Summary

Three bodies of available data at Tufts University were used in determining whether there are meaningful relationships between teaching effectiveness, publication, and the receipt of government support. A search of the literature showed that virtually all comments in the popular literature and most references in professional journals suggest that publication and receipt of support for research somehow detract from teaching performance in the classroom.

The empirical data of the Tufts study do not support these previous conclusions. The students rated as their best instructors those faculty members who had published articles and who had received or were receiving government support for research.

References and Notes

1. These and other contagious clichés have been widely used. For criticism, see (*2*) and (*3*).
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3. J. R. Killian, *Atlantic Monthly* **1965**, 53 (Dec. 1965).
4. P. H. Abelson, *Science* **157**, 759 (1967).
5. *Sci. Newsletter* **88**, 328 (1965).
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8. J. Fisher, *Harper's* **1965**, 18 (Feb. 1965).
9. H. A. Schmitt, *J. Higher Educ.* **36**, 419 (1965).
10. E. J. McGrath, *ibid.* **33**, 148 (1962).
11. V. Voeks, *ibid.*, p. 212.
12. P. J. Bryant, *ibid.* **38**, 326 (1967).
13. J. D. Carroll, *Science* **158**, 1019 (1967).
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15. I am indebted to Miss Lois Rogers for able assistance in collecting data and in typing various drafts of the manuscript, and to Miss Barbara A. Lalinsky for invaluable aid in editing the manuscript and searching the literature. Both are staff members in the Office of the Assistant Provost. I also thank Dr. Jacob Feldman of the Harvard University School of Public Health, who reviewed the statistical procedures used in this study.

NEWS AND COMMENT

Pollution: The Wake of the "Torrey Canyon"

London. When the tanker *Torrey Canyon* ran aground near the southwest tip of England last year, it gave its name to a new kind of maritime disaster, the cost of which is counted not in human life but in widespread economic and ecological damage. This in part accounts for the special efforts subsequently made to assess the implications of the accident. And while the last word has certainly not been said, two recently published British government reports contain much of what is likely to be learned about the effects of the wreck.

A review of events and a set of recommendations for future action are contained in a report* published late last year by the committee of scientists organized at the time of the crisis by Sir Solly Zuckerman, chief scientific adviser to the British government. Then, on the anniversary of the stranding itself, a report† based on a survey and analysis of the biological consequences of the wreck was published by the government-financed Plymouth Laboratory of the Marine Biological Association of the United Kingdom.

Taken together, the two reports offer a good account of the lessons learned. What is insufficiently suggested is the effect of the crisis atmosphere which prevailed in the days when oil was escaping from the stranded ship. As the Zuckerman committee notes, "most of the decisions taken during the crisis had a scientific and technical aspect." But a lack of relevant scientific information, the necessity of improvising a coordinated response to the emergency, and perhaps most of all the legal, political, and economic specters raised by the incident made it difficult to put countermeasures on a "scientific" footing.

The government was criticized, for example, for waiting a full 10 days before ordering an attempt by aerial bombing to burn oil still left in the tanker. First the government hoped the ship might be refloated or the oil might be transferred. Then there were doubts that the oil could be effectively released by bombing, ignited, and kept alight. And Britain, as a major maritime nation, was reluctant to take a step such as bombing while the salvagers held out hopes and so many questions about responsibility were unanswered.

Pollution of the English coast by oil is a perennial problem. What was unprecedented was the scale of pollution threatened by the *Torrey Canyon*, loaded with 117,000 tons of Kuwait crude oil. Exposed to the threat were the beaches of the southern coasts of England, Britain's principal holiday area. Very heavy pressure was immediately exerted to "save the beaches."

With first priority given to safeguarding coastal amenities, the reflex action was to employ measures developed by the Navy in dealing with oil spills in harbors. This meant using detergents to emulsify and disperse the oil. Some 10,000 tons (2 million gallons) of detergents were used to treat 13,000 tons of oil on Cornish beaches, and another half million gallons were sprayed at sea.

