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## TYPHUS FEVER IN NEW MEXICO.

### A REPORTED OUTBREAK AMONG THE NAVAJO INDIANS.

Dr. L. C. Day, of the United States Indian Service, made the following report from Albuquerque, N. Mex., April 23, of an outbreak of typhus fever among the Navajo Indians, 40 miles west of Albuquerque:

I wish to report a recent epidemic of typhus fever among the Navajo Indians, at Canoncito Cojo, about 40 miles west of here.

The first case occurred about January 1. The patient died without consulting the physician. I saw her daughter, who contracted the disease from the mother, on January 31. My diagnosis at this time was typhoid fever, though not confirmed by a Widal examination, for which I had no facilities at my disposal. March 5 I saw nine more cases, at which time I made the diagnosis of typhus fever, basing my diagnosis on the characteristic eruption appearing on the chest and abdomen and sometimes on unexposed portions of the extremities, but never on the face or hands or other exposed portions; also on the hemorrhagic condition of the mucous membrane and the characteristic ending of the fever by crisis in the case which had recovered. I now placed all the people in quarantine who were exposed to the contagion or then sick and began a campaign against the lice which infected the camp.

March 27, assisted by Supt. P. T. Lonergan, I clipped the hair of all exposed and infected cases and covered their bodies with a mixture of coal oil, lard, and sulphur. All fomites were either destroyed or sterilized and new quarters provided. No new cases developed, even among those previously exposed.

The quarantine was raised April 15. The total number of cases was 27—11 adults and 16 children. There were 4 deaths—2 children and 2 adults. Whooping cough was a complication with the children. It was my observation that, as a rule, the children ran a milder course than the adults, although nearly all the cases were seriously ill for a short time, at least, and all had a very marked eruption.

The first source of this infection was an old Mexico Mexican, who seemed ill on a visit to the camp about two weeks before the first case. Whence he came and whither he went no one was able to say, and it is a mere conjecture that he was the source of infection. However, the old woman who first became ill had been a washerwoman for old Mexico Mexicans, railroad employees a few miles from her home, and had a reputation as a wanderer in Mexican camps and Indian villages.

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## TYPHUS FEVER.

### A BRIEF NOTE ON ITS PREVENTION.

By JOSEPH GOLDBERGER, Surgeon, United States Public Health Service.

Up to 1912 American physicians, if they gave the disease any consideration at all, regarded typhus as an exotic plague, and as a sort of medical curiosity having little more than historic interest. In that year the studies made by Anderson<sup>1</sup> and the writer clearly demonstrated that this disease was endemic in the city of New York at least. Since that time there have been reports of cases of apparently local origin in several of the larger American cities, such as

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<sup>1</sup> Anderson and Goldberger, Public Health Reports, Washington, Feb. 2, 1912.

Philadelphia, Atlanta, Milwaukee, Chicago, and Boston. These developments have given to this ancient disease a new importance for the American clinician and sanitarian. Recently this interest has been further emphasized by its threatened invasion from abroad.<sup>1</sup> Since November 19, 1913, at least 19 cases have been discovered in immigrants arriving at Atlantic ports from Europe. Seven of these arrived at Providence from Marseilles and Naples, and 12 at the New York quarantine mainly from southern European ports.

In view of the foregoing, it seems timely to summarize briefly our knowledge relating to the method of spread and of prevention of this disease:

Typhus fever, sometimes also known as "camp fever" and "jail fever," is one of the great epidemic diseases. As has already been indicated, it is endemic in at least the larger of the American cities, but no epidemic has been recognized in the United States since 1891-92. It is a disease of temperate and cold climates. Because of its widespread prevalence in certain areas of Mexico, some writers have been led to include it among the diseases of the tropics. It does not occur, however, except as an imported disease, in any portion of Mexico which has a tropical climate. It is to be found only in the elevated (6,000 feet and above) plateau region of Mexico, and more particularly in the larger cities, such as Puebla, Mexico City, San Luis Potosi, Aguascalientes, and Saltillo.

Its association with poverty and filth is well known. It spares no age, though its manifestations in children are "atypical," that is, they differ in some respects from the manifestations in the adult, in being somewhat milder in children.

The knowledge that we have gained of this disease as the result of clinical studies, chiefly those of Brill, clearly shows that the older opinions as to its fatality must be somewhat revised. Although outbreaks with a fatality rate of 30 to 50 per cent and more have been reported, it is important to bear in mind that the disease even in the adult may be relatively benign, and have a fatality rate well under 10 per cent.<sup>2</sup>

Both the older and the more recent history of the disease testify to its great clinical likeness to typhoid. From a sanitary point of view it is important to recall the important differential points.

