very large subject, I cannot help thoroughly and cordially agreeing with Dr. Henry Davy in his Presidential Address to the British Medical Association at Exeter in 1907, when he pleaded for more drastic treatment as regards the infectiousness of tuberculous disease, likening the sputum of a phthisical patient to the stools of one suffering from enteric fever. So long as no more radical steps are taken to disinfect the sputum of such patients, either in this country or in Britain, so long will phthisis stalk a gaunt spectre in our midst.

REFERENCE.

¹ Report of Medical Officer of Health for the Colony of the Cape of Good Hope, p. 30. Capetown: Cape Times, Limited. 1907.

THE PREVENTION OF TUBERCULOSIS: A SUGGESTION.

By A. R. GUNN, M.B., CH.B. EDIN.

THE object of this communication is to suggest a method by which it is believed that the problem of the supply of tubercle-free milk can be satisfactorily solved. That infection through the alimentary tract plays a considerable part in the etiology of tuberculosis is now admitted by the majority of observers, among whom Shennan¹ and Still² may be cited as obtaining 28 and 29 per cent. respectively of primary intestinal lesions in the *post-mortem* examination of tuberculous children. The question of the essential similarity of bovine and human tuberculosis need not be discussed; but on account of their bearing on the possibility of milk as a not uncommon source of infection, reference may be made to the investigations of Dr. James Niven,³ who found that 18.5 per cent. of the samples of milk intended for the city of Manchester gave evidence of tuberculosis on bacteriological examination, and that on the farms from which the milk had come 14 out of 16 herds were found to contain at least one infected individual. The necessity for the adoption of stringent and reliable measures will be at once apparent.

The method of inspection, even in conjunction with the use of the tuberculin test, is generally admitted to be far from perfect. Even when carried out according to the letter and spirit of the law, detection is, I believe, often evaded by the simple precautionary measure of giving the suspected animal a dose of tuberculin such time before the visit of the inspector is due as will give space for the reaction to occur and be recovered from, but not for its protective properties against a subsequent and official injection to disappear. The method here proposed is founded on the fact, first pointed out by Archdall Reid,⁴ that in every population certain members are to be found who possess an inborn degree of immunity against tuberculosis which renders them less susceptible to its onslaughts than their less fortunate fellows. Just as we find during an epidemic, say of scarlet fever, that some there are who escape infection owing to this inherited trait, going to and fro in its midst as if proof against the disease, though not in a state of protection in virtue of a previous attack, so in tuberculosis certain strains possess this specific inborn and therefore transmissible immunity and even in the most unfavourable hygienic conditions escape infection from what is almost a universal disease. As time goes on, this selective death-rate affects the characters of the race. The susceptible or predisposed—a condition, by the way, which is thus shown to be purely negative, indicating rather a lack of inherited immunity than any positive predisposition to the disease—become gradually eliminated, even although their fertility has almost become a byword, and the more immune only are left to carry on the race. The fit in the struggle against this tuberculous menace to existence survive; the less fit gradually contribute smaller and smaller amounts to the maintenance of the race, and in the end almost wholly disappear, leaving a people which for all practical purposes is as immune to tubercle as the Central Africans, from a like cause, now are to malarial disease.

Now, if we assume the identity of bovine and human tuberculosis, we should expect to find that among cattle, also, there are certain individuals which, under ordinary circumstances, are proof to the disease. My proposal, then, is to take these immune individuals and breed from

them a strain which would remain absolutely free from any taint of disease. That this is far from being impracticable is demonstrated by the fact that something similar has already been achieved in other forms of life. Biffen⁵ of Cambridge has shown that susceptibility and immunity are definite Mendelian characters, the latter being recessive; and that, by cross-breeding an inferior yet immune type of wheat—immune, that is, to the rust fungus—with a superior yet highly susceptible variety, certain of their offspring are capable of producing a strain which is possessed both of the immunity of the one parent and of the other desirable features of the other.

And the same thing is undoubtedly possible in cows. All that is required is to bring the idea before the notice of some enterprising cattle breeders who are willing to spend the little time and money that is necessary to carry it out. Very little observation and experiment would be required to indicate whether a given stock was susceptible or immune, and afterwards from the knowledge we now possess of the laws of hereditary transmission, the raising of a pure breed possessed of this quality would be merely a matter of time. That this suggestion is well worthy of the attention of practical breeders, and of the consideration of medical men, must now be apparent. As regards the former, there is the commercial value which would undoubtedly be attached to such a stock as I have indicated. The possession of a sire of known purity as regards this character would of itself be no mean money asset, while the demand for milk and stock from such a source would increase as the knowledge of their existence became more widely diffused. While to medical men it has the interest of being a practical and possible means of eradicating at least one source of tuberculous infection. If we can rear a breed of cattle which is practically immune to tuberculous disease, then, by attention to the ordinary requirements of hygienic science as regards cleanliness of housing and cleanliness of milking, the danger from infected food, whether in the shape of meat or milk, to which we are at present subjected, ought to be capable of almost complete removal.

REFERENCES.

¹ Shennan, *Edin. Hosp. Rep.*, 1900. ² Still, *Practitioner*, 1901. ³ Niven, *British Congress on Tuberculosis*. ⁴ Archdall Reid, *The Present Evolution of Man*, 1896. ⁵ Biffen, *Journ. Agric. Sci.*, 1905.

THE TREATMENT OF EPIDEMIC CEREBRO- SPINAL FEVER BY INTRASPINAL INJECTIONS OF FLEXNER AND JOBLING'S ANTIMENINGITIS SERUM.*

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IN the outbreaks of cerebro-spinal fever which have recently occurred in America, in Scotland, and in Ireland attempts at treatment have proved most unsatisfactory, and the death-rates have been remarkably uniform. In the recent extensive epidemic in New York 75 per cent. of those attacked died. Ker states¹ that the mortality in Edinburgh and Glasgow reached "over 70 per cent." Robertson² gives the rate in the 62 cases he reports from Leith as 74.7 per cent. In a paper which I read at the annual meeting of the British Medical Association at Exeter³ I gave the results of 230 cases coming under my care in the fever hospitals in Belfast during the first five months of the present outbreak—namely, to the end of last May. In these 230 cases the mortality was 70.4 per cent. It thus appears that the death-rate has been practically identical in these places. In our 230 cases almost every form of treatment which has been suggested was tried, including the use of three varieties of antimeningitic serum by hypodermic injections. The varieties of antiserum used were Kolle and Wassermann's, Ruppel's, and Burroughs and Wellcome's. The results in the cases treated with these antisera were not more satisfactory than those given by other means of treatment—79 cases were so treated, with a mortality of 74 per cent.—and their use was discontinued.

* A paper read before the Ulster Medical Society.