tion. This purified antitoxin may be boiled for half an hour without suffering any appreciable loss of potency.

When injected intravenously in cases of human pneumonia the highly purified solutions do not appear to cause serum sickness. The chemical constitution of this highly purified pneumococcus antitoxin is being investigated at the present time in the Lilly Research Laboratories.

Experiments on the use of both unconcentrated and concentrated pneumococcus antitoxin in cases of human pneumonia have been in progress for a considerable period of time. The results obtained to date appear to justify further clinical experiments on a larger scale.

This conclusion is also supported by the interesting observation that more recently prepared antitoxic sera derived from animals which are now attaining a higher measure of immunity, exhibit strikingly increased protective effects when tested by the mouse lung method.

2962

Experiments on the development of the ear of amblystoma punctatum.

HELEN W. KAAN. (Introduced by R. G. Harrison).

[*From the Osborn Zoological Laboratory, Yale University, New Haven, Conn.*]

A series of experiments was performed during the years 1922-1925 on embryos of *Amblystoma punctatum.* Two main lines of investigation were carried out, namely, experiments to determine the limits of the regenerative capacity of the tissue surrounding the normal ear region, and experiments regarding the nature of the developing ear itself.

The first group involved extirpation of ectoderm in the ear region of embryos at different stages of development. The size of the pieces removed was 0.2 mm., 0.3 mm., 0.4 mm., 0.5 mm., and 0.6 mm., respectively. It was found that complete regeneration generally followed when the operation was performed on stages earlier than that in which invagination of the ectoderm had occurred. Regeneration was completely checked only by the re-

moval of a piece of ectoderm 0.6 mm. in diameter, after a distinct auditory plate had formed.

A definite loss in the regenerative capacity of the surrounding ectoderm was evident, following invagination of the ear. The regenerated labyrinths were greatly reduced and, in several cases, no regeneration took place. Transplantation of undifferentiated ectoderm to the extirpated area caused a distinct lessening in regeneration in the earlier stages, and prevented it altogether in the later stages.

The second group of experiments dealt with the potencies of the ear at the time of invagination and at the time of closure of the vesicle. Experiments were performed involving removal of the anterior, posterior, dorsal and ventral halves of the ear respectively, at these stages, and it was found that while the remaining half, in 25 per cent of the cases formed a complete labyrinth, there was a tendency toward characteristic defects following each type of operation. These defects were more constant at the later stages of operation.

A series of experiments involving reciprocal transplants between white and pigmented embryos brought out clearly the fate of the different quadrants of the auditory plate. The endolymphatic duct and *macula sacculi* alone develop from the dorsal half; the canals, utriculus and the remainder of the sacculus, from the ventral half of the plate. This brings the point of closure of the vesicle very definitely at the base of the endolymphatic duct just where, later, the depression occurs between the duct and the dorsal wall of the utriculus. In the antero-ventral quadrant arises the sensory portion from which develop the *macula utriculi,* and the anterior and lateral cristae. The posterior crista undoubtedly occupies a similar position in the postero-ventral quadrant. These areas are at first apparently continuous with that portion in the dorsal half, which later forms the *macula sacculi.*

From these results it was concluded that at the time of invagination, the ear is in a transitional stage between a condition of equipotentiality and one of localization of definite organ-forming areas.