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ARMY SERVICE FORCES *
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Subject: Leprosy.

1. The purpose of this letter is to call attention to the prevalence of leprosy in areas where large numbers of our troops may be operating and to outline the principal features of the disease. Although the communicability of leprosy is not great and is almost invariably associated with intimate and protracted contact with lepers, occasional cases have been reported which apparently followed only brief contact. During the Spanish-American War a small number of our troops who served in endemic areas contracted the disease. Because of the usually prolonged and insidious onset, early recognition is frequently difficult; but if the possibility of leprosy is considered and careful examination is made, few cases should be missed. While it is possible that medical officers will see early cases of leprosy in troops in the present war, it is obvious that because of the usually long incubation period most of the diagnostic problems will be for the future. Medical officers should be alert, however, to the recognition of leprosy at all stages in natives in areas in which the disease is endemic, so that contact with infected natives may be avoided.

2. *Geographic distribution.* The highest prevalence is in the tropics. Leprosy is widely distributed in Asia, particularly in China, Japan, India, Burma, Indo-China, Thailand, Malaya, the Philippine Islands, and the East Indies. It is common in many of the islands of the Pacific. The highest prevalence is in Equatorial Africa. Leprosy is not uncommon in Egypt, South Africa, and Madagascar. In the Western Hemisphere the chief endemic areas are in certain countries of South and Central America and parts of the West Indies. In the

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United States in recent years indigenous cases have occurred almost exclusively in the Gulf Coast Area.

3. *Recognition of the disease.* Leprosy is a systemic infection in which dermatological manifestations predominate in some cases, neural changes in others. Consequently the disease has been classified into two main types, lepromatous and neural. Cases presenting both forms are usual (mixed leprosy). During an acute lepra reaction the cutaneous lesions tend to appear in crops associated with bouts of fever. In the *lepromatous* form macules and nodules may occur anywhere on the body and diffuse infiltration with thickening of the skin is common. The nasal mucosa commonly is involved later. Ulceration of nodular lesions is another late feature, the discharges containing enormous numbers of leprosy bacilli. In the *neural* form alterations of cutaneous sensation appear early. Macules and flat plaques with well-defined edges are frequent, and occasionally may be evanescent. Anesthesia with analgesia, and paresthesias occur either within these areas or apart from them. Hyperalgesia also may be found. Nerve trunks, particularly the great auricular, ulnar, and peroneal, may present thickenings and paralyses are frequent. Localized paralyses about the mouth and eyes may often be detected. Trophic changes may occur with atrophy of muscle groups in the hands or feet. Contractures may be among the early changes; mutilations may follow. The diagnosis may be confirmed readily in the lepromatous form by demonstrating *M. leprae* in the lesions, but in the neural form the bacilli may be present in such small numbers that reliance must be placed on clinical findings.

4. *Differential diagnosis.* Leprosy may be confused with a number of skin diseases, but particularly with the cutaneous manifestations of tuberculosis, syphilis, yaws, and leishmaniasis. In lupus vulgaris, the type and color of the lesion and its development are different from that in leprosy. Although morphologically similar, the tubercle and leprosy bacilli can be distinguished by guinea-pig inoculation. Differentiation from cutaneous syphilis or from yaws cannot be made on the basis of serological tests for syphilis since a variable proportion of patients with uncomplicated leprosy show positive reactions. The absence of *M. leprae* from the lesions and the response to arsenical therapy serve to differentiate these diseases from leprosy. Leprosy may be differentiated from the naso-oral lesions of leishmaniasis by demonstration of the respective etiologic agents in the lesions. Among other skin diseases which may sometimes cause confusion, ringworm and tinea versicolor may be differentiated by demonstrating the causative trichophyton or microsporon in skin scrapings in these two conditions. Sensory changes are the chief factors in differential diagnosis in the neural form. In most neurological diseases which must be distinguished from leprosy, the motor changes are more marked than are the sensory,

the reverse being usual in leprosy. Evidence of diminution of tactile sensation is elicited with cotton wool, feathers, or a camel hair brush; of sensation to pain with a pin; of thermal sensation with tubes of hot and cold water. Good oblique lighting is necessary for detection of many early cutaneous lesions; here palpation is of great help.

5. *Etiologic agent. Mycobacterium leprae* (Hansen's bacillus) is the etiologic agent. It is acid-fast and resembles the tubercle bacillus. Unlike *M. tuberculosis* it is not pathogenic for guinea pigs or other laboratory animals. To demonstrate *M. leprae* microscopically a number of lesions should be examined. The skin lesion is compressed between the thumb and forefinger. With a sharp scalpel a small incision is made through the epidermis and well into the corium. The cut surface of the wound is scraped and smears of the exudate on clean glass slides are stained by the Ziehl-Neelsen method. Scrapings from the nasal mucosa overlying the cartilaginous septum may occasionally be positive when skin lesions are negative. The acid-fast bacilli are found lying free, often in clumps (globi), as well as within the mononuclear lepra cells. It may also be useful to examine stained histologic sections from affected areas of skin.

6. *Source of infection.* Lesions of the skin and mucous membranes are believed to be most important. Sputum may also be a source of infection in patients with lesions of the respiratory tract.

7. *Incubation period.* An incubation period comparable to that seen in many acute infections is not recognized. A period of two to four years or longer may elapse between exposure and the appearance of characteristic symptoms or lesions.

8. *Communicability.* Leprosy is not highly communicable. Close and protracted association with lepers favors transmission. Most new cases arise from contact with persons with the lepromatous form. Mechanical transmission by insects is a possibility, though not proved.

9. *Susceptibility and immunity.* There is no evidence of racial immunity. Although susceptibility is present at all ages, most of the infections develop during childhood and early adult life. In general, males show a higher incidence. Spontaneous regression of the lesions may occur. In advanced lepromatous cases permanent cure is rare.

10. *Treatment.* Various preparations of chaulmoogra oil and its esters have been used. The present consensus is that none of these can be considered a specific remedy. The patient's general physical and mental condition should be improved by providing a well balanced diet, supervised exercise, occupational therapy, and instructions in personal hygiene. Treatment is best carried out in a leprosarium or agricultural colony, although as a temporary expedient patients may be cared for in a general hospital.

11. *Control.* Because of the insidious onset or because of fear on the part of the patient, many cases are not brought under observation until the disease is well advanced. Recognition of the early clinical manifestations is of the greatest importance with confirmation of diagnosis where possible by bacteriologic examination. Immediate segregation should be carried out. All cases in troops should be reported to The Surgeon General and held in isolation pending final disposition. Medical officers should make inquiry locally concerning the existence of highly endemic foci, and such areas should be avoided where possible. Military personnel should be excluded from any dwelling in which a leprous person lives or is known to have lived recently. In endemic areas all prospective native food handlers and personal attendants should be carefully inspected and if known or suspected of having leprosy should not be employed in handling food or rendering other personal service.

For The Surgeon General:

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