natural sciences

A peep at the deep

The distribution of marine life in the sea is often difficult to determine with present methods of study. Specimens are collected with nets and dredges, a technique that does not always indicate the depth at which an organism was entrapped.

A technique that offers particular promise for defining the locales in which sea creatures dwell is deep-ocean photography.

On a recent voyage of the USNS Lynch researchers obtained 340 exposures of the Caribbean Sea floor at 17 stations. Cameras with special water lenses were lowered into the water and activated by a switch. Among the pictures obtained, reports Walter Jahn of the Naval Oceanographic Office in the Aug. 13 NATURE, was the deepest photographic observation yet of a cephalopod (a class of mollusks that includes octopus and squid). The specimen, about 45 centimeters long, was identified as belonging to the Cirroteuthidae family, that of the octopus. It was about one meter off the sea floor, at a depth of 5,145 meters.

A matter of taste

Plant-eating insects often avoid otherwise acceptable plants because the plants produce a distasteful chemical substance. Drs. J. S. Gill and C. T. Lewis of London's Imperial College believe application of such nontoxic repellents to crops might deter insects from attacking them and thus offer an alternative to toxic pesticides. To be of practical value, they say, a rejectant should be persistent and should be absorbed by the plant so that new plant growth would also be distasteful.

A suspension of crushed seeds or leaves from the neem tree, a large East Indian tree with a bitter bark, will deter some insect species from feeding when applied to plant foliage. A compound isolated from neem seeds, azadirachtin, has been found to be a strong repellent for the desert locust. This compound, Drs. Gill and Lewis report in the Aug. 6 NATURE, can be absorbed by the roots of plants.

The researchers watered the soil around young bean plants with pure azadirachtin and alcoholic and aqueous solutions of neem seed in varying concentrations. Plants were then exposed to hungry locusts. After 25 days, the plants grown in the most heavily treated soil were still only slightly damaged by the locusts.

An insect's repellent

Many insects and animals, when attacked, escape by dousing their enemies with liquid repellents. *Vonones sayi*, an eight-legged invertebrate related to spiders and scorpions, is daintier about it—he dabs the repellent on his antagonist with his legs.

When threatened or disturbed, *Vonones* spits a clear fluid from its mouth, which mixes with an odorous brown glandular secretion. The animal then dips the tips of its forelegs into the mixture and brushes them against its attacker.

The tiny animal's defensive behavior was observed in detail by Drs. Thomas Eisner, Jerrold Meinwald, A. F. Kluge and J. E. Carrel of Cornell University. *Vonones*, they report in the Aug. 13 SCIENCE, can exercise considerable control over the amount of repellent he emits, gearing output to the intensity of stimulation. They also discovered, on probing him with a forceps, that he can administer the repellent with accuracy.

The researchers also measured the amount of repellent *Vonones* used against localized attacks, such as when an individual leg was pinched. They found that he can dole out enough of the substance to protect against 55 such assaults. When placed in the midst of a laboratory ant colony, *Vonones* effectively held the ants at bay using only small amounts of the substance. The same ants devoured any mealworms placed in their midst.

Analysis of the brownish secretion revealed it to be quinoid, a defensive fluid used by many other members of the phylum arthropoda. The clear fluid was water.

A little bit of the Arctic

In an area called Upper Teesdale in northern England are distinctive arctic-alpine flora. In a subarctic environment not quite warm enough for the growth of trees are many species of flowering plants, ferns, mosses and lichens rare or unknown in other parts of Britain. The flora have been interpreted as remnants of the vegetation that began to grow there shortly after the end of the last glacial period, and have survived for 10,000 years.

Drs. G. A. L. Johnson and D. Robinson of the University Science Laboratories in Durham, England, and Dr. M. Hornung of the Nature Conservancy Research Station investigated the geology and soil of Upper Teesdale.

They report in the Aug. 13 NATURE that the survival of the unusual flora is probably a result of the equally unusual geology of the area.

A coarse-grained crystalline marble basement was exposed by erosion and an unusual type of grayish brown soil developed on top of it. The inherent instability and excessive drainage of the soils have, they continue, provided a continuous series of precarious habitats suitable for the survival of the alpine plants.

Cold mice

Adaptation to a cold environment causes various physiological changes, such as changes in weights of organs and tissues. It also apparently affects reproduction.

Drs. S. A. Barnett and Kathleen M. H. Munro of the University of Glasgow found that ovaries of pregnant mice living at minus 3 degrees C. were heavier than those of control mice raised at plus 21 degrees. The discrepancy in weights, they report in the Aug. 6 NATURE, was due to a difference in the number of corpora lutea (cells derived from the lining of the ovarian vesicle that encloses a developing egg).

The number of corpora lutea is generally regarded as a reliable index of the number of ova shed at the most recent ovulation. But the mean number of ova released by control and cold-adapted mice was the same, so the excess of corpora lutea in cold mice did not represent a raised ovulation rate. The excess corpora lutea in the cold, they conclude, were probably remnants of a previous ovulation. They also found, contrary to previous findings, that cold had little effect on litter size.