



FALMOUTH ENTERPRISE

*Days after the spill, bubbles of oil came up from the bottom and spread out over the surface of Wild Harbor, Cape Cod, Massachusetts.*

## LOCAL OIL SPILL

**An oil spill practically on the doorstep of our Institution is providing a "laboratory experiment" of oil pollution and its aftermath.**

by G. R. HAMPSON and H. L. SANDERS

**E**ARLY on the morning of September 16, 1969, the barge "Florida" came ashore off Fasset's Point, West Falmouth, Massachusetts, and ruptured her steel hull spilling an estimated 250,000 to 280,000 liters (60,000 to 70,000 gallons) of No. 2 fuel oil along the shores of West and North Falmouth. As a result of this disaster, some basic questions on the effects of oil pollution may be partially answered.

Within a few days after the spill we investigated the area that seemed most affected, Wild Harbor and the Wild Harbor River. The toll taken on the marine life was obvious—the oil soaked beaches were littered with dead or dying fish as well as worms, crustaceans, and mollusks. Windrows of fish, crabs, and other invertebrates covered the shores of the Wild Harbor River and large masses of marine

worms, forced from their natural habitat in the sediments, lay exposed and decaying in the tidal pools.

### Bottom life affected

The lobster and certain species of fish (scup, *Stenotomus versicolor*, and tomcod, *Microgadus tomcod*) washed up on Silver Beach, North Falmouth, are primarily bottom-living forms. This was surprising for it implied that the impact of the oil spill must have been felt not only between the tide levels, but also on the bottom below low tide (subtidal bottom). To ascertain the possible effects on the subtidal bottom fauna, we trawled about 300 meters off New Silver Beach on September 19, 1969 in 3 meters of water. Our catch contained several species of fish, worms, and crustaceans and various other invertebrates. Approximately 95% of the animals were dead and in various stages of decay. Those still alive were moribund. It now became critical to learn the extent the oil penetrated into the offshore sediments and its possible biological implications. Therefore, over the last several weeks we collected both biological and sediment samples for oil analysis in the West and

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North Falmouth regions believed to be most affected. Also additional control samples were taken well outside these areas.

Our preliminary observations suggest that the oil may have consistently penetrated the sediments at water depths of 7-10 meters in the heavily polluted zones. The bottom samples from the same areas contained many dead crustaceans, snails, and clams. These preliminary findings strongly suggest that the oil either directly or indirectly has had a major adverse effect on some of the offshore bottom dwelling animals as well as the intertidal forms. Our long range program is to monitor selected sites to determine the rate at which the oil is leached from the sediments and the time required for the repopulation of these bottoms.

*Dead fish, crustaceans and marine worms concentrated in tidal pools at West Falmouth, Massachusetts. One week after the oil spill none of this evidence was left; only a few empty shells remained. If it were not for the nearness of our laboratories we could not have known the extent of the marine kill.*



FROM A KODACHROME BY HAMPSON



**Nature works for man and  
man works against it.**

*High tide line at Silver Beach, West Falmouth, Mass., shows evidence of the oil spill. At lower left various dead marine invertebrates found clustered in subtidal pools in Wild Harbor River. Again, none of this evidence remained one week later. An oil boom was installed across the width of the Wild Harbor River and is shown at low tide. The view is toward the north.*



FROM A KODACHROME BY HAMPSON





*OF all inorganic substances, acting in their own proper nature, and without assistance or combination, water is the most wonderful. If we think of it as a source of all the changefulness and beauty which we have seen in clouds; then as the instrument by which the earth we have contemplated was modelled into symmetry, and its crags chiselled into grace; then as, in the form of snow, it robs the mountains it has made, with that transcendent light which we could not have conceived if we had not seen; then as it exists as the form of the torrent — in the iris which spans it, in the morning mist which rises from it, in the deep crystalline pools which mirror its hanging shore, in the broad lake and glancing river; finally, in that which is to all human minds the best emblem of unwearied, unconquerable power, the wild, various, fantastic, tameless unity of the sea; what shall we compare to this mighty, this universal element, for glory and for beauty? or how shall we follow its eternal changefulness of feeling? It is like trying to paint a soul.*

*John Ruskin*

# Natural Oil Seepage

NAVIGATORS, in making the Santa Barbara Channel from the northwest, readily recognize their approach in thick, foggy weather by the peculiar odor of the bitumen, which, issuing from the bottom or the shore about eight miles west, and floating upon the water, works against the summer winds far beyond Point Conception.

Vancouver\* was the first who called attention to the bitumen, using the following language. (Vol. XI, p. 449.)

"The surface of the sea, which was perfectly smooth and tranquil, was covered with a thick, slimy substance, which, when separated or disturbed by any little agitation, became very luminous, while the light breeze that came principally from the shore brought with it a strong smell of tar or some such resinous substance. The next morning the sea had the appearance of dissolved tar floating upon its surface, which covered the ocean in all directions within the limits of our view, and indicated that in the neighborhood it was not subject to much agitation."

The following remarks of Sir Edward Belcher, in October 1839, are taken from the account of his voyage. (Vol. 1, p. 320.)

"Off this part of the coast to the westward (of Santa Barbara) we experienced a very extraordinary sensation, as if the ship was on fire, and after a very close investigation attributed it to a scent from the shore, it being more sensible on deck than from below; and the land breeze confirming this, it occurred to me that it might arise from naphtha on the surface. The smell of this asphaltum appears to be occasionally experienced quite far from the land."

**From:** *History of Santa Barbara and Ventura Counties, California, etc.*, by T. H. Thompson and A. West, 1883? Howell-North, Berkeley, California, second edition? 1961

\*George Vancouver

Sailed on Captain Cook's second voyage as a seaman, and as a midshipman on Cook's third voyage. In 1791, a Commander, he set out for the Northwestern coast of America, charged to take over the territory at Nootka Sound, where he arrived in 1792 and for 3 years (1792-94) he thoroughly explored and surveyed the North Pacific coast.

A bit of digging in historical records often provides interesting information. In our last issue we asked: "Does some of the oil on the ocean come from natural seepage?" This may be true in unstable geological areas. One record of fouling in the Santa Barbara Channel in 1793 was discovered in a curious way when our Mr. A. C. Vine was visiting Dr. C. Hollister's house and idly picked up a book and opened this on the page shown here. The editor turned up the reference to Gulf of Mexico seepage. Both reports, of course, were made long before any offshore drilling took place, or better—in Vancouver's case—before earth oil became in use as a fuel.

IN the Gulf of Mexico, nature provides many examples how bituminous oil floating up to the sea surface can cause well known "flat spots," as described by local seamen. Such an oil spot exists at 27½°N. and 91°W. in an area of 5000 km<sup>2</sup>; two smaller spots are found nearer the coast east of Galveston. At the border between the States of Louisiana and Texas is an area in the Sabine Pass, known to coastal sailors, where an undersea oil spring provides a secure anchorage even during on-shore winds and where subsequently the Pilot Boat tends to lie to.\*

Cloué mentioned a similar oil spot on the southerly coast of the Gulf somewhat easterly of Coatzacoalcos, which provides a secure anchorage for fishing boats, and he attributes this to submarine oil wells in the neighboring river delta.

(Translated by jh)

*From: Krümmel. Handbuch der Ozeanographie, Stuttgart, 1911. 2d Edition. Vol. II, page 102.*

\*Krümmel also indicates that this information was found on the backside of the Pilot Chart of the U.S. Hydrographic Office, 1906, and the Hydrographic Bulletin No. 920, Washington, 17 April 1907.