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TUBERCULOSIS AND WAR*

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The student of history is struck by the fact that disease and pestilence have always been more destructive factors in exterminating human life during war times than all ancient and modern firearms. During previous wars, dysentery, bubonic plague, cholera, typhus, typhoid, smallpox, beriberi, etc., were the main war diseases. Scientific camp sanitation, however, has succeeded in controlling most of these pestilences. But now new medical problems have been confronting the army medical services of the nations at war. Among the last may be mentioned trench nephritis, epidemic jaundice, gas poisoning, the soldier's heart, and functional nervous diseases. However, during the present European conflict the most important problem confronting the part of the medical profession charged with the prevention of disease is said to be the prevention of tuberculosis, which is alleged to be menacing the soldier in the field as well as the civil populations of the warring countries.

Our present conception of the pathogenesis and prognosis of tuberculosis shows that this disease may be a factor during war as follows:

1. While examining recruits for the army and navy, the problem arises at once, Should all who show signs of pulmonary disease be rejected?
2. Is active service in the field liable to wake up dormant tuberculous lesions?
3. Are soldiers and sailors excessively exposed to tuberculous infection?
4. What are the effects of war conditions on the incidence of tuberculosis among the civil population?

EXAMINATION OF RECRUITS

It is clear that those who present symptoms and signs of active and progressive tuberculosis will be easily recognized and eliminated. The symptoms of the disease, cough, expectoration of sputum containing tubercle bacilli, fever, tachycardia, emaciation, etc., coupled with unmistakable physical signs, are sufficient in practically all such cases to show that the candidate is unfit for military service entailing great hardships. But there are several classes of persons who are not so clearly differentiated. Among them are to be mentioned: (1) Those showing inconclusive symptoms and signs of lung lesions; (2) those who have been patients in sanatoriums or hospitals for

consumptives and were discharged as cured, or with arrested disease; and (3) those having other pulmonary diseases, especially the various forms of bronchitis, asthma, emphysema, etc.

The class of persons commonly known as "suspects" is apt to prove the *bête noire* of the military examiner, just as it has been to physicians in civil practice. Among them are found persons who cough more or less, expectorating sputum which is microscopically negative; they may or may not have lost in weight recently, and perhaps give a history of anorexia, hemoptysis, etc., and state that some physicians have considered them tuberculous, while others disagree. In fact, some will bring proofs that they have been "under observation," or actually patients in tuberculosis clinics for months. On physical examination there may be found some signs suggestive of a localized lesion in one of the lungs—some impairment of resonance, harsh, cogwheel or rude breath sounds, prolonged expiratory murmur, dry, or even moist râles, etc. To reject all presenting these symptoms and signs would be unjust, because it is well known that only a small proportion of them are really tuberculous, while the vast majority are troubled with some nonspecific affections of the upper or lower respiratory passages which are not in the least disabling, and which may in fact be cured when the person is subjected to the regular life in a military camp.

A few points which may prove useful in attempts at differentiation of these cases from those affected with active tuberculous disease are: The examiner will be on safe ground if he relies more on symptoms than on physical signs, or even roentgenography. In other words, it is best to investigate whether or not the person has fever, and if he has not, especially after some exertion, the chances of his being actively tuberculous are remote. The pulse is another excellent indication as to the nature of the affection. Active tuberculous disease with a pulse rate of less than 75 per minute is rather uncommon, and one with a pulse rate of less than 70 is extremely rare. In doubtful cases we must study the stability of the pulse. One suffering from active tuberculosis, even having a slow pulse, shows a pronounced increase in the rate after moderate exertion. It may be stated that a pulse uninfluenced by exertion is an indication that the person examined is not affected with active tuberculous disease.

Changes in resonance and in breath sounds, elicited over a limited area of the chest, if found anywhere below the third rib anteriorly, or the fifth dorsal spine posteriorly, are not of tuberculous origin, provided there are negative findings over the apexes. Distinct signs of catarrhal conditions found over the lower parts of the chest, indicating pathologic changes in

* Read before the New York Academy of Medicine, May 15, 1917.

the bronchi or lungs, unilateral or bilateral, are almost invariably indications of nontuberculous disease, bronchitis, pulmonary emphysema, bronchiectasis, etc., or they may be the result of old and healed pleural adhesions.

