REVIEWS

Rat Leprosy, by Dr. P. H. J. Lampe. Geneeskundig Tijdschrift voor Nederlandsch-Indië. Afl. 24 Deel 75, 1935.

Dr. Lampe summarises the results of his experiments as follows:—

"Infection experiments were made with 56 young white rats, either by percutaneous inunction of the skin of the belly shaved so close as to bleed slightly, or by subcutaneous injection into the root of the tail, with lymphnode emulsions from r. concolor, r.r. diardii or r. norvegicus, which had been found in Batavia infected with rat leprosy, (see former announcement in the Geneesk. Tijdschr. v. Ned. Indië, No. 8, vol. 75, 1935). Some of the white rats were fed for 5 months after the inoculation on a diet deficient in vitamines (B₂, B₁ & 2 and A); some were given full diet. They were kept under observation for one and a half years.

"In rather over 90% of the cases the inoculation took, (so) quite regardless of the source of the inoculated material or the manner of inoculation.

Subcutaneous inoculation: method used in 36 rats. After 4 months, 3 out of six showed infection of the lymphnodes of the groin; after 5 to 10 months in 29 out of 30 there were both groin and axillary node infection, sometimes with a perinodular infiltration unilaterally in the groin and (or) granulation tissue at the site of injection; after the 8th (10th) month in 12 cases these granulations ulcerated.

Percutaneous inunction: method used in 20 rats. After 4 months 9 rats showed no lymphnode involvement: after 5 to 10 months, 9 out of 11 showed groin and axillary node infection, sometimes with a perinodular infiltration unilaterally in the groin; after the 12th (?) month in 3 cases there were "skin lepromata" at the site of inunction.

"Smears. There were severe and light infections of the lymph odes. Bacilli were found intracellular in epithelioid (?) cells and in giant cells and spread extracellularly. There was an enormous number of bacilli to be found in the skin lesions.

Sections. A great preponderance of the bacilli were found to be intracellular. There was a granulomatous infiltration of histiocytic cells with a powerful phagocytic action on the acid-fast rods; an indication of a tuberculoid tissue reaction was found (a few giant cells of the Langhans type). There was little exudative change, no softening, but some primary degeneration (pyknosis and cell necrosis). In the skin lesions the subepithelial zone was free; the cutaneous muscle was also free.

"The normal type seems to be infection of the lymph ode apparatus. of the subcutis (the nodes of the jaw are often not involved and those of the viscera but rarely). Sometimes there is swelling of the nodes or a perinodular infiltration, which may be accompanied by ulceration. At the site of injection there often develops a flat, extensive, not softened subepithelial granuloma, often accompanied by ulceration. At the site of inunction there sometimes develop isolated, reddishbrown coloured, flat thickenings of the skin with loss of hair, but without ulceration ("skin lepromata"), resembling cutaneous leprosy in man. Masses of bacilli are often found in the internal organs (and sometimes in the apparently normal skin) in severe infections; sometimes there are very numerous miliary hearths (" rat leprosy sepsis "; no bacillaemia demonstrable).

"The *progress* of the condition is slow and often self-limited. An infection of the regional lymphnodes takes place, followed by a general involvement of the cutaneous lymphnodes and there is only rarely any perinodal process. At the site of injection there is but little "activity" shown and only in a part of the cases were slowly growing granulomata observed, which might ulcerate (cachexia of secondary infection), or might remain stationary, without regression, however. The same may be observed at the site of inunction with in only a very few cases the very slow development of "skin lepromata," which tended to remain stationary, without regression(?). The same appears to be true of the haematogenous spreading of the virus, which in but few instances quite exceptionally led to the development of miliary hearths in the internal organs.

"The *influence of the hypovitaminosis* was only probably in the case of the percutaneous inuncted rats (relatively moderate dose of the virus); it was only a shortage of vitamine B₂ that was accompanied by the development of cutaneous lesions.

"The general physical condition of the rats, judged by the weight curves, deteriorated in those rats that developed ulcerations, but remained good in rats even with extensive lesions so long as these did not ulcerate. The behaviour of the virus in general, far more closely resembles a saprophytic than a parasitic one (apart from possible immunological reactions). The semi-saprophytic behaviour of the virus of rat leprosy in the animal to which it is adapted, even in the case of heavy experimental inoculation, raises thoughts of relationships not seldom, perhaps even usually, met with in human leprosy."

Leprosy like Leishmaniasis. Indian Medical Gazette, Oct. 1935, p. 544.

Dr. R. O. A. Smith and K. C. Halder, make some observations on dermal leishmaniasis. Under the various forms which this disease takes they describe the *leprous type*.

"The nodules in this form of leishmaniasis have often been mistaken for those caused by Hansen's bacillus before a correct diagnosis has been made, but the case whose picture is herewith appended is more like a case of leprosy than any we have yet encountered. He was treated with antimony and iodides, and made an excellent recovery." See illustration facing p.71.

International Journal of Leprosy, Vol. 8, No. 3. July-September, 1935.

