be a main antero-posterior gradient in number of fibres per unit area. In a Welsh Mountain fleece, density decreased from 7,960 fibres per 4 sq. cm., at the shoulder, to 6,770 in the britch region. Additional evidence is furnished by a study of coat development in the fœtus. In all stages the follicles are very much greater in number over the neck and shoulder than elsewhere, diminishing in number more posteriorly and ventrally. There is here a definite gradient in number of follicles. Incidentally, although high density may later cause the production of fine fibres, it is difficult to appreciate Dr. Galpin's point of view that even some differences between arrays are the results of 'overcrowding' at such an early stage as the trio-stage.

It has been stated that there are no gradients in fibre fineness, because relatively large variations occur over small areas of the fleece, and what has been named 'spotted' or short-period variation is evident. I think this is a narrow view. Main trends do occur over the fleece, certainly more evident in the less uniform fleeces, and about these trends occurs the short-period variation. Often the practical necessity of taking relatively few samples for measurement has served only to demonstrate the short-period variation, which has masked any possible indications of gradients which exist. In very uniform fleeces gradients are more difficult to demonstrate, but they are manifest in other types and in the coats of lambs.

Another possible expression of greater activity forward is in the greater length of fibre. Swart states that a ration increased from sub-normal caused increased fibre-length, and the effect was more marked on the back than on the britch and belly. Results of a few analyses I have made, especially on the Welsh Mountain fleece, tend to indicate that there is a main antero-posterior gradient in straight-length of fibre, one fleece, for example, having mean values between 13·6 cm. at shoulder and 12·4 cm. in the britch region.

Many investigations are required to demonstrate subsidiary gradients and to substantiate or disprove these possible explanations. Such suggestions as those I have made are only tentative and arise from a desire to apply a coherent and unifying significance to the mass of results being published.

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Effect of Vitamin E Deficiency on the Thyroid

SINGER[1] found that vitamin E deficiency produced hypoplasia of the thyroid in rats. I have noticed what appears to be cretinism in the young of vitamin E-deficient rats. Female rats kept on an E-free diet usually have an initial fertility and produce a litter of living young before becoming absolutely sterile; the litters of such rats or of rats which have been proved sterile and have then been given a small dose of vitamin E concentrate, just sufficient to produce a litter of two or three, show definite signs of thyroid deficiency.

In one case a rat which had been maintained on a vitamin E-free diet for ten months had a litter of three, all of which appeared normal at birth, but which failed to grow, in spite of the fact that the mother was lactating freely. The appearance of the litter became increasingly cretinous; the head was large, the fur sparse and the nose upturned. The forepaws of one animal were abnormal, one foot being much larger than the other. The animals moved slowly and seemed to be of subnormal intelligence; they lived 17, 22 and 30 days respectively.

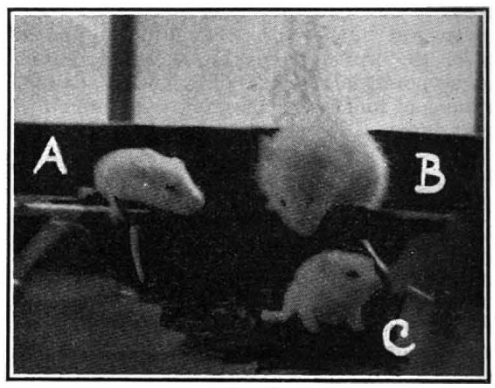

Fig. 1.

The second example was that of a litter of a rat which had been proved sterile and then dosed with a very small quantity of vitamin E concentrate. Again, three young were born, one died within the first few days and the other two gradually became cretinous, one dying at three and the other at four weeks of age. In one of the animals the feet were deformed, there being definite clubbing of the toes. One animal was very much smaller than the others, and post-mortem examination revealed two pink bodies in the position of the thyroid, but these showed no typical thyroid structure. The head was very large, and the fontanelles still widely open.

Fig. 1 shows a cretinous rat *C*, aged 21 days, and weighing 18·5 gm. with a normal rat *B* of 21 days, weighing 40 gm., and a normal rat *A* also weighing 18·5 gm. but aged only 10 days.

This complication of vitamin E deficiency is being investigated in greater detail, and will be fully reported in due course.

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Protein Digestion of Wood-boring Insects

THE nitrogen supply of wood-boring insects has never been investigated. Ripper[1] assumes that it is derived directly from the wood. Mansour and Mansour-Bek[2] arrive at the same conclusion, and since their summary has been published, Parkin[3] has found a proteolytic enzyme in *Lyctus*, which supports this view.

During an investigation into the nutrition of the ash bark-beetle, *Hylesinus fraxini* Panz., which I am carrying out, I examined its protein digestion, and found it necessary to compare it with that of wood-boring beetles of different habitat. For this purpose a number of infested samples of wood was examined,