Of course, positive sputum is conclusive proof of active tuberculous disease. But in the case of conscription, when the aim is the detection of slackers, it must not be lost sight of that there are many malingerers. The sputum should be collected in the presence of some reliable person. Borrowing sputum containing tubercle bacilli, or even buying it, is not unknown in civil life in New York. There is no question that slackers may resort to this subterfuge.

Those giving a history of having been patients in sanatoriums should not be rejected because of this fact alone. My reasons are the following: A large number have been cured, and participation in active warfare is no more liable to reactivate the tuberculous process than life in a large industrial city, and work in any industry, but few. In fact, experience of medical men in the European armies during the present war has clearly shown that a large proportion of these persons get along very well; as well as other soldiers. In England, Sir William Osler¹ says: "I saw the history sheet of a man who had been for years in attendance at a tuberculosis dispensary with bilateral disease, but he slipped in, stood his training, and was actually sent to France." Dr. Osler is of the opinion that some tuberculous persons may be taken into active field service. In a recent paper, Dr. G. S. Banks² speaks of a number of insured tuberculous subjects, formerly in receipt of sanatorium treatment, who have joined the military or naval forces. Of sixty-four such persons, fifty-seven were on military and seven on naval service (mine sweeping):

Of the total, 58 were suffering from pulmonary disease, and of these 34 had received sanatorium or hospital treatment for various periods. One man actually enlisted while he was a patient in the tuberculosis wards of the City Hospital. Out of the 64 who enlisted, 19 have recently been in active service—14 at the western front and 5 on mine sweepers. Among 6 men discharged from the services, one had enlisted no fewer than three times before being finally discharged, and three had been discharged from one branch of the service and then enlisted in another.

That these soldiers were not affected with the so-called "doubtful" or incipient types of the disease is shown by the fact that:

Out of 48 pulmonary cases, one was of the first, 12 of the second, and 35 of the third stage (Turban). Twenty of the 43 whose sputum had been examined gave positive results. Of the 14 cases at the western front, of whom 3 were known to have had tubercle bacilli in the sputum, 4 were glandular, 10 pulmonary, and of the 10, 6 were in the second stage and 4 in the third. From the fact that out of the 14 men accepted for foreign service only one had broken down in health, and that only temporarily, the conditions of life in the field are not unfavorable to the maintenance of the general health of the tuberculous patients if the disease is not active or advanced.

Similar experiences have been recorded by French and German physicians. Thus, Lanzenberg³ insists that we must not reject all recruits presenting auscultatory signs of tuberculosis because of this fact alone:

The men in the active service and territorials were enlisted without any medical examination, and undoubtedly there were many tuberculous among them. But the number who broke down among them owing to pulmonary diseases has been much smaller than we might anticipate in civil life. Moreover, it is well known that many who were discharged for these causes were malingerers. In general, emaciated individuals have gained in weight and in many cases attained striking and surprising physical development, especially as regards the capacity of the chest, despite the rough conditions of life.

He cites these facts in support of his contentions:

At the medical service of the Place de Paris, through which hundreds of wounded and convalescent soldiers pass daily, the physicians are often asked to change the services of injured or temporarily incapacitated soldiers, thus having been rendered unfit for the branch of the service to which they belonged. In the vast majority of cases it is a question of transferring men from the infantry to the aviation or automobile corps. These men are subjected to the minutest physical examination. My colleagues and myself in this service have been struck by the frequency with which the examination of the lungs reveals signs considered pathognomonic of tuberculosis. Yet they have been for a year or eighteen months in active service in the field. When they are asked as to how they withstood the hardships of the front, these men, almost always ignorant of the pathologic condition in their lungs, almost invariably answer that they had not been sick up to the day when they were wounded. The interesting part of these facts lies not so much in the great frequency with which they may be observed, as in the conclusion they imply, namely, that the exclusion of all tuberculous patients and suspects would be an unjust measure which might deprive the country of many useful soldiers.

