smokers, 13 or 36% were found to give positive intradermal reactions of the urticarial type to one or another tobacco. Two cases were also tested with extracts of tobacco smoke. These tests were carried out with a saline extract (Coca) of a concentrate, prepared by Dr. Harry Sobotka from an alcoholic solution of cigarette smoke. Both patients gave positive intradermal reactions. A final conclusion, however as to the significance of smoke reactions will have to be reserved. The average age of the 13 patients who reacted positively to tobacco extracts was 45. Four of these had a personal history of allergy. The average age of the 23 patients who did not react to tobacco was 60 years.

The serum of 6 of the positively reacting patients was studied for the presence of specific reagins to tobacco by the passive transfer method of Prausnitz and Kustner. In 4, reagins could be demonstrated.

The extract of mixed tobacco obtained from Dr. Coca which was nearly free of nicotine gave the largest number of positive reactions. Twelve patients tested with 10% solution of nicotine tartrate 1:10,000 and 1:5,000 were found to be negative.

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Anatomy of Normal and Reduplicated Limbs in Urodeles.

ISABEL W. HARPER. (Introduced by R. G. Harrison.)

From the Osborn Zoological Laboratory, Yale University.

A study of the anatomy of double limbs in urodeles with especial reference to musculature and blood vessels was made as a basis for a further understanding of the process of reduplication.

Double limbs were produced by rotation of the fore limb bud, both in the normal position and 3-5 segments posterior, in a number of species of Amblystoma (Ambystoma) and in *Eurycea bislineata*. Statistical treatment revealed specific differences in the proportions of total suppression, of reduplication and the subsequent resorption of one member of the pair. More cases of reduplication occurred in those species in which the growth of the limbs is most rapid. Most frequent resorption of one member, however, was found in those with the fastest general growth. *A. tigrinum* showed the greatest number of cases of total suppression. Limbs transplanted

to the flank were more often completely suppressed than were the ones rotated in the orthotopic position, but among the reduplications fewer members were resorbed.

The musculature of double limbs was found to be reduplicated from a point slightly proximal to the junction of the members. While distally the muscles of double limbs in the orthotopic position were entirely similar to those of the heterotropic limbs, the shoulder muscles of these series differed in 2 ways. First, the intrinsic muscles were found in the heterotopic limbs only if the parts of the girdle to which they are normally attached were present, and since only 3½-somite grafts were taken, the heterotopic girdles were often mere plates representing just the central portion of the girdle. Second, the 4 extrinsic muscles which are derived from the myotomes and the gill musculature were never found in the heterotopic limbs, although the latissimus dorsi and the pectoralis, which develop from the limb itself, were usually present.

The normal development of the circulatory pattern in the fore limb was essentially the same in all the species examined. It was worked out in both living and injected specimens, and the results compared with those of Hochstetter[1] and Grodzinski.[2]

The blood vessels of the members of a reduplicating limb join to form a common artery and vein. Circulation begins late and is more subject to interruption than in normal limbs because of the smaller caliber of the vessels. It is, however, established relatively somewhat earlier in harmonic than in disharmonic members (those with the laterality of the other side of the body). The pattern and the direction of flow in the blood vessels of any member are in accordance with its laterality. The minimum circulation for each digit is one vascular loop. If stasis occurs in a digit, and the circulation does not become reestablished, the digit is resorbed. On the other hand, stasis may be prolonged and yet the circulation finally resumed.

Lack of circulation cannot always be the cause of resorption, since when disharmonic members are undergoing resorption they retain at least one vascular loop even when reduced to mere spurs.

When reduplications on the flank were compared with those in the normal position it was found that with respect to the time at which the circulation appears and in the development of the pattern they agree entirely. The blood supply of these heterotopic

[1] Hochstetter, F., *Morph. Jahrb.*, 1891, **17**, 1.

[2] Grodzinski, Z., *Bull. de l'Acad. Polonaise des Sci. et des Lettres, Classe des Sci. Math. et Nat., Serie B, Sciences Naturelles* (II), 1930, 247.

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.

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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