

GENERAL SCIENCE

Warning to Mankind

Dr. Thomas Park, retiring president of the AAAS, stresses the dangers of overpopulation and warns that unless man manages biology it will manage him.

► **LEARNING** from studies upon millions of flour beetles competing for food and living space in laboratory glass jars, Dr. Thomas Park, University of Chicago zoologist, in delivering the retiring presidential and principal address of the American Association for the Advancement of Science in Philadelphia warned:

"If man does not manage his biology, it will manage him."

Although reluctant to draw direct parallels between insects and men, Dr. Park is apprehensive that the world's human population explosion is very dangerous. Facts that emerge from his studies are:

Overexploitation of scarce resources and intense interference from crowding are perilous and the peril increases as the population increases.

The largest population, if exposed to stress, does not necessarily enjoy the best prospect of survival.

Man, as we all know and pontificate, has the intellectual talent and the technical skill to avoid such coleopterous (beetle-like) hazards.

He has the capacity to manage his own population and, of equal importance, to conserve those myriad other populations on which he depends.

Dr. Park created "an indoor model of an outdoor experience" in laboratory experiments with small flour beetles known technically as *Tribolium*.

Tribolium is one of the oldest insect pests known to man. Remains of the little insects were found in a jar of milled grain entombed with an Egyptian pharaoh more than 4,000 years ago.

While the flour beetles are a major nuisance to the housewife and the grain man, they are suited for ecological and genetic studies. Their habit of living—and multiplying—in flour makes them useful.

In his laboratory, the beetles are kept in glass containers with measured amounts of flour. Every 30 days—the average span of a beetle generation—the old flour is sifted through a series of graded sieves, and a census is taken of the adult beetles and their young to determine how well the population is doing. After the beetles are counted, they are put in another container with fresh flour, and the study continues.

To solve one population problem, Dr. Park and his staff spent four years simply making the observations needed for analysis; 400 individual populations were sifted and examined every 30 days, and some 3,000,000 beetles were counted.

Dr. Park uses two species of flour beetles, *Tribolium confusum* and *Tribolium castaneum*, to find out how each thrives under

varying conditions and what happens when the two species are together.

He has found that when the two species are put together, one is always eliminated, and the other survives and thrives.

When the beetles are tested under varying conditions, he said, "common sense" could predict that "the species superior by itself should retain that superiority when with its rival."

However, by testing the two species under differing conditions of temperature and moisture, he found the prediction was rarely entirely fulfilled.

In a cool, arid climate, for example, the species that did better by itself always proved to be the survivor when both species were together.

But in a cool, moist climate it was the species that did less well by itself that usually survived when the two species were together.

And in a hot, moist climate, the two species did equally well alone—but when they were placed together only the *Tribolium castaneum* survived.

"Competition, even under supervision, is a complex phenomenon," Dr. Park observed. "It is clear that intraspecies processes can be deeply modified by those new types of interference and exploitation which emerge as a consequence of togetherness."

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PSYCHOLOGY

Critical Periods Decide Babies' Later Attachment

► **THE CRITICAL** period for babies as far as social attachments in later life are concerned occurs between about six weeks and six months of age.

Dr. J. P. Scott of the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine, said that in all highly social animals so far studied there is this critical period when primary social attachments are made. The effect of such a period is to determine which animals will be close social relatives.

Dr. Scott told the American Association for the Advancement of Science meeting in Philadelphia that the critical period in puppies occurs from about three to 14 weeks of age, reaching its peak between six and eight weeks after birth. The emotional disturbance produced by taking a puppy away from its litter mates at this age and adopting it as a pet affects the attachment of puppies to human beings.

Even separating puppies only for overnight during this period makes them become attached to humans more rapidly. Comparing this result with other experiments involving hunger and disciplinary punishment during these stages suggests that any form of emotional arousal speeds up the process of attachment, Dr. Scott reported.

He said the results of his puppy experiments agree with similar experiments on young birds during the critical period, which is known as imprinting in the bird world. Imprinting at the proper time can make a duckling follow a human as if he were its mother.

The critical period mechanism may have evolved, Dr. Scott suggested, because the infant animal of a highly social species must

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Goodyear

AMPHIBIAN—This latest of the "go-anywhere" vehicles was designed by the Borg-Warner Corporation for the Marine Corps. The amphibian military carrier receives its maneuverability from unique tracks composed of 26 high-flotation tires by Goodyear. In water, the tires keep the carrier afloat while the moving track provides propulsion. On land, the strings of tires operate like conventional tank tracks.