having previously been clipped closely, and the skin then washed first with a saturated solution of corrosive sublimate, and afterwards with distilled water. For thirty-six hours after the operation the condition of the animal was noted every two hours. The record of the pulse and temperature (rectal) showed a steady ascent of the temperature during the fourteen hours following the injection of the lymph. The temperature remained high for four hours more; forty-eight hours after the injection it had returned to the normal level. The frequency of the pulse was increased, and the disturbance was maintained even after the temperature had nearly returned to the normal. The heart's action was decidedly irregular, and the pulse was intermittent between the tenth and sixteenth hours after the injection. The cough was notably more frequent during the febrile reaction, and the enlarged glands were distinctly more sensitive to pressure. The general appearance of the cow did not denote any serious disturbance; the appetite appeared good throughout, fæces and urine were passed normally, and the animal ruminated and licked herself as in health. A slight inflammatory tumefaction formed at the seat of injection, and this had not quite disappeared on the third day after the injection.

Second Experiment.—On February 23rd, at 9 p.m., the same cow received 40 milligrammes of Koch's fluid. The effect in this case was the same as in the first experiment save that the rise of temperature was somewhat delayed, and the maximum temperature recorded was 104.8° as compared with 105.6° after the first injection. The cough became more frequent, the enlarged glands more sensitive, but appetite and rumination remained undisturbed. Slight inflammatory swelling followed at the seat of injection.

Third Experiment.—On February 25th, at 11 a.m., the same cow received 80 milligrammes of Koch's fluid. The effect in this case was almost identical with that produced in the first experiment. In both cases the maximum temperature was reached about eighteen hours after the injection of the fluid; the frequency of the pulse was decidedly increased, and the heart's action was irregular for some hours. The cough was more frequent, and the enlarged lymphatic glands were very sensitive to pressure. The inflammatory swelling at the seat of inoculation was much greater than in the other two experiments, but, as in these, it gradually subsided without suppuration. This cow is still alive and under observation, and the precise extent of the tuberculous lesions in the viscera is not yet known.

The reaction obtained in this cow after each injection was so decided that I felt very hopeful that Koch's lymph would prove a most valuable aid in the diagnosis of tuberculosis in cattle. Unfortunately the results obtained in another case were decidedly disappointing. This cow, purchased for experiment by my colleague, Professor Walley, received three separate injections of the same sample of Koch's fluid as that used in the first and third experiments with the cow above referred to. The injections were made on February 21st, 23rd, and 25th, the quantity of lymph employed being respectively 10, 40, and 80 milligrammes. The animal was a small Ayrshire, only slightly heavier than the first cow.

There was practically no reaction as regards the temperature. The same may be said of the pulse. After each of the three injections, however, there was a notable increase in the frequency of the cough, and the respirations were more laboured, and occasionally oral. The animal was killed on February 28th, and the *post-mortem* revealed most extensive tuberculous lesions. The lung was the seat of scattered patches of tuberculous catarrhal pneumonia, the bronchial glands were greatly enlarged, and both parietal and visceral pleura and peritoneum were literally covered with *perlsucht* nodules. Not the slightest trace of any reaction in the tuberculous parts could be detected.

Had the experiments with this cow stood alone it might have been urged that the non-reaction was due to the dose of Koch's fluid having been too small. But the experiments with the first cow showed that even 20 milligrammes sufficed to elicit a decided reaction, whereas the second cow received in the third experiment 80 milligrammes. As further evidence that the result was not ascribable to the smallness of the dose, the experiments recently published by Dr. Stricker³ may be

cited. In these experiments 1 cubic centimetre of a 1 per cent. solution sufficed to determine in four tuberculous cows a rise of temperature amounting in one of the animals to 105.8°.

Only a few experiments with Koch's fluid on cattle have yet been published, but in almost all a reaction was obtained in the tuberculous animals, while in no case was there any rise of temperature in the control non-tuberculous animals. In all the experiments yet published the tuberculous animals appear to have been in rather an advanced stage of the disease, but it still remains to be proved whether any discernible reaction will follow the injection of Koch's fluid when the lesions are of small extent.

NOTE ON SOME FUNCTIONS OF THE CERVICAL SYMPATHETIC IN THE MONKEY.

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IN the BRITISH MEDICAL JOURNAL of March 7th, in the Physiological Section of the SUPPLEMENT, appeared an excellent notice of some "Recent Experiments on the Cervical Sympathetic." In connection with this subject it may prove not without interest to mention some results which (with Mr. J. B. Lawford) I have recently noticed to occur, upon stimulation of the cervical sympathetic, in the monkey. In that animal, if weak induction shocks be thrown into the upper end of the divided sympathetic of one side of the neck (the animal being of course thoroughly under the influence of an anæsthetic), the following effects, on the corresponding side of the head, can be seen to follow:—

- a. The palpebral aperture is slightly enlarged, chiefly by a lifting of the upper lid.
- b. The pupil dilates.
- c. The pinna of the ear is drawn a little backwards, so as to project less from the side of the head.
- d. The pinna, if previously flushed, as often happens during the inhalation of the alcohol-ether-chloroform mixture, becomes blanched.
- e. The skin of the nostril of the corresponding side becomes, in a similar way, slightly blanched.
- f. The hair on the forehead—front half of the scalp, temple, cheek, and of the upper part of the whisker—slowly erects itself, lending to the face an expression of surprise and fright.

The converse of the above effects follow upon section of the nerve, and, in addition there appears a slight flushing of the gum over the superior maxillary bone on the same side as the section. These effects are due to fibres in the nerve, which can be easily traced by the stimulation method back to an exit from the spinal cord *per* the anterior roots of the second thoracic and especially of the third thoracic nerves.

The symptomatology of lesions of the cervical sympathetic in man is not without its points of obscurity. The above observations on an animal type, widely removed from man than are the rabbit and cat, may possibly be possessed of some interest, from a clinical as well as from an experimental standpoint.

A further point suggests itself. Dr. Hale White, after careful microscopical examination of sympathetic ganglia, has been led to conclude that the collateral ganglia (for example, the superior cervical and the semilunar) of the sympathetic system are, in adult man, atrophied and degenerate organs, "like the cœcæx or appendix cœci."¹

In view of the connection in the monkey between the cervical sympathetic and the hair on the front of the scalp, the question suggests itself: Is the loss of hair from the front of the human scalp, which constitutes so common a form of baldness, a phenomenon attendant, perhaps dependent, on the degeneration of the superior cervical sympathetic ganglion in man, for which Dr. Hale White contends?

¹ *Journal of Physiology*, vol. x.: cf. Hale White, *Journal of Physiology*, vol. viii.

APPLICATION has been made to the Board of Trade for a licence to the British Institute of Preventive Medicine to be registered with limited liability without the addition of the word "Limited."

³ Stricker's *Archiv f. animalische Nahrungkunde*, No. 4, and *Oester. Monatschrift für Thierheilkunde*, March, 1891.