TUBERCULOUS INFECTION AND TUBERCULOUS IMMUNITY,

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I quote verbatim from an article by Dr. S. Adolphus Knopf, in the *Medical Record* for January 8, 1916, and reviewed in the New York Medical Journal for January 15th:

> According to exact statistics as well as general impressions given by men of vast experience, the majority of cases of tuberculosis in the adult have their origin in an infection during infancy or childhood. . . . Nearly all authorities consulted unite in the opinion that in order to combat tuberculosis successfully in the young and the old alike, we must diminish the source of infection in childhood.

The first part of the foregoing statement we must admit to be correct. That being so, the second part deserves closer attention. The fact is that nearly every person living in a civilized community has been infected before reaching the twelfth year of life. It naturally follows that we are all more or less tuberculous. If we are, all of us, tuberculous how can we diminish "the sources of infection during childhood"?

At this present moment the war in Europe is diminishing the sources of infection, but those who are fortunate enough to live and tell the tale will continue to be sources. What do we gain by diminishing the sources of infection during childhood, when one source is sufficient for a whole community?

May I call attention to the case of Typhoid Mary, who has the unique distinction of having infected numberless persons with the typhoid bacillus, although she herself does not suffer from the disease. In tuberculosis there may be thousands of such carriers, but their identity remains unknown.

Does the doctor mean that it is better to be infected later in life? In order to find an answer we must refer to some authorities that the doctor has apparently overlooked:

"The wild tribes in various portions of the globe and on our own account the Indians remain free from tuberculosis as long as they live isolated and do not come in contact with so called civilization. But when they do become infected, their mortality from the disease is unusually high, because they have not had time to acquire immunity and the source of the disease is usually a much more rapid one than in civilized regions . . . we must strive therefore to strengthen our rising generation in physique and in general physiological make-up and thus increase the immunity acquired by a one time attack of the disease" (1).

"Those races or groups which have long lived under conditions favoring almost continual exposure to infection, have acquired a certain degree of immunity. . . . Recovery from these mild infections which are often repeated in early life, leads to the development in the individual of an effective relative immunity of the acquired type. . . . Medical care which permits the recovery of a certain proportion of infected individuals, increases the proportion of protected individuals" (2).

"It means that the adult individual must appreciate that he probably already has acquired his infection and that he must depend for his protection, not so much upon dodging the germs as in keeping himself in good physical health" (3).

"Individuals free from tuberculous infection are very susceptible to the pernicious effects of tubercle bacilli" (4).

"Too much stress has been laid upon the infection and too little attention directed toward preventing the production of a soil which would sustain the life of the bacilli after inoculation" (5).

"The future crusade against tuberculosis will probably be directed largely against the factors which reduce resistance" (6).

"The tables sustain the assumption that infection with tuberculosis occurs early in life, . . . also that an infection of this kind confers immunity to new infection later in life, or if infection occurs the course is essentially milder" (7).

"It is every day becoming more evident that by the time our children reach maturity they are all infected with tubercle bacilli, and that therefore the attempt to protect our people against tuberculosis should not so much be against preventing an infection already and inevitably acquired, as toward protecting them from the consequences of what has already occurred and can in no way be avoided. . . . In the present state of our knowledge it is useless to attempt to protect our children against this wholesale infection because we do not know when nor how nor why it is acquired" (8).

"All civilized races long removed from infection are particularly susceptible. Some of the white races have acquired a certain degree of immunity by inheritance and almost universal infection" (9).

"A cow which reacts to tuberculin in a stable with cattle known to be free from tuberculosis, often brings about an infection of the cattle, so that ultimately they all become reactors, although it cannot be proved that the cow which disseminated the bacilli had any physical signs of the disease" (10).

"Given a virgin soil and a race of bacilli already adapted to the species, an initial infection takes place with little hindrance from the nonspecific defensive powers. . . . The ultimate survival of those who acquire a relative immunity will tend to diminish the severity of the disease, but many generations will be required to accomplish this" (11).

"I have elsewhere shown that no intimate contact is necessary to transmit the disease among persons who have not met with tuberculosis before" (12).

"Evidence that a large percentage of persons acquire a limited tuberculosis infection in early life has been accumulated and the conviction has grown stronger that a certain limited immunity is conferred as a result of these early infections" (13).

"At the Nazareth Trade School in Farmingdale, L. I., we have a general average of 400 boys ranging in ages from six to sixteen years assembled under one roof. While there are a few who show what may be termed the 'pretuberculous diathesis' the percentage of those suffering from actual tuberculosis is less than one per cent., yet according to the tuberculin test ninety-five per cent. would be credited with having the disease" (14).

