effects of Etisul (diethyldithiolisophthalate), also already published, appear to be exerted mainly on bacilli of normal morphology, with little action once the bacilli have become granular (in 8-12 weeks). After that the treatment is changed to DDS, but the subsequent progress is better than if only DDS had been used throughout. Neither of these drugs meets the need for a single basic, nontoxic, rapidly-effective antileprosy remedy, although they both have a useful place in leprosy therapy.

In the discussion, REES suggested that the application of some of the methods now used in tuberculosis may be helpful in leprosy; that the number of patients available for trials could be increased by different centers taking part in a centrally-controlled trial; and he offered suggestions for the proper conducting of clinical trials. He confirmed Davey's suggestion that irregular staining with granularity is more sensitive than the bacterial index in assessing improvement, and spoke of reference to corresponding trials in rats treated with isoniazid. The bacilli which stain irregularly are the same bacilli which show degeneration changes with the electron microscope. DRIVER mentioned that, in seek-

ing an acceptable compound from ethyl mercaptan, Etisul had been chosen from 400 derivatives; that Etisul has no cross resistance with the other antimycobacterial drugs; and that it is very effective against murine leprosy. Its antituberculosis action is due to the release of ethyl mercaptan in the body, but neither compound shows any antituberculosis action *in vitro*. JOPLING referred to his failure to get favorable results with Etisul in 4 cases, and thought that this might be due to the bacilli already being dead, they being all granular when the treatment was begun. RIDLEY mentioned that experiments on monkeys showed that dead bacilli took as long to be absorbed as living ones. "Chemotherapy we hope kills bacilli, stops the progression of the infection, and prevents relapse; but after that it could be that the destruction and removal of bacilli, on which so much depends, is left to the patient's own efforts." CHATTERJEE referred to the possibility of there being different strains of *M. leprae*, as shown by morphologic features with the electron microscope. [For anyone in a position to carry out trials on antileprosy drugs, this paper is one of considerable value.]—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 1074-1076.

MCGREGOR, H. A preliminary trial of Etisul in treatment of leprosy patients. Leprosy Rev. **32** (1961) 36-39.

This report comes from the leprosarium near Kuching, Sarawak, where the trial was carried out in 29 lepromatous cases previously treated with DDS or DPT. The Etisul cream was applied over a wide area of the body surface, usually the back, "by gentle persistent inunction," for 20 minutes or more. One case quit because of a sudden dermatitis, and another because of an ENL reaction; there were no other reactions. The patients generally reported a feeling of greater well-being. After 12 weeks all of the 27 other patients showed moderate to marked clinical improvement, and the average bacillus index had decreased from 0.83 to 0.34; indeed, only 3 cases were still positive. Improvement continued when the patients were then placed on DDS or DPT, the association of these drugs being regarded as important.—H. W. W.

DAVISON, A. R. A clinical evaluation of Etisul. Leprosy Rev. **32** (1961) 40-42.

A report from South Africa of treatment for 12 months of 34 lepromatous and 6 borderline cases, all strongly positive for bacilli, divided into [the report somewhat confusing on this point] three equal treatment groups. All of them received DDS and Ciba-1906, but one (control) got nothing else, another got Etisul inunctions 2 times weekly, and the third Etisul 5 times a week. There was slight and parallel clinical improvement in all three groups. The bacillus index fluctuated markedly from month to month, but there was some improvement—also apparently parallel—in all groups (from 19.9-21.8, to 20.5 to 16.2, 18.3 and 16.8, respectively). No attention was paid the morphology of the bacilli, as previous work had convinced the author that there is no significance in that feature. It is concluded that the addition of Etisul to the DDS-DPT treatment, 2 or 5 times a week, gave no better results than that treatment alone.—H. W. W.

MONTESTRUC, E. and BENOIST, J. Action bactériologique du *p*-N,N-diméthyl-aminophényl-1 *p-n*, butoxyphényl-3 thio-2 urée sur les lèpres du type lépromateux et dimorphes sulfono-résistantes. [The bacteriological action of *p*-N,N-dimethylaminophenyl-1 *p-n* butoxyphenyl-3 thio-2 urea (Ciba-1906) on sulfone-resistant leprosy patients of the lepromatous and dimorphous types.] Bull. Soc. Path. exot. **53** (1960) 13-16.

