Microscopic anatomy should show: 1°. The nature and relations of the structural elements which combine to form any organ or tissue. 2°. The blood-supply. 3°. The lymph-supply. 4°. The nerve-supply, and relation of the nerves to the structural elements. 5°. The development of the structural elements, and their combination to form the various tissues. The structure of no tissue or part is known in all this detail. This is both encouraging and discouraging; for, while we see many problems unsolved, we know that they are problems which have eluded the grasp of the greatest anatomists of the world.

It is often said that a certain tissue must perform a given function on account of its structure; but we know that a moner or an amoeba performs all the life functions observed in the higher animals, and hence it seems hopeless to tell by structure alone what the function of individual cells composing one of the higher animals must be. Claude Bernard has said that structure is the key to the grosser and merely mechanical functions alone; and this is fully justified by the facts, that, before his work, the liver was thought to simply produce bile, and the pancreas to secrete saliva; yet the physiologist Bernard found the liver a manufactory of sugar, and the pancreas producing a juice with the powers of all the digestive ferments combined with the power of emulsifying fat. While, therefore, the most intimate structural knowledge gives no hint of the function of a tissue, it is of great value when the function is known in determining the significance of the structural relations.

Knowing the special differentiations accompanying a function, it is usually safe to assume that a similar structure will possess similar properties, and perform nearly the same function, no matter where found. Structural knowledge is also of great value to the morphologist, helping him to recognize and homologize the organs of different animals. Finally, without the knowledge of structure added to the knowledge of physiology, the splendid achievements of modern surgery would be impossible. While our structural knowledge is already great and valuable, our insight into the relations of structure to function is still very slight.

While specialization of function and differentiation of structure are concomitant, no one as yet can state the finer structural relations which accompany extreme specialization of function. It is not difficult to detect a nerve-fibre; but, from appearance, no one can yet say whether its function is associated with motion, sensation, or secretion: between these functions the gulf remains impassable.

Let me now call attention to the structure of an organ in the pharynx of the soft-shelled turtles, and briefly state my reasons for claiming that the mucous membrane of the pharynx is a *respiratory* organ. These turtles remain voluntarily from two to ten hours under water; and, while under, fill the pharynx with water, and expel it about sixteen times per minute: water so used has lost part of its free oxygen, and gained much carbon dioxide.

The pharyngeal mucosa is densely covered with minute cylindrical compound, or filamentous papillae, having the appearance of the villous coat of the intestinal mucosa. This membrane begins opposite the tongue's base, and extends to about opposite the third cervical vertebra, where it passes into the oesophageal mucosa, the beginning of which is surrounded by a sphincter, thus marking off the respiratory chamber. The epithelium of the mouth, pharynx and oesophagus consists of nonciliated nucleated cells, is many layered and stratified in the mouth, but gradually becomes columnar in the pharynx. The columnar cells are interspersed with small cells wedged into the spaces between their inner ends. Both kinds of cells send processes from their inner ends to help form the strong basement membrane. Sometimes the small cells are connected with the stellate cells of the deeper tissue by long processes. Beaker cells are found in the pharynx and oesophagus, but not in the strictly respiratory part. The blood-supply is copious, consisting of a capillary net work. A plexus of non-nucleated nerves gives off branches to the papillae, and probably terminate in the taste-buds (neuro-epithelia) found there.

Such is in brief the structure of this membrane. What is the special significance of this structure? Does it agree with other respiratory membranes? In the gill of a fish the blood-supply is abundant, as here; but the epithelium is tessellated, not columnar. In the external gills of the tadpole and newt, the structure is much the same, except that a columnar ciliated epithelium intervenes between blood-supply and the water. In the inner gill of the tadpole and external of Necturus a pavement epithelium is present. If compared with the lung membranes of air-breathers, there is a general agreement of structural facts; but the structure of each of these membranes stands out clearly from all the rest, that of the turtle resembling none so much as it does the villous membrane of the small intestine of a mammal. Yet the principal function of each of these membranes is the passing into the blood of oxygen, and the passing out from the blood of carbon dioxide. That these membranes vary widely as regards structure, while possessing identical functions, is but one more demonstration of the fact that, if we would have the whole truth, the study of structure and function must go hand in hand.

PROCEEDINGS OF THE SECTION OF HISTOLOGY AND MICROSCOPY.

