limbs comes from one of the segmental branches of the dorsal aorta, and returns through the renal portal system, the postcaval or posterior cardinal vein.

During the early stages of the growth of the limb the development of the circulatory pattern is correlated with that of the skeleton, proceeding most rapidly in the distal region, at a time when the muscles are differentiating in the proximal part of the limb. The collateral vessels and the details of the proximal region appear after the formation of the joints and at the time of the beginning of function.

Since the development of the vascular pattern follows rather than anticipates the laying down of the skeleton in a reduplicating limb, it would appear that an abnormal circulatory pattern is not one of the causes of reduplication.

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Effects of Rate of Growth on Post-natal Development of the White Rat.

G. B. MOMENT. (Introduced by R. G. Harrison.)

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In order to investigate the reactions of the various organs of the body to a radical acceleration in growth rate, over 200 male albino rats of a homogeneous pedigreed strain were fed in such a way that one-half of them grew approximately twice as fast as the other half. This increase in rate of growth was effected by adding greater amounts of yeast and lettuce to an already adequate diet, hence the "slow" growth animals were not stunted but themselves grew somewhat faster than the standard given by Donaldson. At body weights of 60, 90, 120, 150, 180, 240, 300, 360, 420 and 480 gm., 10 rapid and 10 slow growth rats were killed and studied.

A comparison of the 2 groups of rats gives the following results: (1) The ratio between body length and body weight is the same at any given length or weight for both the rapid and slow growth rats and also for Donaldson's animals. (2) The size (measured in terms of wet weight) of 3 different muscles, of the kidney, spleen, thyroid and pituitary depends upon the size of the rat and not upon its age. The same is true, in the main, of the heart and liver, but there is a definite tendency for the rapidly grown rats to have larger

livers and hearts than the slowly grown ones of the same body weight. (3) The size of the eyeballs is a function of age rather than body size, furthermore the growth of the eyes in both rapid and slow growth rats is "heterogonic" and differently so in each case. Rats grown rapidly up to adult size and then maintained at that point until as old as slow growth rats that have just reached full stature have eyes as large as those of the slow growth animals. In other words, the eyes have continued to grow while the rest of the animal was constant. (4) The thymus in rapidly growing rats is enormously larger than in slowly growing ones of the same body weight, attaining a maximum 2 or 3 times the maximum for the slow growth rats. But the age at which the maximum size and involution of the thymus take place is the same in both classes of rats even though their body sizes are very different. (5) The organs of the rapidly grown animals have a water content that is, within the limits of experimental error, like that of the slowly grown ones. Variability in the size of organs was not appreciably increased by the increased growth rate. (6) The final retardation in rate of increase, *i. e.*, the definitive size of all the organs studied except the eyes and the thymus, seems to be determined not by the chronological age of the animal but by its position on the growth curve. At a body weight of about 420 gm. some growth inhibiting mechanism seems to come into play, being especially noticeable in the case of the musculature.

The 3 divergent reactions exemplified by the muscles, thymus and eyes may be explained in part at least on the theory that at different nutritional levels the partition coefficients (measuring the relative distribution of food materials between the various organs) become different.