As a rule, the onset of typhus is decidedly more abrupt than that of typhoid. It is common in typhus to obtain a history of well-being on going to bed and of arising in the morning with a severe headache and malaise, which within a few hours compels a return to bed.

<sup>1</sup> Public Health Reports, vol. 29, No. 16, Apr. 27, 1914, p. 927.

<sup>2</sup> There was but 1 death among the 255 cases observed by Brill in New York city between 1896 and 1910.—Editor.

Chilliness or a distinct chill are common at the onset in typhus, very much more so than in typhoid. Headache with or without chilliness and with or without much malaise almost invariably marks the invasion of typhus. Indeed the patient may complain of little else, either at the beginning or throughout the course of the disease. It is well to bear this point in mind.

In marked contrast to typhoid, the face is flushed and the conjunctivæ are congested in the first few days, as the result of a capillary congestion not unlike that seen at the onset of dengue or of yellow fever.

The temperature rises rapidly, very abruptly indeed, and with it the pulse rate; in typhoid the evolution of the fever takes longer as a general thing, and the rise in the pulse rate is sluggish and not in proportion to the fever.

Other points of distinction relating to the fever must be noted. Although it rises abruptly, it does not as a general thing range at high levels. In this as well as in some of the features of its onset, typhus strikingly resembles yellow fever. The duration of the fever is about twice that of yellow fever, and about half that of typhoid, namely, about 14 to 16 days. The defervescence also suggests yellow fever, except that it is not infrequently critical in typhus. Some of the older descriptions of typhus give the impression that a critical defervescence is invariable; this has not been the writer's experience with the disease, as he has seen it in Mexico.

An important distinction relates to the eruption. The eruption of typhus appears within 3 to 5 days after the onset, therefore, earlier than is the rule in typhoid; it is general, sparing only palms and soles; its evolution is rapid, being fully out within 24 to 36 hours, and is permanent, in marked contrast to the typhoid eruption which appears in *successive crops*. It is important also to recall that the macules constituting the typhus eruption are polymorphic. They have not the regularity of outline or the uniformity of size and appearance of the typhoid rose spots. Moreover, while most or all of the lesions may fade markedly on pressure in the early stages, some fade little if at all, and the proportion of these may and usually does rapidly increase, the eruption becoming petechial as it becomes older.

Blood and fecal cultures in typhus are negative, the former being sterile, as a rule; in typhoid it may be possible to recover the bacillus of Eberth. Of the laboratory tests the blood culture is the most valuable, as it is most helpful when most needed—i. e., early.

Although a disease clinically well known for many generations, its mode of transmission has been known only since 1909. In that year Nicolle and his associates, working in Tunis, reported success

in transmitting this disease by means of the body louse. This was very quickly confirmed and firmly established by the studies of Ricketts and Wilder, and Goldberger and Anderson, working in the city of Mexico. As a result of these studies we now know that typhus fever is transmitted from person to person by means of the body louse (*Pediculus vestimenti*). It is possible, as the work of Goldberger and Anderson would suggest, that the head louse (*Pediculus capitis*) may also at times serve as the propagating agent, but this is not positively established. From a consideration of the well-established epidemiological features of this disease it seems reasonably certain that it is transmitted in no way other than by the bite of an infected louse. As to the details of the mechanism of transmission, knowledge is as yet largely lacking. The virus circulates in the blood of the human host throughout the febrile period and for perhaps 24 to 36 hours after defervescence, and it is probable that the louse may become infected by feeding on the patient at any time during this period. How soon the louse itself becomes infective and how long it remains so are points that await further study and definite determination.

The discovery of the part played by the louse in the transmission of this disease has cleared up all the important epidemiological characteristics of the disease and has made plain many points that had appeared obscure or mysterious. We now understand why typhus has been peculiarly associated with misery and poverty, why it has been a vagabond's disease, a disease of jails and army camps—in brief, a disease of poverty, of filth, and overcrowding.

#### Prevention of the Disease.

Having clearly in mind the important rôle played by the louse in the transmission of the disease, the fundamental rules on which prevention is based may be readily deduced. In general terms it may be stated that association with a case of typhus fever in the absence of the transmitting insect, the louse, is no more dangerous than is association with a case of yellow fever in the absence of the yellow-fever mosquito. Danger threatens only when the insect appears on the scene.