The experiences of the German military medical service have been substantially the same. Goldscheider⁴ says that many of the suspects and doubtful cases of tuberculosis of military age have been placed on garrison duty, and most of them have later been found fit for active service. Blömel⁵ examined many soldiers who were rejected because of tuberculosis, and found that 80 per cent. were nontuberculous. Many had been patients in sanatoriums, and presented proofs to that effect. He urges that:

On the whole, the fact that one was at one time an inmate in a tuberculosis sanatorium should not per se be sufficient to free him from military service, because a certain proportion, fluctuating between 8 and 15 per cent. of sanatorium patients, were never sick with tuberculosis. Furthermore, patients in the incipient stage of the disease, who make up 50 per cent. of the population in some institutions, manifest strong tendencies to healing of the lesion in the lungs, and one to two years after their discharge they may be considered healthy.

On this point Roepke⁶ also agrees. He says that clinically cured tuberculous subjects, who stand the training period well, may be sent to the front. It is understood that the lesion has healed well. Persons with stationary, closed tuberculosis may be utilized for garrison duty. But active, progressive tuberculosis, even in the beginning of the disease, should be a cause for rejection. It is mainly a difference between active and inactive cases.

That sanatorium patients have often made good soldiers has also been found by many French physicians. Burnand⁷ says that in France:

4. Goldscheider: *Ztschr. f. Tuberk.*, 1915, 25, 37.

5. Blömel: *Die Fehldiagnose Lungentuberkulose bei Beurteilung der Felddiensttauglichkeit*, *Med. Klin.*, 1915, 11, 884.

6. Roepke: *Tuberkulose und Krieg*, *Ztschr. f. Medizinbeamte*, 1915, p. 313.

7. Burnand, R.: *Phthisie caséuse guérie par un pneumothorax*, *Paris méd.*, 1916, 6, 168.

1. Osler, William: *The Tuberculous Soldier*, *Lancet*, London, 1916, 2, 220.

2. Banks, G. S.: *Lancet*, London, 1916, 1, 323.

3. Lanzenberg, Armand: *Des tuberculeux et de leur situation militaire*, *Paris méd.*, 1916, 6, 268.

The present war has supplied a large number of examples showing the remarkable resistance of certain consumptives against the hardships of the campaign. Many sanatorium patients, responding to the urgent appeal to their patriotism, escaped from the institutions and went to war during August, 1914. The majority have kept up very well under military life, even better than would be anticipated.

He reports a case of acute progressive tuberculosis treated by artificial pneumothorax, the patient going to the front and doing very well. Rist⁸ reports a similar case, the patient reporting from the trenches periodically for refills of the pneumothorax.

German physicians, reporting on the ability of exsanatorium patients to fulfil military duty during war time, believe that they thus prove the immense value of institutional treatment of phthisis. Leschke⁹ followed up the records of patients discharged from the sanatorium in Leipzig, and found that 241 were taken into active military service during the first year of the present war. Of these, forty-four were sputum-positive on admission, and ten also on discharge; 187 were considered in the first, forty-eight in the second, and six in the third stages of the disease.

Similar reports are available for the Austro-Hungarian, Russian and Italian armies. Fagioli¹⁰ observed many instances in which camp life seems to have given the finishing touch to a treatment started in institutions or at home, and the men, after remaining in the field for some time, are found healthy and free from any signs suggestive of active tuberculosis.

Facts such as these, which can be multiplied considerably, should dissipate our preconceived notions about the fitness of tuberculous patients for work, or for military service. Many who have been treated in sanatoriums may be safely taken into the army; others with latent or even quiescent disease, provided the temperature, pulse, respirations, etc., are around normal, should be given an opportunity to serve their country, if there are no other valid reasons for rejection. Considering that all soldiers are not immediately sent to the front, but must undergo a more or less long period of training, doubtful patients may be sent into the training camp, and if life under military conditions proves harmful, they may then be mustered out. I feel confident that the proportion which will have to be discharged from a selected group of such former tuberculous patients will be comparatively small.

We must bear in mind that a large proportion of patients in sanatoriums for incipient cases, and some even in hospitals for advanced cases, have never been proved tuberculous by the acid test—tubercle bacilli in the sputum; in some institutions over 60 per cent. are sputum-negative on admission. It is an uncontrovertible fact that evidence to the effect that one was a patient in a sanatorium is not conclusive proof that he ever suffered from active tuberculous disease.

