

LETTER TO THE EDITOR.

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The Jaw from the Stalagmite in Kent's Cavern.

It is remarkable that so little notice has been taken of the important discovery by Mr. Pengelly of a part of a human upper jaw in the granular stalagmitic layer of Kent's Cavern, and even more so that some well-known anatomists appear to have been unaware of its existence.

If the deliberate evidence of Pengelly, who for so long so carefully and scientifically explored the floor of the cave, is not to be accepted on this point, his whole investigation will be rudely shaken. It is much to be regretted that Pengelly's pamphlet entitled "The Ancient Cave Men of Devonshire," containing a most clear *résumé* of his exploration, is not better known and more easily procurable. It would be most advantageous if it could be republished. On p. 9 of this pamphlet Pengelly writes as follows:—"The objects in the *modern stalagmite* were not numerous. They consisted of charred wood, marine and land shells, remains of various mammals, including the extinct cave bear, cave hyena, tichorine rhinoceros and mammoth; well-rounded pebbles of various kinds; flint flakes, implements, and cores; and a portion of a human upper jaw containing four teeth, with a loose tooth lying near it. Some of the remains of each of the extinct animals were not only in quite the uppermost portion of the stalagmite, but were not completely covered with it. The human jaw was near its base, where it was twenty inches in thickness."

From this it is clear that extinct animals were living in Devonshire up to the very end of the period during which the upper stalagmite was being deposited; and that this must have been some considerable time after the jawbone became embedded in the lowermost layers of it.

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October 29.

TUBERCULOSIS AND THE MILK SUPPLY.

ATTENTION has been directed to the relationship of tuberculosis and milk, and to the problem of a pure milk supply and the methods whereby this may be ensured, by a series of articles and letters which have appeared in *The Times* during September and October. We may consider the questions thus raised under three headings: (1) how far is tuberculous-infected milk a danger to the community as a whole; (2) will pasteurisation, certified milk depôts, or other means remedy the evil if it exist; (3) can a safe milk supply be ensured without revolution in present methods.

1. The menace, if it exist, of tuberculous milk chiefly falls upon children from one to six or seven years of age, i.e., when cows' milk forms a staple article of diet. There can be no risk to the breast-fed infant, but, unfortunately, the natural method of infant feeding is at present out of fashion! While it is true that tubercle bacilli have been found in some 10-20 per cent. of all samples of milk examined, and while the experiments of the Royal Commissions on Tuberculosis and of others

have shown that tuberculosis may be communicated by feeding with tuberculous milk, the amount of human tuberculous infection derived from milk is still uncertain. The pulmonary ("consumption," phthisis) is the most frequent form of human tuberculosis, the death-rate per 100,000 living for 1901-1909 being 117, as against 50 for all other forms of tuberculosis.¹

Now Bulloch,² from a very careful survey of the literature of the subject, comes to the conclusion that pulmonary tuberculosis is produced almost always, if not exclusively, by tubercle bacilli of the *human* type. More than two-thirds of human tuberculosis is, therefore, certainly not due to the *bovine* bacillus or to milk infection. Bulloch further remarks that the bovine tubercle bacillus plays a relatively unimportant rôle in the production of tuberculosis in man! But it may be objected that, inasmuch as 10-20 per cent. of milk samples contain tubercle bacilli, there must be grave risk of infection therefrom. It will be found, however, that the percentage of infected samples is much lower than this for milk obtained under reasonably good conditions, such as those under which the large dairy companies get their supplies. Again, the method of detection of the tubercle bacillus employed in the examination of milk samples is by the *inoculation* of guinea-pigs (not ingestion or feeding), after *concentration* of the bacilli by centrifuging.

Many experiments prove that inoculation is a method of infecting infinitely more certain than feeding. Probably not more than twenty tubercle bacilli are required to produce a general infection in a guinea-pig by inoculation, whereas Findel found that doses of 19,000-312,000 bovine bacilli did not infect by feeding, and Reichenbach estimated that a dose of no fewer than 140 million bovine bacilli was required to infect guinea-pigs by feeding.³ It is well known that tubercle bacilli are scarcely ever detected by microscopical examination in mixed milk, which gives a positive result with the inoculation test; yet, if they were present in anything like the numbers necessary to infect by feeding, they should be easily detected thus, for of every 100 organisms present, 1-2 should be tubercle bacilli! The fact is, we have no data indicating the infectivity by feeding of ordinary mixed milk.

The work of the Royal Commission gives no information on this most important point, for in all their experiments on the transmission of tuberculosis by feeding, huge doses of bacilli were administered. Although, of course, every effort should be made altogether to exclude tubercle bacilli from milk, it may well be doubted if the risk of infection from ordinary mixed milk is anything like as great as has sometimes been suggested, and the expensive and harassing machinery sometimes formulated to accomplish that end would probably benefit the stockman far more than the general public.

¹ Rep. Med. Officer Local Gov. Board for 1910-11.

² Horace Dobell Lecture, 1911.

³ See McFadyean, Journ. Roy. Inst. Pub. Health, December, 1920, pp. 715 and 718.