nor does it stimulate the thyroid causing increased protein metabolism.

29 (846)

An experimental study of heredity in bovine tuberculosis.

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This study was conducted on what is probably the most valuable herd of Holstein Fresian cattle in the world. It has now extended over about ten years, hence several successive generations of stock have been studied under precisely similar conditions. The experiments have been supervised and verified by officers from the U. S. Department of Agriculture and the data are matters of official record in the register published by the Holstein Fresian Association. I am permitted to summarize and publish the results of the experiments by Mr. J. W. Dimick, the proprietor of Woodcrest Farm, where the problem is under study.

The number of animals comprised in the study is 425. The animals were originally selected because of their desirability from the standpoint of breeders and milkers or because of their "type" and entirely independent of their being or not being tuberculous.

The tuberculous animals greatly outnumbered the non-tuberculous and in most instances several generations of tuberculosis on both sides is known to have existed. 300 tuberculous animals were studied. The existence of tuberculosis was determined by the administration of treble the official dose of tuberculin, repeated in non-reacting animals three times at intervals of six months. All animals reacting to either test were removed at once to the tuberculous farm, the administration of which is entirely separate from that of the non-reacting herd. Little or no possibility of the transmission of infection from the tuberculous group to the healthy one exists.

With few exceptions tuberculous cows are bred to tuberculous bulls, the selection in any case is made for purposes of "type" and no account of the infection is taken in so far as breeding is concerned.

At birth the calves are immediately taken from the mother and no possible communication thenceforth exists between them except that the calf is given by bottle one feeding of the first milk secretion of the mother, removed by stripping and fed unsterilized. All subsequent feedings are made from a modified milk formula, based on pasteurized milk collected indiscriminately from sound and tuberculous animals. The feedings are made directly after pasteurization and before the milk has been cooled; pasteurization is begun immediately after the milk has been collected and before it has lost its natural heat.

Over 200 calves have been born of the tuberculous herd, not one has become tuberculous although all have been tested three times by massive doses of tuberculin. Some evidence exists tending to indicate that these animals are rather more resistant to tuberculosis than animals born of non-tuberculous parents.

No falling off in type, in milk production or fertility is present in these calves, no increased death exists among them as compared with the offspring of healthy cattle. We may also add that no falling off in value takes place and among calves of this ancestry are several of the most valuable cows and bulls in the world. These facts remain constant even where at least three generations of known tuberculous parentage exists.

As to the condition of the tuberculous animals themselves. None showing gross evidence of the disease are kept but in so far as the other reactors are concerned, practically all the world records as to fertility, milk and cream production are held by animals either themselves thus infected or who are the offspring of tuberculous ancestry.

The world's record of milk production was accomplished by a 7-year-old cow of this tuberculous group (Woodcrest Meta Vernon), herself also the descendant of three known tubercular generations. This cow gave in 365 consecutive days a total of 28,436 pounds of milk and during her five years of fecundity has given birth to five high-grade and perfect calves. A 23-month heifer of this group, sired and dammed by tuberculous animals, has beaten the world's record of milk production for this age by 4,000 pounds.

The object of the experiment is to produce a herd of Holstein

cattle entirely free from tuberculous taint and yet endowed with all the most valuable strain characteristics possessed by this breed of stock.

30 (847)

The function of the otic labyrinth in turtles.

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The peculiar method of progression in serpents[1] and the widely different modes of progression in lizards, snakes and turtles[2] have attracted attention to the relation of the semi-circular canals to the processes of progression and maintenance of equilibrium in these forms.

The general results of labyrinthine extirpation in all these forms are similar to the results observed in other vertebrate types. There is, in the turtle, torsion of the head to the injured side, permanent deviation of the eyes and a tendency to crawl or swim toward the injured side, when the lesion is unilateral. The body on the uninjured side may be raised higher than on the injured side.

After bilateral operation, there are coarse wide tremors of the head which seriously interfere with grasping food. The gait on land is not markedly affected permanently, and there is no permanent torsion of the head to either side. The head may, however, be displaced directly upward and backwards in the first few days following extirpation. Swimming is a matter of great difficulty. When the turtle moves slowly, progress is fairly good, but agitation or hurry upset coördination and extreme disorientation results. The animal's reactions are not biologically adequate (Edinger).

It may be shown in turtles and snakes particularly that the otic labyrinth is a great proprioceptive organ for the head segment (Sherrington). The rôle of the labyrinth in the maintenance of equilibrium rests primarily upon its relation to the head, and only

[1] Henri, *Comptes rendus de la Soc. de Biol.*, Paris, 1899, I, IIe serie, 94–5.

[2] Trendelenburg and Kühn, *Archiv für Physiologie*, 1908, pp. 160.