A history of a previous attack of pleurisy, dry or with effusion, should not bar one from serving his country during war. While it is true that the vast majority of pleurisies are tuberculous in origin, and a large proportion of these patients develop active phthisis in later years, still not all do develop the disease. If otherwise found healthy, the average person who has passed through an attack of pleurisy is fit for military service. It may incidentally be men-

tioned that phthisis developing after an attack of pleurisy is usually mild in character, and the prognosis is very good indeed.

A former attack of pneumonia also should not be considered as a cause for rejection, if the patient has recovered and is otherwise healthy. Not only is pneumonia etiologically not at all related to tuberculosis, but one who has survived an attack is no more predisposed to phthisis than the average of the rest of the population.

Chronic bronchitis, pulmonary emphysema, asthma, bronchiectasis, etc., if the heart is found in good condition, and there are no disabling symptoms, such as dyspnea, tachycardia, loss of weight, etc., should also not be considered causes for rejection from military duty. Indeed, the outdoor life, the regular hours, the nourishing food, etc., of modern wars will be beneficial for most of the sufferers from these chronic diseases. This same is true of almost all chronic pathologic processes of the upper respiratory tract.

EFFECT OF ACTIVE SERVICE ON DORMANT TUBERCULOUS DISEASE

The facts just cited would seem to indicate that military service in the field is no more liable to reactivate dormant or quiescent tuberculous lesions than any other civil occupation requiring muscular exertion, walking, exposure to the vicissitudes of the weather, etc. Since we know that the vast majority of tuberculous patients may, and should, return to work as soon as the disease has been brought under control, we cannot say that military duty is in all cases an exception. Modern sanatoriums have of late realized this fact and have shown a tendency to put their patients to "graduated labor," and some even just to work; and the percentage of recoveries is not lower than those attained in institutions in which perfect rest is indiscriminately enjoined, even though it is forgotten that the patients are thus encouraged to remain loafers after their discharge.

One simple way to inquire into the problem is to find out whether or not army and navy life during peace times increases the morbidity and mortality from tuberculosis much above the proportion which might be expected in the male population between 20 and 30 years of age. Of course, it must be borne in mind that during peace the men are carefully selected before admission and weaklings are rejected, while during war many who otherwise could not be enlisted slip in.

It appears that the morbidity and mortality from tuberculosis in the European armies, in which the men are worked quite hard during peace time, has not been excessive, despite the fact that the soldiers and sailors are exposed to many of the factors favoring the development of tuberculosis as we understand at present the etiology of this disease. According to Valery Havard,¹¹ the death rates in the armies during peace times have been as follows: Great Britain (1909), 0.31; France (1907), 0.76; Prussia and Bavaria (1907), 0.20; Austria (1909), 0.45; Russia (1908), 0.58; Japan (1909), 0.34. In the United States Navy and Marine Corps the death rate averaged 0.58 for the years 1905-1906; for the years 1910-1911 it was 0.33 and 0.59, respectively. For the three years 1909-1911, tuberculosis in our army caused annually 16 per cent. of all the deaths from disease.

8. Rist, E.: *Presse méd.*, 1914, 22, 692.

9. Leschke, Erich: *Die Tuberkulose im Kriege*, München. med. Wehnschr., 1915, 62, 363.

10. Fagioli: *Tuberculosis in guerra*, *Gaz. d. osp.*, 1916, 37, 438.

11. Havard, Valery: *Manual of Military Hygiene*, New York, 1914, p. 47.

For all adults from 20 to 29 years (men and women), the nearest class corresponding to the military age, tuberculosis caused 35 per cent. of all deaths (official census).

During war no material increase has been noted in the morbidity and mortality from tuberculosis, as far as historical records go. The present European war also has not shown, so far, any tendency in this direction. Thus Sir William Osler¹ states that:

Of 1,000,000 enlisted men between the ages of 18 and 40, the proportion to develop tuberculosis is probably much smaller than if these men had remained in civil life The circumstances of the soldier's life, as a rule, do not weaken but strengthen the body's resistance.

Dr. Osler is quite emphatic on this question; he says:

I do not think we are to look for a greater increase in the number of cases in the portion of the community which has undertaken military service. We are not going to double our tuberculous population, and are not to expect 70,000 deaths instead of 50,000 annually.