We may say, therefore, that to prevent infection of the individual it is necessary for him only to avoid being bitten by the louse. In theory this may readily be done, for we know that the body louse infests and attaches itself almost entirely to the body linen, and that boiling kills this insect and its eggs. Individual prophylaxis is based essentially, therefore, on the avoidance of contact with individuals likely to harbor lice. Practically, however, this is not always as easy as it may seem, especially under the conditions of such intimate

association as is imposed by urban life. Particularly is this the case in places such as some of the large Mexican cities, where a large proportion of the population harbors this vermin. Under such circumstances it will be well to avoid crowds or crowded places, such as public markets, crowded streets, or public assemblies at which the "peon" gathers.

Community prophylaxis efficiently and intelligently carried out is, from a certain point of view, probably easier and more effective in protecting the individual than is the individual's own effort to guard himself. Typhus emphasizes, perhaps better than any other disease, the fact that fundamentally sanitation and health are economic problems. In proportion as the economic condition of the masses has improved—that is, in proportion as they could afford to keep clean—this notorious filth disease has decreased or disappeared. In localities where it still prevails its further reduction or complete eradication waits on a further improvement in, or extension of, the improved economic status of those afflicted. Economic evolution is a very slow process, and, while doing what we can to hasten it, we must take such precautions as existing conditions permit looking to a reduction in or complete eradication of the disease.

When possible, public bath houses and public wash houses, where the poor may bathe and do their washing at a minimum or without cost, should be provided. Similar provision should be made in military and construction camps. Troops in the field should be given the opportunity as frequently as possible to wash and *scald* or *boil* their body linen.

Lodging houses, cheap boarding houses, night shelters, hospitals, jails, and prisons, are important factors in the spread and frequently constitute foci of the disease. They should receive rigid sanitary supervision, including the enforcement of measures to free all inmates of such institutions of lice on admission.

So far as individual foci of the disease are concerned these should be dealt with by segregating and keeping under observation all exposed individuals for 14 days—the period of incubation—from the last exposure, by disinfecting (boiling or steam) the suspected bedding, body linen, and clothes, for the destruction of any possible vermin that they may harbor, and by fumigating (with sulphur) the quarters that may have been occupied.

It will be noted that nothing has been said as to the disposition of the patient. So far as the patient is concerned, he should be removed to "clean" surroundings, making sure that he does not take with him any vermin. This may be done by bathing, treating the hair with an insecticide (coal oil, tincture of larkspur), and a complete change of body linen. Aside from this, the patient may be

treated or cared for in a general hospital ward or in a private house, provided the sanitary officer is satisfied that the new surroundings to which the patient has been removed are "clean," that is, free from vermin. Indeed, it is reasonably safe to permit a "clean" patient to remain in his own home if this is "clean," for as has already been emphasized there can be no spread in the absence of lice. This is a common experience in native families of the better class and in Europeans in Mexico City.

Similarly the sulphur fumigation above prescribed may be dispensed with as unnecessary in this class of cases.

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## MALARIAL FEVERS.

### PREVALENCE AND GEOGRAPHIC DISTRIBUTION IN ALABAMA.

By R. H. VON EZDOFF, Surgeon, United States Public Health Service.

The regions in the State in which malaria prevails to the greatest extent, are apparently in the Tennessee Valley belt which extends across the northern part of the State and also in the central prairie region known as the "Black Belt." The Black Belt is so named from the character of its soil, which consists of a heavy dark clay with greenish or yellowish subsoil, underlaid with rotten limestone. It has also a large black or colored population of 62½ per cent and over. The disease also prevails to a large extent in counties scattered over the State, particularly in the southernmost counties of Washington and Mobile. Bibb County has also, apparently, a large proportion of cases.

The counties having the largest populations are Jefferson, Montgomery, and Mobile, where the largest cities of the State are located, namely, Birmingham, Montgomery, and Mobile, respectively. In these counties the largest number of deaths have occurred.

The general reports show, and the consensus of opinion of physicians is, that malarial fevers prevailed to a less extent in all parts of the State during the year 1913 than in 1912. This has also been the experience at this station in Mobile.

A study of the meteorological conditions is here of interest. The meteorological reports of the Weather Bureau, Department of Agriculture, which have been furnished this station every month since 1909, by Mr. Albert Ashenberger, local forecaster for Mobile, were reviewed, and the table following was prepared, which shows the mean temperature and the total precipitation for each month during the past five years.