After referring to the results with Ciba-1906 obtained by previous workers, the authors describe their own results with 4 patients, 2 lepromatous and 2 dimorphous [borderline?], chosen from a group who had not become bacteriologically negative on DDS during periods of 1 to 3 years. After initial lower doses, the continuing dose was fixed at 3 gm. per day. This was well tolerated: only 1 patient had slight erythema without fever. The results were favorable, all 4 patients becoming bacteriologically negative

within 6 months. It is considered that Ciba-1906 is very useful for patients who show resistance to sulfone or other treatment.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 1076.]

ROLLIER, R. and REBOUL, E. Nouveaux essais de traitement de la lèpre lépromateuse par la D-cycloserine. [A new trial of the treatment of lepromatous leprosy with D-cycloserine.] Maroc. Méd. **93** (1960) 41-66.

The authors give their own experience with this drug in the treatment of 12 lepromatous patients (1 subclassed as L-1, 7 as L-2, and 4 as L-3). Two of them received cycloserine alone, 4 received cycloserine alone to begin with and DDS added after 6 months, and 6 received the combined treatment throughout. Particulars of improvement under treatment after 18 months are given. The clearing up of bacilli, both in the nasal mucosa and in nodules, appeared to be more rapid where the combined treatment was used than with cycloserine alone. Apart from 2 patients who had severe reactions due to an overdose, reactions in the other patients were almost entirely afebrile and of short duration. Cycloserine was on the whole well tolerated, but it is considered necessary to be careful to exclude nervous or mental conditions before starting the treatment. It is concluded that cycloserine should be used only when there is intolerance to DDS, or in association with other drugs so as to avoid drug resistance. More rapid clinical improvement in comparison with DDS, and quicker clearing up of nasal infection, more than offset the expensiveness of the drug and the greater precautions that have to be taken.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 714-715.]

DREISBACH, J. A. and COCHRANE, R. G. A three year clinical evaluation of Dalacin in the treatment of lepromatous leprosy. Leprosy Rev. **32** (1961). 48-56.

This is a report of a three-year trial of an antibiotic called streptovaricin (Upjohn's Dalacin) in 4 lepromatous cases at the Kano leprosarium, in Northern Nigeria. The dosage was 3 gm. daily—15 200 mgm. capsules by mouth, a little hard to take. Tolerance was good. In all cases there were mild ENL reactions, taken as "an indication of some effectiveness of the drug in dealing with *M. leprae*." All of the cases showed significant clinical and bacteriological improvement, but no more than—if as much as—would have been expected with sulfones. In fact, nasal mucosal lesions failed to respond to the treatment, and biopsy findings in skin lesions did not coincide with the clinical improvement. —H. W. W.

NGUYEN-VAN-UT. Particularités clinique de la lèpre traitée par les sulfones. [Clinical particularities of leprosy treated by the sulfones.] Bull. Synd. Méd. Viet-Nam. (1960) Sp. No. pp. 43-50.

The observations recorded are only a part of those that can be gathered from clinical dermatology, but they suffice to show the marked polymorphism of leprosy in Viet Nam. Aside from the classical polymorphism, many cases of eczema, poikiloderma, scleroderma, mild dyschromia, vitiligoid patches, pityriasis versicolor, etc., were found to be leprous when thoroughly examined. Also all lesions which are tenacious and stubborn to the usual therapies, all dyschromias, all atrophies, etc., should be thoroughly examined for the possibility of leprosy. As regards the effect of sulfones, particularly disulone and DDSO, it has been found marked for all forms of leprosy. Disulone, which is as active as DDSO, is apparently better tolerated than the latter. With progressive therapeutic doses according to the weight of the patient (2 to 3 mgm./kgm. per day) the reactions are infrequent and not severe, and generally can be controlled by appropriate medication.—[From author's conclusions.[

LE KHAC QUYEN, BUU-BOI, N. P. and XUONG, N. D. Résultats d'un traitement antilépreux pilote par le 4,4′-diéthoxythiocarbanilide dans un hôpital de Sud-Vietnam. [The results of a pilot trial in the treatment of leprosy with 4,4′-diethyloxythiocarbanilide in a South Vietnam hospital.] Bull. Acad. Nat. Med. **144** (1960 535-538.