That Osler's prediction was correct is seen from an editorial published as late as Feb. 17, 1917, in the *Lancet*,¹² after the experiences in warfare had extended over two and one half years. Says that writer:

Camp and trench life has not been productive of more breakdowns than would have occurred in civil employment. It is amazing that in a citizen army running to millions the incidence of breakdown from tuberculosis all told should have been only in the lower thousands. A rough calculation of breakdown from the same cause among the men of military age in industrial occupations would give a vastly higher total.

H. Hyslop Thomson¹³ speaks in the same direction, and A. M. Fauntleroy,¹⁴ of the United States Navy, after making careful medical and surgical observations behind the allied armies in France, reports that "tuberculosis of the lungs is of rather infrequent occurrence."

The German experience is not different. Goldscheider¹⁵ says that, as far as he could ascertain from personal observations, the winter campaign at the western front caused an amazingly small number of cases of tuberculosis; other physicians inform him that this has also been their experience. He has not seen a single case of tuberculous infection. In a discussion on the subject before the medical society of Hamburg, Germany, August Predöhl,¹⁶ the historian of tuberculosis, stated that he found that tuberculosis has not increased among the soldiers in active service. Among 5,000 medical and surgical patients treated in the military hospital under his care, only eighteen showed symptoms and signs of active tuberculosis. In another hospital, Rassmann encountered only seventeen tuberculous among 3,000 soldiers. In Russia, Savvin,¹⁷ having under his care 100,000 sick and wounded soldiers in the military hospital of Moscow, found that among 26,524 medical cases, not including those suffering from acute infectious diseases, the following number were affected with various pulmonary diseases of the respiratory tract: laryngitis and

tracheitis, 181; bronchitis, 2,153; emphysema, 209; pleurisy, 636; fibrinous pneumonia, 197; catarrhal pneumonia, 411, and pulmonary tuberculosis, 955. Pulmonary tuberculosis was thus found in only 0.96 per cent. of the total number of patients; among those suffering from medical diseases (not from injuries) 3 per cent. were found tuberculous. The author advises that the last figures are in all probability the more correct, because in a surgical clinic tuberculosis is apt to be overlooked. He observed the significant fact that during the first few months of the war tuberculosis was more frequently found than during the later months, which points to the conclusion that many of those who were ill with the disease were ill before they were drafted. On this point most authorities agree. Grau¹⁸ found on careful inquiry that in 39 per cent. of cases of tuberculosis the soldiers have suffered from the disease before they were drafted into the war; similar observations have been recorded by Moritz¹⁹ and others.

How unlikely tuberculosis is to develop in soldiers on active duty is clear when we consider the rarity of surgical tuberculosis in wounded and injured soldiers. We know that tuberculous disease of the bones and joints frequently follows in the wake of injuries in civil life; yet it is extremely rare to find that contusions or wounds acquired in warfare have become tuberculous. On this point all authorities agree, though some cases have been reported during previous wars as well as the present war. Moreover, it was observed during the Franco-Prussian War that gunshot injuries to the lungs only rarely produced pulmonary tuberculosis.²⁰ Tonnisson²¹ found in fifty-six lung injuries no case of tuberculosis; Roepke, Helm²² and others confirm this from their own observations.

It thus appears that the life in the open air, the good and nourishing diet, the regular hours, and the removal of the deleterious features of city and industrial life of modern times, which the soldier enjoys, are rather of benefit, and outweigh the hardships which go hand in hand with active warfare in the battlefield. At any rate, tuberculosis is no more liable to develop in soldiers than in the civil population. It has also been observed that other diseases of the respiratory tract, such as pneumonia, bronchitis and tonsillitis, and also acute articular rheumatism are not excessively frequent.