In its effects on marine life this detergent "cure" proved much more damaging than the oil itself. The chief conclusion of the Plymouth Laboratory study is that, except for serious effects on some species of sea birds, the oil was not lethal to flora and fauna. Detergents used to disperse the oil, on the other hand, were highly toxic to marine life, most conspicuously to intertidal life such as limpets and barnacles. In the open sea, detergents in quantities as small as one part of detergent per million parts of seawater proved lethal to planktonic growth.

Toxic Effects

Detergents used in spraying operations are mixtures of several compounds —a surfactant (or surface-active agent), an organic solvent, and a stabilizer. A stable emulsion of oil and water was necessary if the oil was to be dispersed. Solvents which enable the surfactants to mix with oil to form an emulsion contain a high proportion of aromatic hydrocarbons. Research indicated that the detergents with the highest proportion of aromatics are the best emulsifiers, and also the most toxic to flora and fauna.

Spraying of a half-million gallons of such detergent could be expected to have a devastating effect on plankton living near the surface of the water. Biologists reported surprisingly little damage to planktonic organisms in the spraying area. The explanation, they

* *The Torrey Canyon* (Her Majesty's Stationery Office, London, 1967). † J. E. Smith, Ed., *"Torrey Canyon" Pollution and Marine Life* (Cambridge Univ. Press, London, 1967).

A New Round in Fountain versus NIH

Conflict between Representative L. H. Fountain (D–N.C.), chairman of the House subcommittee on intergovernmental relations, and the National Institutes of Health broke out anew last week when Fountain charged that a defense of NIH grant programs contained "untrue or misleading statements" and endorsed "flagrantly irresponsible" practices. Fountain's subcommittee has conducted three major inquiries into NIH operations since 1961. The latest resulted in a report issued last October that attacked NIH's administration of grant programs in language that was notable for its bitterness and hostility (*Science*, 3 November 1967). The Department of Health, Education and Welfare, NIH's parent organization, issued a mild rebuttal to the Fountain committee's charges late in February (*Science*, 1 March), but Fountain was clearly not pacified. Last week he dispatched an eight-page letter to Wilbur J. Cohen, secretary of HEW, charging that the report defending NIH was "not fully responsive" to the original charges and that it sought "by skillful use of language . . . to portray some weaknesses as virtues."

Fountain wrote that he was "astounded" at the explanation of why NIH awarded grants to two schools under the new Health Sciences Advancement Award program a full 7 months before the program was publicly announced. NIH had explained that it needed to develop experience through a small pilot program before extending the program to a large number of institutions. But Fountain dismissed the explanation as "attempting to rationalize non-competitive awards to two handpicked schools." He added: "Administrative flexibility is unquestionably a valid need in the administrative process, but it cannot legitimately be extended in a democratic society to embrace favoritism and the dispensation of special privilege."

Fountain also charged that HEW's defense of NIH "glossed over" the questions he raised about the wisdom of awarding a single 5-year $22.6-million grant to the Sloan-Kettering Institute for Cancer Research to replace 44 separate grants and contracts previously in effect. The Fountain committee contended that the grant will remove a large sum of money from the competitive pool. The committee further predicts that such a "single-instrument" grant will result in the government's supporting a lower quality of research. The committee stated that 41 percent of Sloan-Kettering's research grant applications were disapproved by NIH review bodies in 1964 and 1965, but under a single large grant, the committee said, Sloan-Kettering will almost certainly have the discretion to finance such projects with federal funds. Fountain does not say the "single-instrument" approach is "inherently good or bad," but he argues that "such a major departure from previously authorized forms of support should be formally acted on by the Congress."

Fountain does not make an item-by-item attack on HEW's defense of NIH, but he does charge that a statement defending the quality of research supported by NIH is "categorically and demonstrably false," while another statement, concerning large overpayments to Health Research Inc. for indirect costs, is branded "incorrect," and a third statement, also relating to indirect costs, is deemed "not responsive." Fountain also questions whether NIH is taking effective action to ensure that its advisory councils are not dominated by a favored few scientists. The congressman urges Cohen to take "prompt corrective action" on the various problems cited above and he warns Cohen that his subcommittee will "closely monitor the health research programs until such time as your department takes decisive action to remedy the weaknesses disclosed by the committee."