In 1957 the authors reported results of 500 leprosy patients treated with the drug referred to (Dialide). They chose this form of thiourea in preference to 3 others because of its comparative simplicity and lower price. In the earlier trials they had used a daily dosage of 100 mgm., but later they found that they could raise the dose to 400 or 600 mgm. safely and get better results. The good results appeared after some 6 months, but in some cases bacilli tended to reappear. A total of 166 patients were treated. The lack of permanence of effect, it is suggested, may be due to the development of resistance on the part of the mycobacteria.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 1180.]

Job, C. K. Treatment of lepra reaction with chloroquine. J. Christian Med. Assoc. India **35** (1960) 184-190.

Antimalarial drugs have been found effective in the treatment of lupus erythematosus and rheumatoid arthritis in a way similar to corticosteroids. Since the latter are useful in controlling lepra reaction, antimalarial drugs might also be useful in controllng that condition. This reasoning, along with the results in a leprosy colony in Nigeria where the 500 patients were given pyrimethamine for malaria prophylaxis, resulting in reduced lepra reaction, led the author to undertake this experiment. He chose chloroquine for the purpose, as it has been shown to be one of the least toxic of antimalarials. He gave the drug to 96 patients with lepra reaction, 150 mgm. 3 times daily for the first week, twice daily for the second week, and once daily thereafter. Of the 96 patients, 75 showed complete resolution, 6 a fair amount of response, and 15 no response. There were no serious toxic symptoms, even when the treatment was prolonged up to 12 months. The results compare favorably with those with antimony and mercurochrome, and have the advantage that the patient does not have to be hospitalized. It is therefore valuable for use in outpatient clinics, and when given in lower doses over a long period of time it "provides a safe and valuable form of treatment for chronic lepra reactions which may constitute such a troublesome therapeutic problem."—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 1178-1179.]

Ellard, G. A. Biochemical aspects of the chemotherapy of leprosy. East African Med. J. **37** (1960) 765-775.

Quicker acting drugs are needed for the cure of leprosy. An account is given of the problems to be considered and methods used in searching for such drugs. The drugs in present use are discussed from a biochemical point of view. It is considered that a rational approach to the problems may be feasible.—John Garrod

Ridley, D. S. The comparative action of chemotherapy on *M. leprae* in superficial tissues and in the reticulo-endothelial system. Leprosy Rev. **31** (1960) 189-192.

The question is raised whether the reticulo-endothelial system (RES) acts as a reservoir of bacilli and possibly as a source of reinfection after treatment. The material studied was obtained postmortem from 4 untreated lepromatous cases, and specimens from 8 patients at different stages of treatment. It was found that under chemotherapy bacilli generally disappear from the RES before they do from the skin, nerve or testis. That system has a primary function of disposing of foreign particles and noxious agents. It is assumed that the bacilli in the liver and spleen are there only because they have been filtered off from the blood stream. "In lepromatous leprosy, in which the tissue reaction to *M. leprae* is quite passive, it is likely that the RES is the principal site of destruction of the bacterial bodies. When infection is arrested and the inflow of bacilli to the liver and spleen is reduced, numbers rapidly decline."—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 1176-1177.]

Wilkinson, F. F., Jonquieres, E. D. L. and Falciani, S. J. A. Influencia de la hialuronidasa intraneural en las neuritis. [Influence of intraneural hyaluronidase in neuritis.] Leprología **4** (1959) 140-142.

The authors report the results of treatment of neuritis, leprous and nonleprous, with intradermal injections of hyaluronidase. They emphasize the fact that this treatment has been employed in nonleprous neuritis. They hold that the method is effective and harmless, and urge others to investigate.—[From authors' summary.]

WILKINSON, F. F. and FALCIANI, S. J. A. Vitamina E hidrosoluble en las amiotrofias. [Water-soluble vitamin E in the amyotrophies.] Leprología **4** (1959) 136-139.

The authors treat leprous amyotrophies with intramuscular injection of water-soluble vitamin E. They propose a practical method to measure the degree of muscular atrophy. They consider vitamin E to be an effective treatment, the possible oil action being eliminated.—[From authors' summary.]

ORENTREICH, N., STURM, H. M., WEIDMAN, A. I. and PELZIG, A. Local injection of steroids and hair regrowth in alopecias. Arch. Dermat. **82** (1960) 894-902.