EXPOSURE OF SOLDIERS TO TUBERCULOUS INFECTION

The foregoing shows clearly that there is no more danger of tuberculous disease in active army life than in civil life — perhaps even less than in many branches of urban and industrial life of modern times. When considering the problems of tuberculous infection, it must be borne in mind that recent research has clearly shown that the adult human being has almost invariably been infected before he reached adolescence, and that in adults infection hardly ever, if at all, coincides chronologically with the development of disease. Practically all who suffer from tuberculous disease have been infected during childhood, the virus remain-

12. Tuberculosis and the War, *Lancet*, London, 1917, 1, 268.

13. Thomson, H. H.: *Brit. Jour. Tuberc.*, 1917, 11, 44.

14. Fauntleroy, A. M.: Report on the Medicomilitary Aspects of the European War, Washington, Government Printing Office, 1915, p. 55.

15. Goldscheider: *Ztschr. f. Tuberk.*, 1915, 25, 36.

16. Predöhl, August: *Ztschr. f. Tuberk.*, 1915, 24, 372.

17. Savvin, V. W.: *Russk. Vrach*, 1917, 16, 26.

18. Grau, H.: *Krieg und Lungentuberkulose*, *Ztschr. f. Tuberk.*, 1915, 24, 351.

19. Moritz: *Ueber Lungentuberkulose im Kriege*, *Ztschr. f. ärztl. Fortbildung*, 1915, 24, 321.

20. *Kriegssanitätsbericht von 1870-71*, 3, 556.

21. Tonnisson: *München. med. Wchnschr.*, 1915, 61, 89.

22. Helm: *Tuberkulose während des Krieges*, *Ztschr. f. Tuberk.*, 1915, 24, 1.

ing dormant for years, until some exciting cause reawakens the bacilli into activity, or reduces the natural resisting forces within the body, and the bacilli are permitted to multiply, producing active or progressive lesions. It appears that over 90 per cent. of civilized humanity have thus been infected, and exogenous reinfection with tubercle bacilli cannot take root. On the other hand, endogenically, by metastasis, dormant lesions may become active and cause more or less serious disease. To be sure, we know at present that privations, exposure to the inclemencies of the weather, injuries, overexertion and like adversities are often instrumental in reactivating the dormant virus, or in reducing the inherent immunity of the body; during warfare these factors are more likely to act than in civil life. But it appears to be the fact that all these adversities have never been instrumental in increasing the tuberculosis morbidity and mortality, as is evidenced by the history of the wars of which we have reliable records, including the present one.

All through history we find enumerated and carefully described the horrors of war, among which medical horrors played no small rôle. In his exhaustive history of the epidemics resulting from wars, Prinzing²³ says:

Until comparatively recent times, the most serious human cost of war has not been losses from disease in the armies, but losses from epidemics disseminated among the civil populations. It was the war epidemics and their sequelae, rather than direct military losses, that accounted for the deep prostration of Germany after the Thirty Years War. Such epidemics were also of the gravest consequences of the Napoleonic Wars.

It is noteworthy that in the descriptions of the diseases affecting armies in the field in Prinzing's work, as well as in various old and recent books and monographs on military hygiene, hardly any mention is made of tuberculosis as a factor during or after wars. We find details of dysentery, typhus, typhoid fever, smallpox, beriberi, bubonic plague, cholera, etc., and in more recent books, like that of Arthur F. Hurst's,²⁴ on trench nephritis, epidemic jaundice, gas poisoning, soldier's heart, functional heart disease, etc., but no mention is made of tuberculosis.

It cannot be said that there has been a conspiracy among medicomilitary writers, historians and observers to ignore the factor of tuberculosis in war. There is no doubt that if tuberculosis were actually an appalling war menace it would have been observed and recorded; surely during the Civil War in this country, the Franco-Prussian War of 1870-71, the Russo-Japanese War of 1905 and the first two years of the present war, it would not have been overlooked. I therefore believe that I am safe in concluding that tuberculosis is not more likely to occur in soldiers during active warfare than in civil life.

That the cases occurring in the armies are not necessarily due to infections in the barracks and trenches has been proved in another way. Osler¹ puts it tersely when he says that "in the majority of cases the germ enlists with the soldier." Mönckenberg²⁵ performed necropsies on eighty-five soldiers, and found tuberculous lesions in twenty-seven, or 31.76 per cent. In only five cases could tuberculosis be considered the

cause of death, while in the rest it was only an incidental finding. He considered tuberculous only those lesions which showed caseous and calcareous changes of the lungs, pleura or thoracic glands, while scars of the lungs or pleura, even when localized in an apex, were not counted. Had he counted the latter changes, because they are undoubtedly tuberculous, he would have found over 90 per cent. of tuberculosis, as has been recorded by others. Schroeder,²⁶ from observations of German soldiers during the present war, emphasizes that exposure to tubercle bacilli plays no significant rôle in the causation of active tuberculosis in the German army. He has not seen a case of primary tuberculosis acquired in the campaign. The same has been recorded for the English and Russian armies, as has already been mentioned.

