

# Biological invasion via Suez

**Vigorous Red Sea organisms are moving through the Suez Canal; they may upset Mediterranean ecology**

by Christopher Weathersbee

Choked with the hulks of 15 vessels, the Suez Canal today is a battle line rather than a waterway. Prospects for the removal of the sunken ships, used to block the canal during last year's Six-Day War, alternate between dim and dimmer. Arab and Israeli machine-gun bullets continue to zip sporadically across the water, and peace negotiations are still a will-o'-the-wisp.

But beneath the smokes of politics and war, noticed by no one except a few biologists, heavy traffic of a sort still moves through the canal. The Red Sea is invading the Mediterranean. In ever-increasing numbers representative species of the rich fauna of the Red Sea are establishing themselves in the Eastern Mediterranean.

So far about 140 life forms, mostly animal and mostly invertebrate, have crossed the Isthmus of Suez. Eighty percent have come over in the last 40 years and the overwhelming majority of these are believed to have arrived in the last 10 years.

**The influx** is accelerating with the removal of a natural barrier in the canal, and the colonists are doing well. Two of the 24 species of fish to immigrate, in fact, the lizard-fish and another tropical species, have become so abundant they now constitute the principal Israeli fishery.

Some ecologists are alarmed at the invasion. The Mediterranean is the least-fertile of any saltwater body, and is among the poorest in both flora and fauna. These scientists are worried that harm will come from competition between the vigorous aliens and the native life forms. They are traditionally suspicious of the effects of man's engineering on the delicate entente between food chains and the physical environment. To them the canal is a sewer of biological pollutants.

Other ecologists, though also wary of the hand of man, think there may be room for the colonists. The disagreement centers principally on whether or not the native species have adapted to utilize their habitat as fully as possible. This second group of scientists feels that they haven't, that there are many ecological niches—ways to make a biological living—not now being used.

They argue that the colonists may adapt to these niches and make the Mediterranean ecology richer and more productive.

The debate over the desirability of a migration through the canal has been going on almost since the waterway was opened in 1869. The question long remained academic, however, because the canal runs through the highly-saline Great Bitter Lake. Floored with solid salt, the lake created a salinity barrier that few organisms could cross.

Then, 10 years ago, the Egyptians dredged the canal from an average four meter depth to an average of 12 meters, in order to accommodate deeper-draught vessels. The tripled depth greatly increased the flow of water through the canal, thus diluting the salinity derived from the Bitter Lake.

Many of the salt deposits had already been depleted from a century of water flow over them, and other deposits are covered with silt. The net effect is that the salinity of the canal has dropped, and with it the barrier to the movement of life.

**Not long after** the dredging the current biological invasion began. Before the dredging, the salinity of the canal ranged from 80 parts per thousand up to 100 parts per thousand, compared with up to 45 parts per thousand in the quite-saline Red Sea and the oceanic average of about 35 parts per thousand. After dredging, the canal's salt content dropped to its present level of around 42 parts per thousand, entirely commensurate with invasion.

The comparative barrenness of the Mediterranean derives from its geological history. The sea is a vestige of the Great Thetys Seaway, which ages ago separated the land masses that are now Europe from a land mass to the south. The Thetys Seaway was a tropical ocean with tropical life forms; these persisted as land rose and the boundaries of the present-day Mediterranean were formed. Then came the glaciers, which reached almost to the Mediterranean and which served to fill the shallow sea with frigid water. The tropical forms died out.

The sea's only outlet is the Straits of Gibraltar; through here recoloni-

zation had to come. Prevailing currents are such that water from the North Atlantic tends to flow in through the straits, and many North Atlantic species are represented among the Mediterranean fauna. Besides these North Atlantic forms the sea became populated with a few inshore species which worked their way north into the straits, against prevailing currents, from the rich fauna of West Africa.

**The more prevalent** North Atlantic coldwater fauna contains few species and thus a limited gene pool. The portion of this gene pool that made it through the straits was then confronted with an impoverished environment. The combination of the limited gene pool and the inhospitable environment apparently is responsible for the limited number of species found in the sea today. Ecologists believe that the small gene pool allowed little speciation and that there is little in the environment worth speciating for. Arriving life forms made the best of what they found, with what they already had.

The Red Sea, a remnant of the Thetys Seaway which remained tropical throughout glaciation, should be able to provide life forms which can fill gaps in the food chain. For instance, there may be in the Mediterranean native bottom-dwelling microorganisms on which Red Sea invertebrates could live. Red Sea fishes then could live on the invertebrates.

**The Red Sea** offers one of the richest marine faunas in the world. There are great numbers of species of triggerfishes, goatfishes, scorpionfishes, gobies, blennies, parrotfishes, labrids and damselfishes, plants, invertebrates and many other tropical groups. All these constitute a pool of diverse genetic material of vast adaptive potential.

It is possible that this potential, plus a certain vigor noted in many organisms introduced to new environments, will result in the loss of a few native fish and invertebrate population to stiff competition from the newcomers. This may not be too high a price to pay if at the same time the Eastern Mediterranean can be made host to a more varied and interesting, not to mention more economically productive fauna.