Regrowth of hair after intradermal injection of the more insoluble forms of prednisolone, hydrocortisone and fludrocortisone was induced in alopecia areata, alopecia totalis, and alopecia universalis, but not in other kinds of alopecia, the new growth lasting for 6 to 9 months after a single injection. A patient with growth of the eyebrow is shown. [It cannot be said whether or not it would be worth while to try this method in leprosy, which is not mentioned in the list of conditions in which the treatment failed.] —H. W. W.

BERGER, R. A. Alopecia areata of eyebrows—corticosteroids. Arch. Dermat. **83** (1961) 151-155.

This is a report of treatment of 11 cases of alopecia areata of the eyebrows by injection of corticosteroids, this area being particularly suited for treatment with this modality. Several of the drugs were used with effect. The response in favorable cases is temporary, but the treatment is practical and worthwhile, and the response can be maintained by repeated injections at intervals dependent on the duration of response in the individual case.—H. W. W.

MASANTI, J. G., FUHRER, E. and MELAMED, M. Proteínas séricas en la lepra. Modificaciones en las diferentes formas clínicas, en la amiloidosis y acción de los glucocorticoides. [Serum proteins in leprosy. Modifications in the different clinical forms, in amyloidosis, and action of the glucocorticoids.] Leprología **4** (1959) 143-152.

In a group of 77 persons (18 healthy and 59 leprous), in which 106 complete proteinograms were made, the equivalence of total proteins and the different protein fractions of the blood serum were studied. In patients with tuberculoid, borderline, and residual lepromatous leprosy there is a decrease of the serum albumin fraction, with relative normal values of the globulin fractions. Patients with active, nonreactional lepromatous cases present, as distinctive, an increase of the gamma globulin, and the reactional lepromatous cases an increase of the alpha-2 globulins. In lepromatous patients with amyloidosis the picture is conditioned by the evolutionary condition of the leprosy and not by the amyloid complication. Decrease of albumins and increase of alpha-1 globulin are two usual facts in all clinical forms and are therefore nonspecific, even if it is possible that the cause of the hypoalbuminemia may be different in each group.—[From authors' summary.]

LANGUILLON, J., BOISSAN, R. and PICARD, P. La C-réactive protéine dans la maladie de Hansen. [C-reactive protein in Hansen's disease.] Méd. Trop. (Marseilles) **20** (1960) 365-367.

Reference is made to studies which showed that the serum of patients with acute pneumonia precipitated with the polysaccharide C of the pneumococcus. After testing

the sera of 156 lepromatous, 142 tuberculoid and 40 indeterminate cases of leprosy, the authors found lower CRP rates than had been reported by American workers. They concluded that the CRP is a nonspecific indication of an inflammatory state, found more frequently in lepromatous cases (38%) than in the tuberculoid cases (19%), and particularly when lepromatous patients are suffering from lepra reaction. CRP diminishes with the favorable course of the reaction, and if it remains at a high level a relapse of the reaction is to be expected.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 1072.]

CAMBIAGHI, O. Reação de Mitsuda em crianças de 5 á 13 anos de idade. Estudo comparativo entre comunicantes de doentes lepromatosos e não comunicantes de doentes de lepra. [Mitsuda reaction in children 5-13 years of age. Comparative study of contacts of lepromatous patients and noncontacts.] Rev. brasileira Leprol. **28** (1960) 77-90.

Two groups of children aged 5-13 years showing no symptoms of leprosy, one being contacts of patients with lepromatous leprosy and the other being noncontacts were studied with respect to lepromin reactivity. The noncontacts were 254 schoolchildren from the Usina Santa Barbara, São Paulo, and the contacts were 208 children from the Piracicaba Dispensary. Integral lepromin was used, and the results were read in 30 days according to the standard adopted by the Madrid congress. Among the schoolchildren 53% were positive (1+, 46%; 2+, 4%; and 3+, 2%). The sexes were equally reactive (boys, 50%; girls 57%). Among the contacts there were proportionally fewer positives (1+, 25.5%; 2+, 2.4%; 3+, 11%). Concerning the strongly positive (3+) reactions, however, the reverse was true; there were over four times as many among the contacts as among the noncontacts. In this case the girls showed higher total positivity than the boys (43% and 34%, respectively), and the same holds for the 3+ reactions (13% and 8%, respectively).—[From author's summary.]

MONTESTRUC, E. and DESPIERRES, G. La réaction de Mitsuda et la rôle du B.C.G. dans la positivité de cette réaction en milieu indemne de lèpre. [The Mitsuda reaction and the role of BCG in the positivity of this reaction in a leprosy nonendemic area.] Bull. Soc. Path. exot. **53** (1960) 630-634.