The effect of Fountain's latest attack is simply to remind NIH that its operations are under a scrutiny that is continuous, skeptical, and perhaps without parallel in relations between a congressional committee and a federal research agency. This situation is not likely to help much as NIH shops for a director to replace the retiring James Shannon.

—PHILIP M. BOFFEY

suggest, is that toxic aromatics evaporate very rapidly from the surface of seawater. Otherwise, as the report puts it, "the biological consequences in the English Channel would have been vastly worse than they were."

The worst sufferers from the oil were sea birds; the heaviest casualties were suffered by diving birds—guillemots, razorbills, cormorants, and shags. Gulls seem to have learned to avoid oil, and very few were affected. Ornithologists have reported a decline in the number of auks and other diving birds breeding on southern British coasts in the last 30 years and have attributed it to oil pollution. Total casualties of the *Torrey Canyon* oil were estimated at 20,000 guillemots and 5000 razorbills. A sad aspect of the oil fouling of sea birds was the failure of rescue operations. The British are unrivaled bird lovers, and a big effort at cleaning birds was made by the government and by voluntary agencies and individuals. But of nearly 8000 birds recorded as treated, only 450 were alive by mid-April and only about 1 percent of the birds treated were expected to be returned to the sea.

Little Effect on Seals

Contrary to some predictions, effects on offshore fisheries seem to have been negligible. The seal population does not appear to be seriously affected, although some breeding caves were badly polluted by oil and scientists suggest that ill effects may become apparent later. No commercial shellfish ground was affected by oil, as such grounds were in France, and care was taken not to spray detergent near such beds.

France's battle with *Torrey Canyon* oil was different from Britain's, in part because the French had more time and perhaps because they profited from the British experience. The main difference was that the French shunned detergents. Oil came ashore on the coast of Brittany in higher concentrations than in most parts of Cornwall, but the French relied on mechanical means of removal and such natural effects as waves, tides, and bacterial degradation. Oil did do considerable damage to Breton shellfish beds, but these are expected to recover. At sea, a big patch of oil in the Bay of Biscay was successfully treated with powdered chalk. The chalk binds the oil into particles which sink to the bottom. The French estimate that 3000 tons of chalk will sink 20,000 tons of oil.

The two British reports give the im-

pression that, after the accident, luck was with the defenders. A northerly wind blew for nearly 2 months afterward, at a time of year when the wind normally blows from the southwest. Under normal conditions much more oil would have come ashore, instead of being blown out to sea. It even appears that if the bombing and the burning of oil aboard the *Torrey Canyon* had been done earlier, a lot of unburned residue would have ended up on the beaches. The immediate costs of the wreck to Britain (estimated at £3 million), the setback to the tourist industry, and the damage to coastal ecology all could have been devastatingly increased if even half the oil in the *Torrey Canyon's* tanks had come ashore.

Research Needed

The recommendations of both reports follow logically from the *Torrey Canyon* ordeal. The Zuckerman committee asks that better means be developed for transferring cargo from disabled tankers and for destroying or dispersing oil at sea. Detergents should be used judiciously, and less toxic detergents should be developed, both reports agree. And more research needs to be done on the neglected questions of the effects of pollution on marine life and ways of minimizing these effects.

Chances for a more effective government response in future crises have probably been enhanced by the decision, late last year, of the House of Commons Select Committee on Science and Technology to form a subcommittee on coastal pollution. This subcommittee, the first formed by the parent committee, is looking into all aspects of the problems raised by the *Torrey Canyon* episode and should eventually make recommendations for across-the-board action in future disasters.

