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THE THYROID GLAND OF THE "BULL-DOG" CALF OF THE DEXTER.

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THE significance of the monstrous "bull-dog" calf of the Dexter breed of cattle is being investigated in this department. Data have been collected which show that about one in every six calves born presents certain constant and definite abnormalities which would appear to render the calf non-viable.

The exact nature of the pathological condition present in these cases has not yet been recognised, and opinions seem to be divided between the diagnosis of achondroplasia and that of foetal cretinism. Emerson (1) in discussing achondroplasia in the human refers to the description of the bull-dog calf by Dauberiton and by Peloquin in 1750, and suggests that this condition is comparable to achondroplasia. In 1902 Leblanc (2), Apert (3), and Regnault (4) debated as to whether the condition was cretinism or achondroplasia, but without results. Seligmann (5) in 1904 recorded the results of his examination of several cases and concluded that the condition was foetal cretinism. In 1911 Sheather (6), in describing one case which he had investigated, suggested that probably the condition was achondroplasia and not cretinism.

Thanks to the kindness and interest of the Dexter breeders, we have had the opportunity in this department of obtaining five specimens of bull-dog calves. It was decided to make a thorough examination of the thyroid glands of these calves, and this paper will deal with the results of this examination in their bearing upon the general pathological condition.

In order to provide standards to which our specimens could be compared, a histological examination was made of the thyroid

glands of normal foetuses ("slink-veal") of about the same age. A normal thyroid of six and a half month's development shows solid masses of cells bound together by well-marked bands of connective tissue. The cells are rounded in shape and have central, densely-staining nuclei. Here and there large vesicles lined with a single layer of well-formed cubical or columnar epithelium may be seen. In the interior of these vesicles colloid is usually found (Fig. 1).

Seligmann describes the thyroid glands of bull-dog calves as differing greatly from the normal. The gland is represented by a couple of rounded, œdematous, purple-coloured masses, one on each side of the trachea. The isthmus is absent, or irregularly developed; the gland is usually rich in blood, soft, and much

FIG. 1.

Section of the thyroid of a normal foetal calf, six and a half months. ($\times 150$).

infiltrated with serum. Upon histological examination, the field is found to consist of masses of more or less cubical or spheroidal cells. The capillary network is extremely dense and well developed. Very few vesicles, and sometimes only the faintest trace of a vesicular arrangement, can be detected. There is complete or almost complete absence of colloid. Even the vesicles contain either no colloid at all or a small amount of a heterogeneous vacuolated substance which may represent some slight and abnormal degree of formation of colloid. More often, however, the lumina of the vesicles are packed with cells.

The condition of the thyroid in Sheather's case was in every way opposed to Seligmann's conclusions. The size and shape of the gland were normal, the isthmus was well developed, and the colour was somewhat paler than usual. The histological structure was also absolutely normal, except for a slight excess of interstitial

tissue in some parts of the gland. The vesicles were perfectly formed and completely filled with colloid.

It is known that in the case of the human cretin the thyroid is usually atrophied, with few vesicles preserved. Sometimes it is so small that it is supposed to be altogether absent. In the majority of cases of achondroplasia, on the other hand, the thyroid has been found to be normal, sometimes described as large (in one case even twice its usual size), but not atrophied. Arthur Keith (7) suggests that the condition found in achondroplasia points to the action of some factors regulating growth, "probably a hormone arising in one of the glands of internal secretion."

In the monstrous calves which we have examined the thyroid gland is of normal size and shape, having paired lateral lobes

FIG. 2.

Section of the thyroid of a monstrous calf, six and a half months. ($\times 150$).

joined by a well-developed isthmus. It shares in the general oedema where such is present.

The histological structure of the gland (Figs. 2 and 3), however, is not identical with that found in the normal foetuses. Similarly to the normal, it shows cell masses as well as a few large vesicles filled with colloid; but a large proportion of it consists of numerous small vesicle-like structures containing no colloid. The epithelium of these small vesicles appears catarrhal and is in many places disintegrated, with individual cells lying in the lumen. This, however, may be a *post-mortem* change, since in all our cases at least forty-eight hours had elapsed between abortion and the fixation of specimens. The interstitial connective tissue is increased in amount and the blood vessels appear more prominent. The isthmus of the gland shows a structure similar to that of the lateral lobes.

From the above account it follows that the thyroid of bull-dog calves is not normal, but the abnormality is not such as would suggest a cretinous condition, *e.g.*, hypo-functioning of the gland. Seligmann seems to have based his diagnosis on the general absence of colloid in the gland, but in our opinion the presence or absence of colloid is no criterion of the functional state of the gland: it is known that there is actually less colloid in an active than in a resting gland. Our specimens show a condition which suggests a more advanced development than normal, and, if the appearance of desquamated epithelium and the general absence of colloid be taken as evidence, the gland appears to be in a condition of hyper-functioning rather than hypo-functioning.

M'Carrison (8) has shown that cretinous offspring may be experi-

FIG. 3.

Section of the thyroid of a monstrous calf, eight and a half months. ($\times 200$).

mentally produced in goats by causing a goitrous condition in the mother, and in the human there generally is a history of such in the parents. But there is no such history in the case of the monstrous calf, and the Dexter itself presents no evidence of aberrant thyroid function. In Seligmann's paper Shattock suggests that the maternal thyroid is probably sufficient for the mother's needs only; but the experiments of Halstead, and later of Edmunds, on the dog show that were this the case the thyroid of the foetus would be very greatly enlarged. There is, however, no evidence of this. The histological appearance of the thyroid of the bull-dog calf is not consistent with the diagnosis of cretinism.

In conclusion we wish to convey our sincere thanks to Dr. R. K. S. Lim of the Physiological Department, University of Edinburgh, for much valuable help and criticism.

SUMMARY.

1. The thyroid gland of bull-dog calves is not normal in histological structure.
2. The abnormality is not that which is associated with the general condition of cretinism, for the gland shows hyper- rather than hypo-functioning.

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DETECTION OF THE SPORES OF THE BACILLUS ANTHRACIS IN SOIL.

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THIS work was carried out at the Veterinary Bacteriological Laboratory, Baghdad, in connection with an extensive outbreak of anthrax at the Advanced Base Remount Depôt, Baghdad.

The outbreak commenced on 17th March 1921 and terminated on 21st April 1921. It involved the death of thirty-four horses and twelve mules.

The usual symptoms of anthrax in equines were shown. There was a sudden rise of temperature up to 106° F., accelerated pulse, respiration hurried and laboured, profuse perspiration in many cases, and colicky pains, in most cases severe. Death took place in from one to two hours after the onset of the symptoms.

Four of the cases showed moderate swelling of the throat, and one case showed a large swelling of the sheath.

Diagnosis.

For the purpose of diagnosis the veins of the ear were opened under aseptic precautions. Smears were made for microscopic examination, and blood for cultural examination was taken on sterile swabs. This was done immediately after the death of the animal.

Microscopic.—One blood smear was stained by aqueous solution of methylene blue (1 per cent.), and another by Gram's method. They were examined, and if anthrax bacilli could not be discovered in the smears cultural examination was resorted to.

Cultural.—The cultures were made on plain agar slopes, in wide test tubes (1½ inches in diameter), by sowing direct from the swab.