In one fifteen-and-one-half-day transplant which was attached to the mesenteries of the host, the outer portion of the graft was covered with brown feathers, the inner portion possessed white plumage, and the characteristic brown pigment was lacking in the lower leg and foot. Furthermore, typical Brown Leghorn feathers covered the greater portion of the right wing of the host. Although this latter condition may have been due to a somatic variation, Dr. Harry L. Kempster, professor of poultry husbandry at the University of Missouri, joins me in the view that the pigmentation of the wing feathers has been induced by the graft. This case seems to indicate a mutual interaction between the host and transplant or between the hereditary constitution and the environment.

A diffusion gradient apparently does not explain these latter cases, since some well-attached grafts developed colored plumage and other less well-attached transplants possessed white feathers. Experiments are in progress which may shed additional light on the problem.

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NEW OBSERVATIONS ON THE EFFECTS OF CALCIUM DEPRIVATION[1]

THE authors have observed that a profound neurological disturbance develops in growing rats maintained on diets very low in calcium (0.01 to 0.02 per cent.) which has heretofore not been associated with a deficiency of calcium. The neurological picture, which is quite complex, is suggestive of a diffuse lesion involving the cortex, basal ganglia, spinal cord and peripheral nerves.

The nervous condition is best demonstrated by subjecting the experimental animals to short and mild galvanic shocks from an induction coil after they have been on the low calcium ration for six weeks or more. This stimulus causes the rats to collapse. The rats remain conscious, but they respond poorly and sluggishly to all stimuli. They show little ability to right themselves or to grasp objects with their paws. The fore limbs remain relatively normal, but there is always a paralytic foot drop of one or both hind limbs. Immediately after the onset of the collapse, the tail becomes anesthetic, while the head and trunk appear to be hyperesthetic. After a lapse of about 24 hours, the head and trunk also become anesthetic. The normal propulsive locomotion of these animals is greatly altered, and they generally show a retropulsive response which is not observed in the normal rat.

The effects of the disturbance appear to be reversible. The degree of prostration increases the longer the animals are kept on the calcium deficient diet. Severely depleted animals remain in a state of prostration for long periods of time and, as a result, usually die of inanition. Less severely deficient animals recover from the prostration after a varying period of time, even if they are still kept on the low calcium ration. Recovery, however, is hastened by feeding the control diet to the injured animals.

A condition similar to that which is induced by the galvanic stimulus may develop spontaneously in animals that have been maintained on the experimental diet for a period of from 9 to 14 weeks. The effect of the spontaneous collapse is very severe and the animals usually die within a few days.

Visible hemorrhage occurs frequently. In the central nervous system it has been observed in the cerebrum, spinal cord and the circle of Willis. This finding suggests that the neurological disturbance may well be a secondary effect of the vascular pathology. Hemorrhagic areas also have been noted in the lungs, gastrointestinal tract, bladder, bone and in the muscles of the gluteal region.

Chemically, the calcium deficient animals exhibit a low blood calcium, which was found to vary from 4.4 to 6.6 mg per 100 ml of serum.

Tetany does not occur in animals when merely reared on the low calcium rations. Tetany can be induced in thyro-parathyroidectomized rats by placing them on the low calcium diet. It takes 4 to 6 weeks to develop on this regimen. The tetanic spasms can be induced with a galvanic shock or, even better, with the hissing sound from an air jet.

Another point of considerable interest is that, although the bony skeleton is almost completely decalcified, the teeth appear to be relatively well calcified.

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