"Children recover apparently from their tuberculous infection as they do from measles or scarlet

fever. There is, however, this difference. In the recovery from measles or scarlet fever the germs seem to have been destroyed in toto, while in tuberculosis the bacillus is apt to remain in the host latent, much as Spirochæta pallida" (15).

These quotations certainly throw some doubt, not only upon the possibility, but upon the advisability of attempting to "diminish the sources of infection in childhood." Since every person has been infected, he may, for all we know, be a carrier of the infection. One of the first things that we must learn to appreciate more and more is the fact that "tuberculosis" is not synonymous with "phthisis." A patient may have tuberculosis, but it does not necessarily follow that he is or ever will suffer from phthisis. Phthisis pulmonalis is a symptom complex and requires at least three permanent factors, all of them to be present at one and the same time.

First, the patient must be infected with the specific cause, the bacillus tuberculosis; second, the patient either never had an immunity because never infected, or else he has lost a previously acquired immunity; third, the patient must have either a localized anemia or a general lowered body resistance.

As we have seen from the foregoing citations, the infection with Bacillus tuberculosis is practically universal and usually confers a more or less lasting immunity.

Among wild tribes there is no immunity because they have never been infected with the specific germ. When they do become infected, phthisis occurs rapidly and usually with fatal results. Tuberculous infection is a result of civilization; all civilized nations are infected. They all have as a result acquired a reasonable degree of immunity. Civilized modes of living tend to destroy this acquired immunity. When this acquired immunity is lost the patient is apt to become like his uncivilized brother, rather hypersensitive, in a condition of anaphylaxis. This condition of anaphylaxis either creates or is preceded by a localized anemia, usually in the upper or unused portion of the lungs.

Having these three conditions, a local anemia in the lungs from nonuse, a nonimmune person or a state of anaphylaxis plus an infection with the specific cause and we have phthisis pulmonalis.

The treatment is as specific as the disease. It will take some time to rid the human mind of fads and fancies. When that time comes, phthisis pulmonalis will be treated on rational lines according to well established laws in harmony with physiology.

Phthisis pulmonalis is an easily preventable disease and certainly as easily cured as any other disease to which human flesh is heir.

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231 WEST NINETY-SIXTH STREET.

EARLY SYPHILIS.

Its Clinical and Microscopic Diagnosis,

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Experience impresses us with the unruliness, the inconsistency, and the obstinacy of syphilis. The longer we observe these cases and the greater the intimacy with the victims, the more we appreciate the fact that a long course of intensive treatment is necessary. It is generally conceded that the prognosis is best when the treatment is given in the very early stage of the disease. It is therefore of infinite importance for the physician to make a diagnosis of beginning syphilis. This sketch is written to review the clinical appearances assumed by the chancre and to emphasize the value of a microscopic examination of material from the initial lesion for the microorganism of syphilis.

The typical chancre usually appears within three weeks of inoculation, but may occur as early as ten days after exposure. The patient usually experiences a slight localized itching and notices an erythematous spot, which gradually develops into a persistent, superficial, dark red papule. After a few days the surface epithelium desquamates and a round, superficial, dark red, sharply circumscribed, glistening erosion forms, which exudes a scanty discharge. Occasionally a beginning induration may be felt on the periphery. This is the picture usually present when first observed by the physician. It is typical. No other lesion on the penis resembles it and a positive diagnosis is confirmed by finding the spirochetes. The Wassermann reaction is almost always negative at this time.

After four or five days, the erosion tends to extend peripherally and penetrate the deeper tissues, forming a sharply circumscribed, well defined ulcer, which feels hard, firm, or cartilaginous. The induration feels as if it were about and underneath the lesion and set into the skin. When not secondarily infected, it looks clean, has sloping edges, a regular, shining, dark red floor, and exudes a profuse serous discharge containing the spirochetes. The skin around the ulcer looks blue and congested and not an angry red. The lymph nodes in both inguinal regions are uniformly enlarged, painless, indurated, freely movable, do not suppurate, and the skin over them is not inflamed.

The great majority of genital chancres occur on the glans penis, the prepuce, and the skin of the penis; the others are found scattered on the scrotal skin, the meatal mucosa, and within the urethra. In the female they may be found in the vulva, the vagina, and the cervical canal. Extragenital chancres may develop on any part of the body where the continuity of the skin is broken or on a mucous membrane.