Pathogenesis of Leprosy by Dr. Spindler. This paper is summarised as follows:—

"My study of material collected by Kupffer and Talvik confirms the view that leprosy is only gotten by infection. Nobody gets leprosy who has not been exposed to infection by a leper, and nowhere does leprosy appear without a previous case having been imported from a leprous region. That of all those who are exposed to the infection only a comparatively small percentage is infected must be explained on the ground that to acquire leprosy there must exist, besides the infection, a specially inherited predisposition. The hereditary nature of this disposition is shown by the fact that among blood relatives of lepers there are many more serious cases (lepra tuberosa) and fewer light cases (lepra maculosa) than among non-relatives." The writer comes to the conclusion regarding the *hereditary* nature of the disposition because of the greater prevalence and severity of leprous infection among contacts who are relatives of the infectious case, as compared with contacts who are not relatives. It is clear however to anyone reading the notes, that the related contacts were of a more tender age than the unrelated contacts, and the greater frequency and severity among the former group may be due to greater susceptibility at a tender age, (acknowledged by most authorities) rather than to a " hereditary disposition."

Dr. Moiser, writing on *Tuberculoid Leprosy in Rhodesia*, summarizes what he regards as pathognomonic signs as follows:—

"The case is usually a 'neural' one; the edge of the lesion is sharply raised and smooth; the surface is rough, pebbled, 'micopapular'; the colour is a peculiar, characteristic purplish tint; there is little or no anæsthesia, and bacteriological smears from the lesions are negative."

He has found 6 cases of this type out of about 700 patients. This relative frequency is interesting, as in the Calcutta clinic at the School of Tropical Medicine, this type often reaches 50 per cent. or more of those appearing for first examination; in these however anæsthesia is generally a marked feature.

Dr. Gomes describes 56 cases tested by means of his complement-fixation test. He considers that the test is not absolutely specific, with which opinion we think readers would be inclined to agree.

Dr. Soule discusses the Relationship of Human Leprosy and Rat Leprosy. This paper is summarised as follows:—

"Patients with leprosy have been segregated continuously for the past twenty-nine years at the Culion Leper Colony, on one of the small isolated islands of the Philippine archipelago. The inmate population at the present time numbers about 6,700. Throughout this period the local rats have been intimately exposed to the human infection through scavenging in infected waste material from wards, clinics, dormitories and private residences, occasionally even by actual ingestion of pathological tissue from dead bodies or even sleeping patients, and by contact with the heavily infected soil. It has been frequently alleged that

the causative agents of human leprosy and of rat leprosy are identical. An examination of rats captured at Culion should reveal unequivocal proof of the validity of this contention as regards the existence of the disease in nature. Accordingly, 212 rats were trapped alive; 83.3 per cent were identified as Mus norvegicus, the remainder M. rattus. Of the former group 46 were old animals, 12 were half-grown, the others full-grown; all but 10 of the black rats were recorded as fully No external gross pathological lesions were found, though mature. each animal was scrutinized for alopecia and ulcerations, also for mutilations and for evidence of affections of the nose and eyes. Under deep anæsthesia the abdominal and thoracic walls, including the axillary and inguinal glands were examined, and the cavities were opened and their contents removed. No suggestion of bronchopneumonia or nephritis (both cardinal involvements in naturally occurring rat leprosy) or other abnormalities were present in the gross or in sections examined histologically. Blood was withdrawn from the heart, direct smears and stained preparations were made, and the blood was cultivated on Petragnani's medium and rabbit blood agar. There were no macroscopic or microscopic findings suggestive of the presence of an infection with Stefansky's bacillus. This study would therefore indicate that, under what might be considered ideal conditions in nature, rats are not subject to infection with the causative agent of human leprosy. Comminuted human leprous tissue from a leproma and a broken-down nodule, and also acute reaction-pus, were injected into the skin and subcutaneous tissue of 23 half-grown rats (15 M. norvegicus and 8 M. rattus) in an attempt to transfer the human disease to the rodents. The possibility of immunity on the part of the local animals was controlled by including in the series injected 11 young rats caught on a neighbouring island; these controls suffered no untoward effect."

Dr. Mitsuda writes on Langhans Giant Cell in Leprosy and the Stellate Body in Nodular Leprosy.

He states "that when leprosy and tuberculosis attack the same organ we often find Langhans giant cells which contain bacilli of both kinds. Tuberculosis-like changes in leprous macules, tuberculoid macules and neural changes indicate the resistance of the body to the bacilli. The same histopathological changes can be seen in Mitsuda's skin reaction. Langhans giant cells may also be seen in the skin, testicle and epididymis in nodular cases. These differ from giant cells of the other type (a) in having a lower degree of foamy reaction, and (b) in the presence of one or more stellate bodies which can be stained with elastic-tissue or Bielschowsky's stain."

Leprosy in Morocco is described in two articles by Drs. Sainte Marie and Barneaud. The former himself knows of 330 cases in N. Morocco, but new cases are constantly being seen. He does not consider that in the present state of education an attempt at compulsory segregation would be successful. Dr. Barneaud states that prophylaxis along educated lines is being undertaken by the authorities.

Dr. Rodrigues describes 5 cases of arrested leprosy in boys who were kept under ideal conditions. In spite of this 4 out of the 5 cases relapsed. Little-understood factors such as natural individual immunity, or varying states of infectiousness of the leprosy organism, may prove to be chiefly responsible for these results.