cles, and then nucleated cells are formed within them, and are the parents of the epithelium cells of the perfect organ.—*Ranking's Abstract*, vol. i.

ANATOMY AND USE OF THE THYMUS GLAND.

On this subject we are fortunate in being able to refer to some recent researches by Mr. Simon,* the value and importance of which have attained for them the high honour of gaining the first Astley Cooper prize. In the endeavour to place before our readers a brief abstract of this work, we shall omit the author's very concise and accurate history of the labours of former writers, and proceed at once to the discussion of the original portion of his labours.

The first appearance presented by the gland, as observed in the fœtal calf, is that of a simple tube lying along the carotid vessels, and exhibiting faint traces of commencing areolar tissue. The contents of the tube at this time are granular, but do not contain any distinctly formed corpuscles. Mr. Simon suspected that this tube was not the primary condition of the organ, but that it might exist at an earlier period in the more simple form of a string of primordial cells; he has not, however, been able to verify the suspicion. He refutes the opinion of Arnold, (*Lehrbuch der Physiologie*, tom. ii. p. 265), that the thymus is a development of the respiratory mucous membrane, as well as that of Bischoff, that it is in some way connected with the thyroid gland. The development of the gland proceeds in the same manner as that which has been observed as the primordial tube of the true glands, that is to say, by the addition of diverticula, which spring from the sides of the tube. These diverticula, when they have arrived at three-fourths of a sphere, themselves give rise to secondary bulgings, which again reproduce others, until at length by the repeated occurrence of the same process, conjoined with a continued interstitial molecular increase, the organ attains the bulk and complexity of the structure exhibited by it in the mature state of the fœtus.

The researches of Mr. Simon confirm in the main the dissections of Sir A. Cooper, with respect to the existence of a central cavity; he thinks, however, that it has hitherto been supposed to be larger than it really is. They likewise accord with those of Haukstead, in reference to the period at which the thymus attains its greatest size, this being, not as is commonly supposed during intra-uterine life, but at a certain period after birth. This exact time it is not easy to ascertain, as it is probable that it varies in different instances; it has, however, been laid down as a law by the author, that its bulk is inversely as the amount of mortality and consequent exhaustion of tissue, and its duration, therefore, dependent upon the period at which muscular activity becomes established. In reference to this point, the author has arrived at the following results:—1st. During the period next succeeding birth, the activity of the thymus is remarkable; it increases considerably in size, becomes turgid with secretion, and its specific gravity is lowered by the greater fluidity of its contents. This first growth is far out of ratio to the general increase of the body. 2nd. For several months it continues to increase at a diminished rate, and merely in proportion to the general growth of the body; its further enlargement ceases about two years after birth. 3rd. From this me, during a *very variable* number of years, it remains stanary, and, supposing the individual to be adequately urished, gradually assumes the structure of the fat. 4th. e duration of its decay, and the epoch of its entire vanishi are still more uncertain; about puberty, it seems in most ces, to suffer its chief loss of substance, and to be reduced tc vestigiary form.

he first appearance of this organ before birth is supposed byatomists to be as early as the fifth week after conception, but in the tenth week of pregnancy it is sufficiently perceptible to the naked eye. It, at this time, exhibits a distinct tubulo-vesicular structure. The third chapter of the work contains a description of the mature gland. Its mode of formation has been already alluded to; it remains only to mention the intervesicular structure and the contained fluid. The intervesicular tissue is a prolongation of the wall of the original tube, and consists of an indescribably fine membrane, over which a close capillary network is spread for the purpose of supplying materials for secretion. This secretion consists of a fluid, in which, as was discovered by Hewson, microscopic corpuscles were seen to float. These corpuscles are circular discs of nearly the same size as the coloured particles of the blood. Their average diameter is 1-3830 of an inch. They are marked by minute dots which are supposed to be molecules of fat in combination with fibrin or solid albumen.

The author gives three separate chemical analyses of the thymus fluid, all of which concur in demonstrating the error of the opinion that it was essentially a highly carbonaceous product. It is proved by them on the contrary that the fluid contains no more carbon than enters into the composition of muscle and blood.

The nerves of the thymus are derived from the inferior and middle cervical ganglions and from the cardiac branch of the pneumogastric nerve.

In the comparative anatomy of the gland, the author's researches have been very extensive, but our space will not allow of a repetition of the different tribes of animals in which he has carried on his investigations; we shall content ourselves with giving the following summary of the results to which they lead. 1st. The *presence of the gland* is coextensive with *pulmonary* respiration. 2nd. Its shape and position are variable and unimportant. 3rd. Its *size* and *duration* are, generally speaking, in proportion to the habitual or periodical activity of the animal. 4th. Where it remains as a persistent organ (as in the hybernating tribes), it is one of the general reservoirs for the accumulation of nutritive material.

In further prosecuting the developmental anatomy of his subject, the author next passes in review the maphological history of the true glandular system, with which he contrasts that of the thymus and its analogues, the thyroid, supraenal glands, and the spleen. The principal difference between the two orders of organs appears to consist in the ultimate arrangement of their secreting cells, that of the true glands being distinctly cellular, that of the glands without ducts, consisting of the cytoblast alone, the involving cell-structure being only of the exceptional formation. It is a curious fact, however, that in those animals in which the thymus becomes a permanent organ, the nucleus, instead of being simply surrounded by aggregate molecules, as in the temporary state of the organ, is converted into a perfect cell. These different points are rendered plainly intelligible by the plates with which Mr. Simon's work is liberally illustrated.

We now pass on to the most remarkable part of the work, the physiology of the gland. It is thus stated by Mr. Simon:—

"It secretes into a closed cavity certain particular elements of nutrition, which are deposited differently under different circumstances, viz:—1st. In most animals it occurs only temporarily; the secreted matter then presents itself under a *fluid form*, and closely resembles the liquor sanguinis in ultimate chemical composition. 2nd. In some animals, after discharging this temporary function, it assumes one of greater permanency, the sequestration of material in the form of solid fat. In both cases, however, though peculiar, the function is especially the same, and consists in the laying by of nutrient material. How this is used up, Mr. Simon next proceeds to show. Here, however, we are called to notice a certain circumstance which is co-existent with both

*hysiological Essay on the Thymus Gland. 4to. London: 184