The authors carried out this immunologic investigation in Lyon, France, which is a nonendemic area, and they arrived at the following conclusions: (1) The nontuberculous inhabitants, those not reacting to a 50 TU intradermal tuberculin test, never give positive Mitsuda reactions. (2) In 112 cases, aged 8-18 years, after vaccination with BCG by scarification, conversion of the Mitsuda reaction from negative to positive occurred in 77%; in 20% the reactions were doubtful, and only 4% were definitely negative. (3) Conversion was as good, if not better, in persons not given a lepromin test prior to vaccination (35 out of 42, or 83%) than in those who had been tested previously (53 out of 70, or 76%). The intensity of the positive reactions were practically the same in both groups. The role of BCG in provoking this positivity of the Mitsuda reaction is therefore indisputable, and that of lepromin is negligible, at least so far as concerns a single injection. The consequences of these findings are, for the leprosy prophylaxis, of great importance, it being generally agreed that Mitsuda positivity indicated resistance to leprosy infection. (4) It was confirmed in this study that persons with pulmonary tuberculosis react positively, sometimes very strongly, to lepromin. (5) In persons vaccinated with BCG long before, the Mitsuda reaction is apparently more accurate for the investigation of allergy to tuberculin than the cuti reaction to tuberculin, and it gives practically the same results as the intradermal test with 50 units of tuberculin. (6) There is no concordance between the intensity of the tuberculin and lepromin reactions.—AUTHORS' ABSTRACT

AZULAY, R. D. and XEVES, R. G. Sensibilization of guinea-pigs after repeated lepromin tests. Leprosy in India **31** (1959) 48-50.

After submitting 15 guinea-pigs to 5 lepromin tests, the authors found that 11 (73%) gave negative reactions, 3 (20%) gave doubtful reactions, and 1 (7%) gave a positive reaction. From this it is concluded that repeated lepromin tests are able to sensitize guinea-pigs to that antigen, but this capacity is very inferior to that of BCG. It is concluded that lepromin has a very low antigenic capacity.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 1183.]

BLITTERSDORF, F. [The problem of tuberculosis immunity from the clinical point of view.] Beitr. Klin. Tuberk. **121** (1959) 111-120.

The author holds that immunity is a special form of allergic conversion, i.e., an acquired alteration of reaction to a pathogen. There are still wide differences between man and test animal with regard to the process of immunization and the intensity and form of the immunity achieved. The type of allergic conversion is so typical for every species of animal that the allergic process for one species cannot be generally applied to others. Immunity reactions in man can be reliably intercepted only by observations on human beings. The various humoral or microscopic findings of a tuberculous conversion are significant only when they result in a proved reduction in the incidence of infection and reinfection. Allergy is by no means identical with immunity. Hyperergic inflammatory reaction is the opposite of immunity, biologically and medically. For the clinician, not the development of immunity but the state of immunity is important. When a superinfection is rapidly followed by perifocal inflammations, this is not due to propagation of the microorganism itself, but indicates a hyperergic inflammation or true hypersensitivity. The important clinical question is whether hyperergic, hypergic, or anergic reaction is more frequent in reinfection. In addition, there are the cases of reactivation without exogenous reinfection, which are the so-called endogenous exacerbations. Arguments to prove the existence of immunity to tuberculosis may be: (1) animal experiments in which later infections take a milder course than the first; (2) clinical experience, because in active tuberculosis exogenic new infection rarely leads to the formation of new foci; (3) the obvious and regular immunity in many other infectious diseases; and (4) comparative investigations on adults with positive and negative tuberculin reactions. The author investigated these points and concluded that a number of important arguments tend to disprove tuberculosis immunity. Tuberculosis in adults is characterized by features which are hardly compatible with immunity from the primary infection: (1) the periodic course, (2) the relatively high exacerbation rate of old tuberculous foci, and (3) the presence of old calcified foci in many patients with recent tuberculosis. The transition from active to clinically cured tuberculosis should be associated with an alteration of sensitivity to reinfection. Inactive tuberculosis has a relatively great tendency to reactivation. Endogenic exacerbations, even if their incidence is only 10 or 20%, disprove even more the possibility of an acquired specific immunity than the reactivation of old primary foci or inactive foci as a result of reinfection. The author concluded that no true immunity develops in tuberculosis.—[Abstract from *J. American Med. Assoc.* **174** (1960) 321 (Foreign Letters).]

