The Direction of Differentiation in a Regenerating Appendage.

By Charles Zeleny.

(Abstract.)

When an appendage possessing the power of regeneration is removed a proliferation of new cells takes place at the cut surface. At first the structures of the new appendage can not be recognized in this cell mass, but gradually the various parts appear. The problem presented for solution is the determination of the manner of this differentiation. Do all the parts of the new appendage appear simultaneously? If not, is the progression of the differentiation from the tip inward, from the base outward, or from the middle toward both ends? Or finally, is the method more complex than any one of these?

The antennule of the common brook sow-bug (Asellus) was chosen as a suitable object for the study of the problem because the structural differences in its various segments are unusually great. A study of the early stages of the regeneration shows that the first segmental partitions appear at the base. These are followed very soon by others at the tip, and from this time on the new segments appear near the middle of the organ. The region of new growth is then located in one of the middle segments. Differentiation therefore proceeds from both base and tip toward the middle of the appendage.

An examination of the growing antennule of young animals shows the same method of development.

The Regeneration of an Antenna-like Organ in Place of the Vestigial Eye of the Blind Crayfish.

By Charles Zeleny.

(Abstract.)

The right eye stalk was removed in nine specimens of the blind crayfish. A year after the operation three were alive. Two of these showed no regeneration, but the third had developed an antenna-like organ in place of the removed one. The new organ consists of a slender feeler-like process covered with hairs and has the appearance of a functional tactile organ. The terminal third is unsegmented but the basal two-thirds is divided into segments.

The result is of interest because it furnishes the only instance as far as I know of the development of an apparently functional organ in place of a removed non-functional one.