

values when gamma globulin and other serum protein measurements are made.

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- * Woodward fellow in Physiological Chemistry.
- 14 December 1955

Green Crabs and the Redistribution of Quahogs

In a recent report, Dow and Wallace commented on the effects of winter storms in redistributing populations of the quahog, *Venus mercenaria* L. (1). The probable effect of water currents in accumulating masses of young quahogs has been indicated elsewhere (2). Recently it has come to light that crabs also constitute a factor in the redistribution of a quahog population.

The green crab, *Carcinides maenas* (L.), is a voracious predator upon clam and quahog populations in northern New England waters (3, 4). Although other factors are also involved, its progressive increase in the Gulf of Maine has roughly paralleled a serious depletion of the soft-shelled clam, *Mya arenaria* L. (5), and the crab is an important factor in the reduction of seedbeds of the quahog (4). Data obtained during the fall of 1955 indicate that, in addition to its importance as a shellfish predator, the green crab plays a minor but appreciable role in redistributing quahogs in an area where crabs and quahogs occur together.

On 16 Sept. 1955, while repairing a fence impeding the entrance of crabs into Brickyard Cove, Sebascodegan Island, Me., we collected a green crab that was moving about with a 1-in. quahog pinched onto the tip of one of its walk-

ing legs. When the crab was lifted from the water, the quahog pinched down more tightly on the crab's leg, thus removing the tip of the terminal segment. The same action left a small circular nick, marking the two valves symmetrically, at the edge of the quahog shell. It was then noted that several quahogs lay exposed on screening that had been placed on the bottom behind the fence to reduce tidal erosion and on which the crab with the attached quahog had been collected. Of a sample of 32 of these exposed quahogs, 26 were living, and in 24 of these the edges of the valves were scarred by nicks similar to that described. In the other two living specimens, growth had continued after scarring so that each valve was marked near the edge by a semicircular scar, and its concavity was filled in by new growth.

It is assumed that the quahogs found on the flat screening had been transported there by the movements of crabs and that once over the screening the quahogs had either been shaken off or had amputated the tips of the crab legs, thus freeing themselves. It is further assumed that a quahog becomes attached to a crab's leg when a crab inadvertently places a leg tip between the open valves of a quahog in the region of the pallial sinus as the latter rests upright in the mud.

These assumptions are strengthened by the following observations. Small quahogs are frequently collected about the periphery of Quahog Bay, of which Brickyard Cove is an arm, each with a small circular nick in the edge of the shell in the region of the pallial sinus. When a quahog is opened immediately after it has pinched off the tip of a crab leg, it is found that the tip lies between the valves near a circular nick at the edge of the shell. Green crabs with missing leg tips occur frequently in the area. Robert L. Dow and Dana E. Wallace of the Maine Department of Sea and Shore Fisheries have observed a horseshoe crab, *Limulus polyphemus* L., at the moment that it picked up a quahog passenger in the manner postulated for the green crab; they have photographed the specimens involved.

After the observations of 16 Sept., we collected a random sample of 1000 quahogs, all under 5 cm and more than 1.5 cm, in Brickyard Cove. Of these specimens, 29, or 2.9 percent, demonstrated a circular nick at the edge of the shell, or a shell bilaterally marked by semicircular scars that had been filled in by subsequent growth. Of the specimens thus far examined, the smallest in which the nick, either peripheral or elsewhere, has been detected has been 2 cm in length; the largest, 3.7 cm.

The role of the green crab in redistributing the quahog may not be especially

important to the whole ecology of either, but it may be that something of a beneficial effect is introduced by the green crab in thinning crowded populations, since it would be in such areas that the walking legs would seem most likely to enter the valves. On the other hand, the breaks introduced may allow entrance to foreign invaders or to the action of green crab pincers, thus increasing the susceptibility of the quahog to destruction. However, a sample of several empty scarred valves that were collected showed that the nick was in a peripheral position in but one case.

One value of the observations reported here may lie in a possible correlation between frequency of the scar reported and the relative populations of green crabs and quahogs. On the other hand, the frequency of missing leg tips of the green crab in a quahog area might reasonably be presumed to be related to the density of small quahogs in the feeding zone.

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22 December 1955

Serotonin-Releasing Activity Limited to Rauwolfia Alkaloids with Tranquilizing Action

Previous findings (1, 2) have led us to postulate that the clinical effects of reserpine are mediated through serotonin (5-hydroxytryptamine), a substance that is normally present in the brain, and that serotonin may have a role in brain function. This concept is based in part on the observation that reserpine liberates serotonin from its body depots. The evidence presented in this paper strengthens the concept by showing that of a number of centrally acting drugs only *Rauwolfia* alkaloids exerting a tranquilizing action effect the liberation of brain serotonin.

Rabbits received the various drugs intravenously and were killed 4 hours later. Their brains were removed as rapidly as possible, and serotonin was determined fluorometrically (3).

In Table 1 is shown the effect of a