Meetings

Pacific Shores

The 49th annual meeting of the Western Society of Naturalists was held 27–29 December 1968 at the University of Oregon, Corvallis. Approximately 200 biologists attended, mainly from the western United States and Canada.

The symposium "Pacific Shores—Doomed?" presented new evidence on the influence of man's activities on marine biota, and proposed some means whereby environmental disturbance could be minimized. In the intertidal zone, environmental change caused by dredging, waste disposal, and excessive collecting have eliminated old habitats and created new ones. Chemical changes in water and living tissues, excessive algae production, red tides, and dangerous concentrations of bacteria have also occurred. Tumors on white croakers; deformed skull bones and gill rakers in bass; and changes in flatfish coloration took place in the vicinity of sewage outfalls. However, the exact causes of these abnormalities are not yet understood. In 1967, 11.5 million fish were killed directly by water pollution. This figure excludes secondary deaths due to loss of food organisms or lowering of oxygen levels.

An example of the adverse effects of pollutants on the marine environment near Point Loma, California, showed that "armies" of sea urchins eat kelp holdfasts, completely destroying the kelp beds. When the vegetation is gone they consume invertebrates dwelling on the bottom. In unpolluted areas, the urchins soon starve, thus allowing the kelp to reestablish. However, in areas of sewage outfall, urchins persist, apparently because they can absorb dissolved organics (especially amino acids) through their tube feet and spines. Large concentrations of organics near outfalls allow great numbers of sea urchins to survive independent of their normal food supply. Quicklime was found to be useful in eradication of urchins because it did not affect crustaceans or mollusks. Extensive use of this treatment in the Point Loma area since 1963 has resulted in nearly complete restoration of the kelp beds.

Application of systems techniques facilitates prediction of the impact of waste disposal on the marine environment. Using this approach David L. Mayer (Moss Landing Marine Laboratories, Moss Landing, California) derived the formula: Waste Impact Index $= \Delta P_p + \Delta B_p + \Delta D$. The term $\Delta P_p =$ primary productivity of receiving water estimated by chlorophyll concentration; $\Delta B_p =$ oxygen consumption of surface sediments (an estimate of benthic productivity); and $\Delta D =$ index of diversity of Foraminifera population. These parameters were evaluated in a harbor containing a fish cannery and a chemical outfall producing concentrated $CaCO_3$ effluent. All three were lowest in the area of the outfall. The last two were highest near the fish cannery. Mayer used a species of Foraminifera because it was the only readily observed organism alive near the outfall, and it occurred in large numbers.

W. J. North (California Institute of Technology, Pasadena), described a sequence of recreational use of bays in which (i) a bay may at first be kept clean even to the point of sterility; (ii) as use intensifies, the area becomes less desirable for the wealthy because of overcrowding; (iii) eventually regulations lapse, dumping of garbage and other pollutants increases, thus reducing further the attractiveness of the area; and (iv) finally industry moves in. Although programs of rehabilitation may be implemented, they are expensive and are never completely satisfactory. Of the 23 bay environments in southern California, only two have been reserved in their natural state.

Of the many physical factors influencing beach dynamics the two most susceptible to man's influence are the quantity of beach material present and wave characteristics. Damming of streams, channel and bank stabilization, groin construction, removal of sand and gravel, and the stabilizing effect of people trampling on sand dunes are some of the ways in which man has changed beach environments. An excellent color film entitled "A Beach—Rivers of Sand," produced by the Scripps Institute of Oceanography, showed the cycle of sand transport from its origins in rivers and streams to its eventual disappearance into submarine canyons. The effects of lateral transport, harbor construction, breakwaters, and dredging were demonstrated through use of time-lapse, aerial, and underwater photography, wave generating tanks, and models. The film showed that, when a river is blocked by construction of a dam, any beaches that depend on it as a source of sand will be lost.

Suggestions for minimizing environmental disturbance included (i) location of sewage outfalls at least 2 miles offshore; (ii) dumping of refuse as landfill or disposal by electronic combustion methods; (iii) establishment of reserves to protect examples of those habitats in danger of being destroyed; (iv) consultation of ecologists whenever changes are envisioned which will seriously alter the natural marine habitat; and (v) primary emphasis on field observation as a teaching technique because indiscriminate collecting has caused serious depredations in the past. Studies show that increased use of oil dispersants, biodegradable products (for example, detergents), and insect attractants in pesticides (thus decreasing the amount of poison needed) improves the outlook for reducing pollution.

A number of other papers were given on influences of selected environmental features on marine organisms studied under both controlled and natural undisturbed conditions. These included: temperature, nutrient and oxygen supply, light intensity, salt concentration, deep-sea sediments, space requirements, and shore displacement by earthquakes. Symposia were also held on the physiological ecology of terrestrial communities and on marine parasitology.

Abstracts of papers may be obtained from David H. Montgomery, Secretary, Department of Biological Sciences, California State Polytechnic College, San Luis Obispo 93401. The 1969 meeting will be held late in December at the University of California, Los Angeles.

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