oceanography

Gathered at Tektite 2, Greater Lameshur Bay, St. John, Virgin Islands

PESTICIDES

Corals hold, transmit poisons

Evidence gathered studying the crown of thorns starfish infestations in the Pacific (SN: 5/30, p. 525) indicated that coral reefs might be the first marine ecosystems to show the damaging effects of pesticides. This is because corals are long-lived and thus may accumulate and store large amounts of the toxins.

Further credence has been given to this hypothesis in work from the Tektite 2 habitat (SN: 10/3, p. 283) by Drs. Richard Chesher of Westinghouse Ocean Research Laboratory and Lawrence R. McCloskey of the Marine Biological Laboratory in Woods Hole, Mass.

The two men exposed corals to chlorinated hydrocarbon pesticides, as well as poly-chlorinated biphenyls, then observed these and control corals. Their preliminary finding: corals can, indeed, endure large doses of the biocides, which they store, like a reservoir stores water.

The biocides are then transmitted to microscopic plants that live in the coral (as well as to other reef organisms), the two scientists discovered. Oxygen production of the plants is thus reduced. The results could be detrimental to the entire reef ecology, the men report.

ESCAPE RESPONSES

Vision not only cue to flee

Ann C. Hartline of Scripps Institution of Oceanography, a Tektite 2 female aquanaut, studied, and filmed, stereotyped escape responses of species of a family of reef fishes, *Pomcentridae,* to determine what kinds of sensory cues evoked these responses. Also involved in the work were Dr. Peter Hartline, Miss Alina M. Szmant and Arthur Flechsig. Although the film has not been completely analyzed, certain conclusions are possible, says Mrs. Hartline.

Not only visual cues elicit the escape responses. The fishes' lateral line detectors are sound sensors which alert the fish to an approaching predator (in this case models towed through the water by the experimenters). The fish responded to opaque and transparent models in the same fashion, if towed at the same speed.

Different shapes of models are equally effective if of the same area. Color and pattern usually have little effect. Speed of approach is an important variable, with faster approaches leading to more abrupt escapes.

BIOGEOGRAPHY

Coral islands vary

The sand-algal flats around coral reefs—plains of sand with algae growing on them—have scattered coral colonies, or islands, growing on them. Miss Alina Szmant of Scripps Institution of Oceanography observed these coral islands during her Tektite 2 work.

Associated with the islands, she says, are many types of small invertebrates, as well as fish. The number of species of both appears to depend on the size and shape of the island. Larger islands have more faunal variety than smaller ones. Also an island with many nooks and crevices has different kinds of fauna from those without.

The observations will be useful in the study of the origin and succession of committees around coral reefs, says Miss Szmant.

In another study, Miss Szmant observed that certain coral polyps generally are in a contracted state during the day and an expanded state during the night. One theory had been that this is related to the greater availability at night of the zooplankton on which the polyps feed. Miss Szmant suggests two other mechanisms are probably also at work: at night oxygen levels are reduced because of cessation of photosynthesis by algae, forcing polyps to expose greater surfaces to absorb oxygen; and there are fewer polyp-feeding reef fish active at night.

PLANT-ANIMAL INTERACTION

Oxygen apparently a key

Characteristic small motile fauna are found in the leaves of marine plants. It has been speculated that they seek the plants as refuge from predators; another view is that during the day oxygen levels are higher near the plants and this encourages the fauna to congregate.

Dr. Renate S. True of Bio-Oceanic Research, Inc., one of the Tektite 2 female aquanauts, constructed a square of artificial sea grass near the Tektite habitat to compare faunal behavior on this non-oxygen-producing environment with behavior on living grasses.

Crustaceans and molluscs were the predominant fauna on the natural grasses, and they were most abundant during daylight hours. But these animals were not present on the artificial grass during the week of observation, although several juvenile fish forms inhabited both the real and artificial grasses without apparent discrimination. The oxygen variations in the natural grasses from day to night were as much as two parts per million, Dr. True reports. The findings indicate that the plants' oxygen is thus the primary factor.

MARINE ECOLOGY

Grazing fish reduce plant life

All ecosystems operate according to the same broad principles, and marine ecosystems are no exception. That is, plants are at one end of the food chain and predatory animals at the other—with grazers, smaller predators and other creatures in between.

Dr. Sylvia A. Earle of the Los Angeles County Museum, leader of the Tektite 2 female aquanauts, studied the impact of grazing fish on plant life on the coral reef and surrounding areas, using cages to make plants inaccessible to the grazers.

"Plants inside the cages near the reef showed noticeable increases in size and abundance in contrast to plants in the adjacent area outside," she reports.

One anomaly was in cages more than 200 feet from the coral reef, in which plant growth was sometimes diminished. Dr. Earle suspects smaller fish that were able to get inside the cages used them for cover in this relatively exposed area—and grazed at the same time.