EFFECTS OF WAR CONDITIONS ON THE INCIDENCE OF TUBERCULOSIS AMONG THE CIVIL POPULATION

Viewing the problem from any angle, it appears that we cannot look for any change in the tuberculosis morbidity and mortality among the civil population because of the war. The hardships to be sustained by the dependents whose breadwinners will be drafted into the army will undoubtedly be significant from an economic standpoint; the increased cost of living will increase these hardships. But as far as can be ascertained among the European belligerent nations at present, it appears that the morbidity and mortality from tuberculosis has not increased during the past two years. As already mentioned, no previous war has increased the tuberculosis morbidity and mortality. As has been shown by Reiche,²⁷ in Hamburg, where excellent vital statistics have been kept, no increase in the tuberculosis mortality occurred during and after the Franco-Prussian War of 1870-1871. The same was true in the United States after the Civil War.

It appears, however, that in France there have lately been issued urgent appeals for funds to help the *invalides blessés par la tuberculose*—wounded by tuberculosis—as L. Landouzy²⁸ has called them. From a careful inquiry into the facts as presented in the appeal, it seems that while there are many thousands of soldiers who had to be mustered out because of tuberculous disease, the proportion is not higher than could be expected among men engaged in industrial pursuits. For instance, it has been shown that there are about 100,000 tuberculous ex-soldiers in France at present. This number is undoubtedly appalling. But when we consider that there have been about 6,000,000 or perhaps more soldiers engaged in this war fighting for France, the percentage is no higher than could be expected under any circumstances among people living under modern conditions. The urgent call for the control of tuberculosis was not heeded in France before the war with the same energy as it was in other countries, as England, Germany and the United States. Now that the invalided soldiers who valiantly fought for their country need relief, the French begin to feel that something must be done.

Indeed, figures published by Rénon²⁹ show clearly that tuberculosis has not increased among the civil population of France since the war began. The tuber-

23. Prinzing, Friedrich: *Epidemics Resulting from Wars*, Oxford, 1916.

24. Hurst, A. F.: *Medical Diseases of the War*, London, 1917.

25. Mönckenberg: *Tuberkulosebefunde bei Obduktionen von Kombattanten*, *Ztschr. f. Tuberk.*, 1915, 24, 33.

26. Schroeder, S.: *Betrachtungen über die Tuberkulose zur Zeit des Krieges*, *Ztschr. f. Tuberk.*, 1915, 24, 337.

27. Reiche: *Ztschr. f. Tuberk.*, 1915, 24, 372.

28. Landouzy: *Le guerre et la tuberculose*, Paris méd., 1916, 6, 59.

29. Rénon, Louis: *La defense sociale contre la tuberculose pendant la guerre*, Paris méd., 1916, 6, 64.

culosis mortality rates, despite the lack and excessive cost of food, have apparently not changed. "The war has had no effect at all, judging by vital statistics, hospital and private practice," as Rénon puts it. There is no reason to believe that conditions in this country will be different.

RECAPITULATION

The medical history of wars shows that the incidence of tuberculosis among soldiers and noncombatants has not been more excessive than could be expected normally among persons of military age. The morbidity and mortality from this disease have not increased during and after former wars. It is not to be expected, therefore, that during the present war the number incapacitated by tuberculosis among the nations at war should increase. In fact, available evidence, published by those who, because of their exceptional opportunities for observation of soldiers in the field, are competent to express an opinion on the subject, shows clearly that tuberculosis has not changed the rates of morbidity and mortality in England, France, Germany, Italy, Russia and other countries. The large number of tuberculous men among the veterans is only absolute; when considered in relation to the large number of the men engaged in the battlefield, the proportion is quite small.

