to the closeness of the snail's association with water; however, work in progress on a variety of intertidal prosobranchs indicates that the relationship is by no means as simple as such a statement may suggest. Nevertheless, the chief migratory pathways in a terrestrial snail like *Helix* could be expected to differ from those found in aquatic snails, an expectation which is fully supported by the foregoing evidence.

Of particular interest is the use of the reproductive organs as a migratory route in *Helix*. Not only are these organs not involved in either *Bullia* or *Australorbis*, but their use for the elimination of foreign particles appears to be unknown also among the lamellibranchs[4]. The accumulation of laden haemocytes in the lower regions of the reproductive organs is clearly temporary, for the shadows cast by the penis and vagina have both disappeared by the tenth or eleventh day after injection. The fact that there was no accumulation of haemocytes in the gut may be accounted for by the conditions in which the experiment was conducted, the animals being allowed to eat as much as they wished after a period of aestivation; presumably the rapid translocation of food through the gut carried away haemocytes which had migrated through its walls.

I thank Professor P. E. S. Palmer and the staff of the Department of Radiology at Groote Schuur Hospital for their help.

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Insect Population Control by the Use of Sex Pheromones to inhibit Orientation between the Sexes

Several people have speculated on the thesis that if a sufficiently high concentration of an insect sex pheromone could be maintained in the atmosphere, the sexes could not find each other for mating purposes[1–3] (for a review, see Jacobson[4]). Their conclusion was that this could lead to control or possibly eradication of the species. In the only large scale experiment to test this principle, gyplure, an analogue of the gypsy moth sex pheromone, was distributed over an island infested with gypsy moths[5]. Mating of males with females was not prevented; the failure of this experiment was attributed to the presence of a "masking" substance in the synthetic pheromone[6]. We have for the first time obtained experimental confirmation that pre-mating communication between the sexes can be disrupted by permeating the atmosphere with an insect pheromone. This general phenomenon was demonstrated using *Trichoplusia ni* (Hübner), the cabbage looper, as the test organism.

The experiment was carried out in a 27 m² plot which was cross-hatched with 100 stakes set at 3 m intervals. Each stake was about 1 m above the ground. A stainless steel ringed planchet, 25 mm in diameter, was attached to the top of each stake. A cylindrical trap, 11 cm in diameter and 64 cm long, of a design suggested by Howland (personal communication) was placed at an elevation of 1 m in the centre of the plot. The trap was divided into three compartments of equal length. The centre compartment, separated from the end compartments by a copper screen, contained ten virgin *T. ni* females. The open end compartments were lined with a sticky material. The experiment was carried out during a period of six nights. At the start of the experiment 20 μl., about 17 mg, of synthetic *T. ni* pheromone[7] was added to each of the 100 planchets. Each planchet was covered with wire gauze to prevent stimulated males from falling into the pheromone. At the start of the fourth night, an additional 10 μl. of pheromone was added to each planchet. An identical plot 600 m away with a female baited trap, but without synthetic pheromone, was used as a check on male *T. ni* activity. The locations of the pheromone-treated and the check plots were randomized every other night. The female traps in the check plots caught a total of 102 *T. ni* males whereas the female traps in the pheromone-treated plots caught no *T. ni* males.

The absence of *T. ni* males in the female traps in the treated plots is interpreted as indicating that the synthetic pheromone concentration in the air was sufficiently high to prevent *T. ni* males from orienting to the additional increment of pheromone released by the living females. The females probably were prepared for mating and released pheromone during the time interval between 10 p.m. and 5 a.m.[8]. The temperature range during that time for the experiment was 21° C to 9° C. At these temperatures the pheromone release rate ranges from 110–40 μg h^{-1}/planchet with the lowest release rate for one night being 57–40 μg h^{-1}/planchet (unpublished work of Gaston, Shorey and Saario). Experiments are in progress to establish the minimum pheromone concentration required to prevent male orientation to females.

The successful disruption of male orientation to females may be caused by sensory and (or) central nervous system adaptation to the pheromone. In addition, the relatively large concentration of pheromone near the individual planchets could have caused the males to orient there rather than to the females.

The result of this experiment indicates that economic control of an insect over large areas may be possible by behavioural control using sex pheromones. Large scale release of sex pheromones presents numerous potential problems: (*a*) cost of pheromone; (*b*) cost of distribution; (*c*) how to keep a sufficiently large concentration of pheromone in a large area, and (*d*) mammalian hazards. Since a large part of the cost of the behavioural control method may be in the distribution system, the pheromones of two or more different insect species can be distributed as economically as one.

We wish to express our appreciation to the U.S. National Institutes of Health for supporting this work through a grant.

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Received October 26, 1966.

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New Phenolic Plant Growth-regulating Compounds

It has been reported that 2,6-dichlorophenol and the corresponding dibromo- and diiodo- compounds show appreciable activity in promoting cell elongation when examined in the pea segment and pea curvature tests, and that they induce severe epinastic responses when applied through the soil to tomato plants[1]. Further work has now revealed other 2,6-substituted phenols which are active in these tests. Thus, in the pea tests, 2-chloro-, 2-bromo- and 2-iodo-6-nitrophenols possess activities approaching that of 2,4-dichlorophenoxyacetic acid (2,4-D); the corresponding 6-cyanophenols are also active (Table 1). 2-