WE have to record the cessation of section G, histology and microscopy, of the American association. This anomalous section, finding its end near, proceeded with dignity to request the association to kill it: the request has been granted, and we are consequently forced to write an obituary of an existence which we have long disapproved. Not that we are in any way opposed to microscopy, the most delightful of what-not sciences, but because microscopy had to be dignified by rob-

bing biology of its histology. To this the histologists have strenuously objected: the extreme of feeling was, perhaps, reached by one of these gentlemen, who declined the nomination to the presidency of the section on the ground that the establishment of the section was a disgrace to the association! However this may be exaggerated, it indicates the general sentiment among histologists, that their investigations are morphological or biological, and not 'microscopical.'

We have pointed out on previous occasions that microscopy does not constitute a natural division of science, but is a compound of fragments taken from many distinct sciences, and patched together by the arbitrary association with a single instrument. In the American association, the sections are distinguished according to natural lines of division in the domain of science, all except that of microscropy, which existed by encroachment on every one of its neighbors. Its trespasses will, we trust, now find posthumous forgiveness. On the other hand, there are many technical processes which are of interest to the majority of those who habitually use the microscope, but not to others; and these processes are essential to many investigations: it is to be hoped that Dr. Minot's suggestion, of forming a microscopical club within the association, will be carried out to insure the cultivation of technique among the members interested. In conclusion, we may mention another cause of the failure of section G; namely, the prosperity of the American society of microscopists, which has withdrawn many from the association who might otherwise have made the section successful. We fear that some of the microscopists may feel themselves to have been slighted; but surely such has not been the intention, for it must not be forgotten that the change was made at the request of the section itself.

The address of the president of the section was admirable. It was well received, and in itself the most valuable communication presented to the section. For the rest, the attendance was very small, and there were only four papers presented. In fact, the section exhibited too plainly its moribund condition.

Mr. W. H. Walmsley read a paper which will be of much value to photo-micrographers, as it gives exact directions for lantern-slides with gelatine plates. Mr. Walmsley described the methods which his own extended experience has led him to prefer, and added accounts of several manipulations and ingenious devices of his own. The utility of the paper is mainly practical. We have understood that it will appear in full in the proceedings.

Prof. T. J. Burrill reports that Dr. H. J. Detmers has obtained good photographs of Amphipleura pellucida by the use of a common coal-oil lamp. Still better results than with balsam preparations may be obtained with imbedding media of higher index. He says, further, "At my suggestion, Mr. S. W. Stratton designed and constructed a new heliostat of simple mechanism, which answers the purpose required in photo-micrography as well as the more elaborate and more expensive instruments, and which is far more readily managed. For those who need to have the sun's rays constantly thrown in any given direction for one day only without resetting, the apparatus is all that may be desired."

Mr. C. P. Hart described a clever manner of making a microscope into a microtome by using the tube to carry the imbedded object, and the movable stage to carry the razor: the object to be cut is moved by the fine adjustment.

THE NATIVE TRIBES OF ALASKA.[1]

THE first half of Capt. Dall's address was devoted to the history of investigations into the anthropology of Alaska, which he divided into three periods. The first began with the expedition of Bering and Chirikoff, and continued during the remainder of the eighteenth century. The second began with the establishment of the Russian American company, and the third with the expedition of Mr. Robert Kennicott. The remainder of the address was taken up with an account of the native tribes of the region concerned, and closed with an attempt to classify the various tribes of the far north-west. We give almost without abbreviation that portion of the body of the address which deals with the Innuit.

Most of the Arctic Innuit are not separated into tribes in the same sense that the Indians of the United States, east of the Mississippi, were at the time of their discovery, nor even to the same extent as those Innuit south from Kotzebue Sound on the north-west coast. Terms are used to indicate the groups of Innuit geographically separated from each other by a stretch of unoccupied coast; and, for convenience, these terms are referred to as tribes. This is practically their own fashion. The people are all known as Innuit: those from a certain quarter have a special name, and those from each village in that district, or each river, have a still more special name. But there are no chiefs, no tribal relations in the strict sense; and the only distinction used among the people referred to is based on their locality of origin: they freely migrate from village to village, or district, and are not regarded as foreigners, though the obligation of free hospitality is not felt to be binding in regard to strangers from a distance long domiciled in another than their native village. We have no new information from the Kopagmut, nor from the people of the Colville River, except a few notes derived from the Point Barrow people by Prof.

[1] Abstract of an address delivered before the section of anthropology of the American association for the advancement of science, at Ann Arbor, Sept. 1, by Mr. W. H. DALL of Washington, vice-president of the section.