In evaluating the fitness for military service, examiners should not reject persons because of history of past attacks of tuberculosis, or of having been patients in sanatoriums. A substantial proportion of sanatorium patients have never been sick with phthisis; a larger proportion have been affected with the abortive form of the disease and have completely recovered; and many who had suffered from the chronic forms of phthisis recover to such an extent as to be considered completely cured and fit for any task, including military service. Only symptoms of active disease, especially fever, tachycardia, dyspnea, emaciation, excessive cough and expectoration should be considered causes for rejection. The experiences of military physicians and others in the field in Europe have demonstrated that many soldiers who had suffered from tuberculosis before the onset of the war have made brave and good warriors, and have returned from the field healthier than when they enlisted for service. Nor has it been observed that active military duty is more liable to reactivate latent or dormant tuberculous processes; many affected with quiescent disease have done well.

The problem of tuberculous infection of soldiers need not be considered seriously. Despite the large number of tuberculous soldiers in the European armies, those entitled to an opinion have not seen cases of tuberculous infection acquired while serving during the present war. The reason is known at present: Most adults have been infected with tubercle bacilli during childhood, and have thus been immunized against exogenic reinfection with the same virus, and they are just as safe in the army as in civil life. In the vast majority of tuberculous cases discovered among the soldiers, it was ascertained that they had been affected with the disease before enlistment. Reactivation of old, dormant lesions occurs in civil life; it is doubtful whether it is more likely to occur in military life.

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THE CONTINUOUS BATH IN MENTAL DISEASE*

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The value of the prolonged neutral bath for producing quiet and sleep in certain nervous conditions, hysteria, mild excitements and anxiety states has long been recognized. Brierre de Boismont in France, and Scholz in Germany employed a modified continuous bath for excited patients many years before Kraepelin's observations and emphatic approval brought this method into more or less general use. More than seventy years ago Dr. Isaac Ray visited the important hospitals for the insane in Great Britain, France and Germany, and the following reference is gleaned from his tour notes. "Nothing seems to be so much relied on, especially in France, for subduing inordinate excitement, as the warm bath protracted for an hour or two."¹

About twenty years ago, Kraepelin noticed that confused, restless and debilitated patients were greatly benefited by several hours spent in a warm bath. He gradually increased the treatment time to an entire day, and finally the unsatisfactory condition of his excited patients during the untreated or night period led him to attempt the experiment of a really continuous or *Dauer-bad*. Patients are now frequently kept in the baths for weeks, or even months, without any untoward results.²

THE CONTINUOUS BATH ROOM

The chief requisites for the treatment room are ample space, sufficient light and air, and mechanical facilities for the shutting off of sound communication with the outside world. There are in the Pennsylvania Hospital for the Insane two large sunny bath rooms, each containing three extra size tubs, and equipped with heavy plate glass double windows and doors, and ventilating devices. With the doors and windows closed, the rooms are practically sound proof. The temperature of the water is controlled from a temperature table, and the nurse, who is in constant attendance, takes half hour readings from an ordinary bath thermometer. The patients are clothed in a loose fitting, one piece garment, permitting great freedom of movement. There is an observation window facing the hall through which every part of the bath room can be readily be seen. An electric button enables the attending nurse to signal for assistance in case of emergency.

The continuous bath room of the future will probably be developed along somewhat more esthetic lines. Since certain patients are under treatment for many hours, days and sometimes weeks, the room must necessarily be used not only as a bath, but also as a living apartment. The introduction of books, magazines, a few games and puzzles, and possibly a picture or two on the walls, will perhaps help to modify its rather monotonous appearance. There is also a distinct need for more individual bath rooms, in which certain types of patients, who are either annoying to others or themselves easily disturbed, may be placed under treat-

* Based on a contribution by the author to Dr. J. Hendrie Lloyd's article, "The Modern Treatment of Insanity," in Musser and Kelly: Practical Treatment, Volume IV.

1. Ray, Isaac: Observations on the Principal Hospitals for the Insane in Great Britain, France and Germany, Am. Jour. Insan., April, 1846.

2. When the time of the bath is protracted beyond the usual period, but does not exceed two hours, it is generally spoken of as "prolonged." When it occupies more than two hours it is referred to as "continuous."