And the odds are that there will be other Torrey Canyons. Some 10 percent of world's shipping accidents occur in Britain's heavily trafficked coastal waters. And tankers are getting bigger. The 210,000-ton Japanese supertanker *Idemitsu Maru*, for example, dwarfs the *Torrey Canyon*. And within a few years tankers of a half-million tons deadweight may be plying the seas.

The Plymouth Laboratories scientists say in summing up, "We are progressively making a slum of nature and may eventually find that we are enjoying the benefit of science and industry under conditions which no civilized society should tolerate."—JOHN WALSH

NEWS IN BRIEF

● **FUND DRIVES**: Carnegie-Mellon University has begun a 3-year, $55-million fund drive aimed at strengthening the university's academic and research programs. Objectives of the drive include the establishment of a Graduate School of Urban and Public Affairs, a College of Humanities and Social Sciences, and supplementary programs in engineering and the sciences. To date the university has raised about $20 million of its goal, including a $10-million gift from Richard King Mellon for the proposed Graduate School of Urban and Public Affairs. Rice University, which will end a 3-year, $33-million campaign in December, has been awarded a $1-million Ford Foundation grant for development of its undergraduate and graduate social sciences programs. The Ford grant, however, will not be counted toward the $33-million goal, of which $26 million has been obtained to date. The $33-million drive is for funds to be used by Rice over a 4-year period to add 15 faculty members, provide 70 graduate fellowships, create summer recruitment sessions, and finance social science research.

● **VIETNAM PEACE PETITION**: Seven hundred and fifty scholars, scientists, and writers—including 25 Nobel laureates, 10 Pulitzer Prize winners, and 160 members of the National Academy of Sciences—have signed a statement urging a Vietnam settlement "based on meaningful mutual accommodations with those Vietnamese now opposing politically and militarily the present Saigon regime." The statement, which was published as an advertisement in the Washington *Post* on 7 April, adds, "Social and political stability cannot be attained without active participation of all significant elements of the Vietnamese people, including the N.L.F., in the Government of South Vietnam. . . ." All who signed the statement are Fellows of the American Academy of Arts and Sciences or the American Philosophical Society.

● **ROTTERDAM MEDICAL SCHOOL**: The Albert Einstein College of Medicine, Yeshiva University, has been awarded a $108,000 grant by the Commonwealth Fund to develop a cooperative program with the Rotterdam Faculty of Medicine in the Netherlands. The grant, which was made on the condition that it be matched equally by the Dutch government, provides support for 3 years to assist the Dutch institution in developing competence in the basic medical sciences. The school was founded by the Dutch parliament and opened in 1966. Its curriculum differs considerably from that of traditional European universities, featuring intensive laboratory experience, opportunities for students to select their subjects, and substantial student exposure to patients.

● **FISH PROTEIN**: The Food and Drug Administration (FDA) has declined to hold a hearing on its order permitting domestic distribution of whole fish protein concentrate for food, even though it received nearly 100 objections to the order. According to the FDA, most of the objections were submitted by "dairy interests." The FDA said the objections were not supported "by grounds legally sufficient" to justify a hearing.

● **NEW NARCOTICS BUREAU**: The Bureau of Narcotics in the Treasury Department and the Bureau of Drug Abuse Control in the Food and Drug Administration of the Department of Health, Education, and Welfare were merged into a new bureau on 8 April. The new organization, the Bureau of Narcotics and Dangerous Drugs, will be part of the Justice Department.

● **INTERNATIONAL ENGINEERING ORGANIZATION**: The World Federation of Engineering Organizations was formed in early March when representatives of the engineering profession in 60 countries met in Paris. Objects of the new organization are "to advance engineering as a profession in the interest of the world community; to foster cooperation between engineering organizations throughout the world; and to undertake special projects by cooperation between member organizations and in cooperation with other international bodies." The federation will be made up of national members representing the engineering profession in participating countries, and international members representing regional federations of engineering societies. A Swiss engineer, Eric Choisy, was elected president of the federation. The next general assembly of the organization will be in Beirut, Lebanon, in October 1969.