THE EFFECTS OF MILITARY TRAINING UPON LEAD WORKERS.

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SINCE the beginning of August, 1914, 14 cases of lead poisoning have come under my notice among men who have joined or were members of the Territorial Forces. In North Staffordshire, where several thousands of male lead workers are employed, it can be safely said that some hundreds of these have enlisted in the various units of the army, and it is interesting to consider the effect of training and of the different mode of life upon those engaged in lead processes.

Of the 14 cases, 10 were pottery workers—3 being employed in the dipping house and 7 being glost placers, and of the remaining 4, 3 were house painters and 1 was a plumber. These cases did not occur among men belonging to the same battalion or among those stationed in the same place, and 4 had not left the head quarters dépôt.

Symptoms and Diagnosis.

The symptoms upon which the diagnosis of lead poisoning was made were the ordinary symptoms associated with this disease. In every case the patient was anaemic and showed the characteristic blue line on the gums. All of them complained of headaches and of feelings of sickness, and marked constipation was an invariable symptom. I noticed the blue line round the anus in 2 of the cases. In 12 cases there was definite abdominal colic, and in 1 case the patient suffered from peripheral neuritis of the arms. The patients suffering from abdominal colic complained of biliousness and pronounced constipation. They said that the pains "in the stomach" doubled them up, and there was general tenderness over the abdomen, but no localized tenderness over the vermiform appendix.

In only three instances had there been any previous trouble. In one case the man, who was a house painter, had been away from work in the spring of 1914 for nine weeks on account of colic, which was undoubtedly due to lead poisoning. The recurrent attack was of a serious nature, and the man was given his discharge. The second case was that of a glost placer who had previously suffered from several attacks of lead colic during the twenty years he had worked in a lead process. The examination of the blood showed that the haemoglobin was 65 per cent. of the normal, and basophilic granules were present in considerable numbers. Examination of the urine showed albuminuria. This man was incapacitated for three weeks, and on his recovery was excused drill and route marches and was allowed to follow light employment in the kitchens.

The most serious case was that of a patient who suffered from peripheral neuritis. He had worked for some years in the dipping-house, but two years ago, after being suspended for lead poisoning by the certifying factory surgeon, he gave up his employment at the pottery and became a general labourer in a non-lead process. The symptoms of lead poisoning commenced three weeks after the man had enlisted; he complained of pains and tenderness in the arms, weakness of the wrists, headache, giddiness, and nausea, and the bowels were only opened after taking a big dose of Epsom salts. On examination of the blood it was found that the haemoglobin was diminished by 40 per cent., and that cells showing basophilic granules were present to the extent of 500 per cubic millimetre. The man had the pasty appearance of the face characteristic of lead poisoning, was listless, and albuminuria was present. There was no question of the neuritis being due to alcoholism. The condition of the arms and wrists became worse, and the man had to be discharged from the battalion.

Date of Onset and Cause.

The onset of symptoms in the 14 cases occurred from three to seven weeks after mobilization or enlistment—that is to say, after the real military training began. This is of importance, as I find that no cases of lead poisoning have been observed or reported among

Territorials after their annual training, which is never of greater duration than a fortnight.

The symptoms of colic must be attributed to lead poisoning from the fact that they were associated with the other symptoms that I have mentioned, and also because constipation was an invariable symptom. Had the colic been due to digestive trouble, I would have expected diarrhoea instead of the reverse condition, and I have already said that the case of peripheral neuritis could in no way be attributed to over-indulgence in alcohol.

There was nothing unusual in the course of each attack, and in two cases there has been a recurrent attack after the resumption of military duties, with abdominal colic, vomiting and headache as the most prominent symptoms.

These cases could certainly not be regarded as a local epidemic of lead poisoning due to impure water or to food contaminated with lead, from the fact that the men belonged to different battalions and four of them had never left the head quarters dépôt. And, further, if this were the cause of the trouble, I should have expected to find cases of lead poisoning among non-lead workers, who formed by far the greater proportion of the battalions of which these lead workers were members, but no cases of lead poisoning were found except among lead workers.

We do, however, know that symptoms of lead poisoning have frequently been observed in lead workers after attacks of influenza and tonsillitis and after the administration of such drugs as potassium iodide, potassium citrate, and sodium salicylate, but whether the symptoms are due to the action of these drugs upon the lead lying latent in the system or to the abnormal conditions resulting from influenza or tonsillitis is not yet known. I have seen acute symptoms of lead poisoning follow an injury to a lead worker.

But in the series of cases of which I am speaking I strongly suggest that the altered conditions of life, especially the muscular exercises associated with route marches and physical drill, cause increased metabolism, with the result that lead compounds previously locked up in the muscles and organs of the body become released and reach the blood stream, thus setting up the symptoms of which the men complained.

It is generally known that the work of a glost placer is as arduous as any that can be found in a pottery, and entails a great deal of muscular exertion; at first I thought the theory that increased metabolism due to excessive muscular exercise is the cause of the onset of symptoms might not apply to men following this occupation, but it must be remembered that the military exercises which form part of the daily training of the soldier bring into play different groups of muscles from those used in the work of glost placing, so that even in the case of these workmen, in my opinion, the theory of increased metabolism might still hold. I do not wish to be dogmatic as to the cause of lead poisoning in these patients, but I think that the occurrence of so large a number is suggestive of the theory that the symptoms are caused by increased metabolism. I believe that these cases are similar in nature to the series of cases of delayed lead poisoning which have been recorded by Dr. Kauffmann, of Birmingham, in which partial starvation was supposed to promote the rapidity of the onset of the symptoms.

MR. JOSEPH A. HILL, in a report on the insane in the United States, recently issued by the Bureau of the Census, states that in a typical community of 200,000 persons, equally divided as to sex, 208 of the males and 200 of the females would be found in the insane asylums. In the course of a year, 72 males and 60 females would be admitted to the asylums. In 1880 the total number of inmates in lunatic asylums in the United States included 20,635 males and 20,307 females. Thirty years later the number of male inmates had increased to 98,695, and the number of females to 80,096. The excess of men among admissions in 1910 showed a still further increase in the proportion—namely, 128 males to 100 females. An analysis of the specific forms of insanity among these patients showed that if the factors of alcohol and syphilis, as manifested by general paralysis, were deducted, the proportion of the sexes was practically the same. Approximately, of every 500 persons in the United States in 1910, one was an inmate of a lunatic asylum.