ROSENTHAL, S. R. and LIBBY, J. E. P. Simultaneous multiple tuberculin testing. Bull. World Hlth. Org. **23** (1960) 689-692.

Simultaneous duplicate tuberculin testing is often used in experimental work (e.g., in standardizing tuberculin), giving a much more precise comparison than alternate testing of different individuals because of variations of allergy in them. It is tacitly assumed that the two tests in the same person do not interact in any way, which assumption this report shows is not justified. In a study of 611 BCG-vaccinated infants, 306 of them given a single 10 TU test of OT and 305 given a duplicate test with 10 TU in one arm and 100 TU in the other, it was found that the reactions to the low-dose test were reduced in size

when it was given simultaneously with the high-dose test. This is said to be the first report of simultaneous multiple testing in man, although a parallel phenomenon has been observed in guinea-pigs. It suggests competitive drawing upon an antibody production which is not unlimited in the period of the reaction.—[In part from review in *WHO Chronicle* **14** (1960) 486.]

RUGE, H. G. S., FROMM, G., FÜHNER, F. and GUINTO, R. S. Serological findings in leprosy. An investigation into the specificity of various serological tests for syphilis. Bull. Wld. Hlth. Org. **23** (1960) 793-802.

This is a report of multiple tests done in Germany on lyophilized sera from the Philippines. Some of them were from patients who had not received any treatment with sulfonamides [sic!]—also referred to as "antibiotics"—but the sera from those which had been so treated showed no evidence of any influence of the treatment. It was found that false positive results were not as frequent as expected, and that for those which occurred the lipid antigens were mainly responsible. The tests with treponema antigens were far more specific than the standard tests for syphilis, and for relative simplicity the Reiter-antigen test is recommended. [In an addendum attention is called to a report on a serologic survey, done in 14 different laboratories on 1,200 sera from patients with syphilis, leprosy, pinta and yaws, which showed that even under the best working conditions it is not possible to get complete agreement with any of the tests used. Serology Evaluation and Research Assembly (SERA) 1956-1957, Washington, D.C. (U.S.P.H.S. Publication No. 650).].—H. W. W.

MATTMAN, L. H., TUNSTALL, L. H., MATTHEWS, W. W. and GORDON, D. L. L variation in mycobacteria. American Rev. Resp. Dis. **82** (1960) 202-211.

The L variant bacterial forms (i.e., without cell wall, as produced for example by growth on penicillin-containing media) have been reported for many genera, but none for the mycobacteria. The authors report four years work on the subject, which involves the questions of certain atypical forms which have been observed, and of filterability. Although the original article must be referred to for details, a few highlights can be given here. At the beginning of the work giant round L bodies, nonacid-fast, measuring 50 μ and larger, were produced. Their membranes frequently ruptured with extrusion of a granular content, which however, would not undergo further development until sucrose was used as a stabilizer in a hypertonic medium. In a diagram it is shown that an L body may revert to the bacterial form (rods being developed within the membrane), or may produce filterable particles which are extruded. There is a question whether smaller L forms developed on media unsuitable for continuation of the L cycle should be regarded as protoplasts, which are a form developed in bacteria when cell walls are digested by lysozyme, and it is concluded that the terms "protoplast" and "L body" should not be used interchangeably. However, two pictures of bodies from human and avian bacilli shown are labelled as protoplasts. Specimens of cerebrospinal fluid from cases of tuberculous meningitis, when examined by phase optics, showed L bodies or protoplasts; they were often numerous when acid-fast rods were not seen. "The L cycle in mycobacteria is the same as that shown in other genera of bacteria, and thus provides a new basis for the filterability of the genus."—H. W. W.

RHODES-JONES, R. Preliminary report on the rapid fading of *M. leprae* in sections from patients treated with diethyl dithio*iso*phthalate. Leprosy Rev. **31** (1960) 200.

The author found that in biopsy specimens taken from patients treated with diethyl-dithiolisophthalate (Etisul), sections with deeply stained acid-fast bacilli tended to fade, so that 24 hours later no bacilli can be found. When restained the bacilli reappeared, but again similarly disappeared. Even in sections of a specimen from a patient who had been treated with Etisul for only 4 days, disappearance occurred. Specimens from patients

treated with other drugs did not show the same result, the bacilli retaining their acid-fastness. Smears on slides taken from the same patient treated with Etisul did not fade.—[From abstract by E. Muir in *Trop. Dis. Bull.* **57** (1960) 1180-1181.]

