were carried back through the supply tube for a distance of ten meters. It may be that the sensitiveness of a flame requires a sufficient space through which vibrations may be carried backward in order for the incident sound to produce its effect, and that either a sufficient length of tubing or the enlargement in a bottle supplies this space, whereas a partly closed cock reflects the waves and does not give them access to the necessary space. This suggestion is at present little more than a guess, and it may be necessary to modify it when the exact mode of action of sensitive flames becomes better understood.

ARTHUR TABER JONES

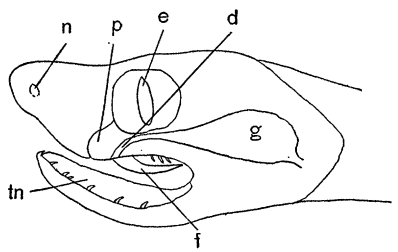
SMITH COLLEGE

THE VENOM OF NEW-BORN COPPERHEADS

THE writer recently received from a local attorney, Mr. C. Wm. Cramer, a female copperhead snake, *Agkistrodon mokasen* Beauvois, with three young. The young were born in a glass case in Mr. Cramer's office on September 13 and 15.

When received by the writer the young were about a month old and were about 20 cm long by 1 cm in diameter at the thickest region. They were quite active and aggressive, being more inclined to strike at moving objects near them than was their mother.

When only a day old, according to Mr. Cramer, one of these young snakes struck a live mouse upon the head. Mr. Cramer left the room, at this time, and when he returned, in about five minutes, the mouse was dead. In order to test the venom of these young snakes the writer placed a half-grown rat in the small case in which they and a blacksnake were confined. The activity of the rat soon excited the young copperheads and they were not slow to strike. Several times they hit the rat, but whether their fangs penetrated the skin it was not possible to determine; no blood was seen, but as the fangs, even in these tiny snakes, were about 3 mm long and as sharp as a needle it would seem likely that they would penetrate the rat's skin. The rat, however, was apparently not affected in the least although it was kept alive until the next day.



A lateral view of the head of a one-month-old copperhead snake, after removal of the skin. Outlined with a camera lucida. ×4. *d*, curved duct of poison gland; *e*, eye; *f*, poison fang; *g*, poison gland; *n*, nostril; *p*, pit; *tn*, tongue sheath on floor of mouth.

A few days later the young snakes were killed and skinned for mounting. At this time one or two of the poison glands, which were very large in proportion to the size of the snake, as is seen in the accompanying figure, were removed and were ground in a small quantity of normal salt solution. This solution was then hypodermically injected into several very young rats which were about half the size of an adult house mouse. None of these tiny rats showed any effect from the injection, though they were kept until the following day.

A poison gland was removed from one of the young copperheads and mounted for histological study. Its microscopic structure was apparently the same, except for differences caused by size, as that of the several adult glands with which it was compared, but there was little or no secretion to be seen in the alveoli. Of course the amount of secretion found in sections of adult poison glands varies in different individuals, but I have never seen an adult gland entirely devoid of secretion. Possibly if other of these young glands could have been sectioned they would have been found to contain secretion.

It would seem from the absence of injury to the half-grown rat from repeated attacks by the new-born copperheads; from the absence of any effect from the subcutaneous injection of crushed gland into very young rats; and from the apparent absence of secretion from the only gland microscopically examined that new-born copperheads, in spite of relatively very large fangs and poison glands, are not capable of poisoning other animals.

In the case of the mouse killed in Mr. Cramer's office it is possible that during Mr. Cramer's short absence from the room the adult copperhead may have struck the mouse, although he is sure that such was not the case. I have seen a mouse die almost instantly from the bite of a 30 cm rattlesnake.

Possibly some reader of SCIENCE may have made some more conclusive observations upon the age at which the pit-vipers acquire their power of injecting venom.

ALBERT M. REESE

WEST VIRGINIA UNIVERSITY

GRADUATE WORK IN HORTICULTURE[1]

GRADUATE students who are interested in horticulture are not now compelled to take their graduate work in closely allied subjects, especially botany. They can take it in horticulture directly, since sev-

[1] Published with consent of Director of Experiment Station.