Mori, T., Kosaka, K. and Ito, T. Detection by Nile blue staining of tissue contaminants in murine leprosy bacilli preparation. Biken's J. (Osaka) **3** (1960) 261-263 (correspondence).

Usually, Ziehl-Neelsen staining has been used to detect contaminating tissue components in suspensions of the rat leprosy bacillus. The purest preparation obtained by Ito and Sonoda's trypsin method, negative by Ziehl-Neelsen, still showed a considerable amount of contamination when counterstained with nile blue. Technique: stain with Ziehl, decolorize with HCl-alcohol 1%, and counterstain with saturated aqueous nile blue diluted with 95% ethanol (2:1, v/v) for 0.5-1 minute. There must be a considerable amount of debris which is not attacked by trypsin. It may be that the debris so stained is the residue of some structural components of the tissue whose surface protein, stainable by methylene blue, has been digested by trypsin. Partial success has been obtained in removing this debris (a long schedule of centrifuging being given), but still caution must be used in employing this material in biochemical research.—H. W. W.

Robson, J. M. and Smith, J. T. Immunity in *Mycobacterium leprae murium* infections. British J. Exper. Path. **41** (1960) 81-85.

Mice were vaccinated intradermally with 3 x 10^8 *Mycobacterium leprae murium* or with 10^5 viable units of BCG, and challenged intracorneally 12 or 72 days later with 10^7 bacilli. Comparison of the macroscopic lesions and the total numbers of bacilli in the corneas of these mice with those of unvaccinated mice, showed that there was no immunity after 12 days, but there was a definite reduction in the multiplication of the bacilli after 74 days. By the 50th day after challenge the inoculum had increased only 2- to 3-fold in the vaccinated animals challenged after the 74th day, whereas in the unvaccinated animals it had increased more than 10-fold. In spite of this reduction in multiplication there was no apparent effect on the macroscopic lesions, and the authors suggest two alternative explanations for this discrepancy, i.e., the large challenge inoculum in the cornea continues to exert chemotactic influence on the macrophages which leads to the production of the macroscopic lesion, or the immunity restricts the spread of the bacilli in the cornea whereas in the nonimmune mice these bacilli do spread and, although not contributing to the visible lesions, they add to the total number of bacilli.—[From abstract by S. R. M. Bushby in *Trop. Dis. Bull.* **57** (1960) 716.]

Fegeler, F. Günstige Wirkung von Kanamycin bei experimenteller Rattenlepra. [Good effect of kanamycin in experimental rat leprosy.] Ztschr. f. Tropenmed. u. Parasit. (Stuttgart) **10** (1959) 447-449.

A suspension of a 5-month leproma was injected, partly subcutaneously and partly intramuscularly, into the shoulder region in 16 rats. Kanamycin treatment was given 30 days later to 8 of them, 3 mgm. being injected daily for 3 weeks and 6 mgm. for 10 weeks. In the text and table the size of the lesions is denoted as that of a lentil, pea, bean, cherry or plum; in a figure it is represented more quantitatively. In the control rats the lesions increased progressively in size, 5 attaining "plum" dimensions; in the treated animals they shrank, 5 disappearing and 3 ending as "lentils."—[From abstract by L. P. Garrod in *Trop. Dis. Bull.* **57** (1960) 915.]

Johnson, J. E., Cluff, L. E. and Goshi, K. Studies on the pathogenesis of staphylococcal infection. I. The effect of repeated skin infections. J. Exper. Med. **113** (1961) 235-248.

The influence of repeated staphylococcal infection of rabbit skin upon the characteristics of the experimentally induced lesion was studied. It was found that the repeated

infection was associated with the development of delayed hypersensitivity unaccompanied by the appearance of demonstrable serum antibody. The delayed hypersensitivity to the straphylococcus resulted in an increased infectivity of the organism in skin of the sensitized animal, characterized by intensification of the lesions seen with large bacterial inocula and the induction of abscesses with inocula incapable of producing any lesion in normal rabbit skin. [Here would seem to be a case in which delayed hypersensitivity is not associated with any degree of immunity, but rather the contrary.]—[From authors' summary.]