Letters

Oily Wastes at Sea

Abelson's editorial "Oil pollution" (26 May, p. 1037) recognized the efforts of refiners to prevent water pollution, but I should like to point out what petroleum companies are doing to curb oil pollution of the seas. Amendments to the Oil Pollution Act, passed in 1966, contained language that makes enforcement difficult and oil industry witnesses uniformly supported elimination of the 1966 requirement that *gross* negligence be proved before a polluter can be prosecuted. These same witnesses endorsed the principle that anyone responsible for an oil spill, even if accidental, should be responsible for taking whatever measures may reasonably be required to minimize damage. Oil companies in the United States are able to take such a stand because normal precautions in tanker operation go well beyond the requirements of federal law and international conventions.

Many modern tankers are equipped to separate and store slop oil from tank-cleaning and deballasting operations for later disposal at on-shore facilities. This totally eliminates the need for releases of oily wastes at sea and is one of the reasons why several U.S. oil companies have issued strict "no dumping" orders to their tanker fleets, as well as to chartered vessels.

A number of companies have adopted the "load on top" procedure, so that oily tank washings need not be dumped at sea. New cargo is loaded directly on top of the slop, or dregs, from the previous cargo. When ballast water is carried in a cargo compartment, this slop oil floats to the top. During deballasting, the clean water is drawn from the bottom of the compartment and discharged. New cargo is then loaded on top of the slop, which often still contains considerable amounts of sea water. The reluctance of some customers to accept cargo that has been loaded on top of slop containing salt water is one deterrent to the more widespread use of the "load on top" procedure.

When it is necessary for a tanker to discharge oily water, it must be done more than 50 miles offshore under the terms of an international convention. Along the northeastern seaboard, the restricted zone extends some 100 miles to protect fishing banks. Moreover, when tank washings and oily ballast are discharged in permitted zones, it is done in such a way as to promote rapid bacterial oxidation of the oil film. There is little chance that oil pollution of beaches in the northeastern United States is traceable to tanker cleaning or deballasting, because tankers bound for eastern seaboard ports are rarely under ballast. Deballasting and tank cleaning are normally performed en route to loading ports, rather than discharge ports, and then only far out to sea in permitted zones.

In considering the overall oil pollution problem one must not overlook the role played by vessels other than tankers. Any ship that uses oil as fuel is a potential contributor to the problem. This includes most naval vessels, dry-cargo ships, passenger ships, and pleasure craft. The contribution of oil escaping from vessels sunk during World War II is likewise significant. The U.S. Coast Guard, in its reply to a recent United Nations questionnaire on sources of oil pollution, listed seepage from sunken vessels as a primary source, and estimated the volume of this oil at 200 million gallons for known U.S. flag vessels alone.

The report also listed as another source of coastal pollution natural seepages from undersea oil formations, of which there are at least seven in the Caribbean and two off the coast of California.

Unexplained oil pollution of beaches and coastlines is frequently attributed to tanker operations, simply because tankers are the most obvious potential source of oil. Thus it should be no surprise that most oilmen favor vigorous enforcement of antipollution laws and conventions, for only in this way will the genuine efforts of U.S. oil companies to prevent such pollution receive proper recognition.

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Archival Project in Physics

Joseph Agassi's brief note concerning *Sources for History of Quantum Physics* (Book Reviews, 23 June) is quite inadequate to convey to the reader the intent and the value of the volume; and the impression the note leaves is totally different from the opinion of persons who are actually using the volume.

Indeed, it would be difficult to name any other single volume in which so much information about sources is so readily accessible to anyone concerned with the developments of 20th-century physics. Sponsored by the American Physical Society and the American Philosophical Society, the work, which was four years in process, began as an archival project for the collection of information on the history of quantum physics. The published volume includes: (i) a description of the development of the project along with a critical analysis of the methods used; (ii) information obtained from physicists who participated in the development of quantum physics (the record of some 175 taped and transcribed interviews with about 150 physicists); (iii) information about the existence and location of relevant manuscript materials—correspondence between physicists, lecture and research notes, institutional records, and other unpublished papers; (iv) appendices illustrating some of the research methods (for example, sample biographies and sample outlines for interviews); and (v) a complete analytical index—by name, institution, type of material, and source depository. Much of the material described is now deposited at the Archives for History of Quantum Physics located at the libraries of the American Philosophical Society in Philadelphia, the University of California in Berkeley, and the Niels Bohr Institute in Copenhagen.

The kind of information which this work contains and the form in which it is organized and presented has nothing in common with what Agassi casts off as an inventory of "hastily collected material." Rather, what it does represent is an undertaking without precedent—one that obviously demanded, besides good historical scholarship, considerable critical judgment concerning the potentially significant problems in the history of quantum physics. Actually, we have here something of an experimental model for historians to build upon, and perhaps to improve for other fields.

With commendable discretion the authors recognize that only time and use will tell how helpful their interviews with scientists will be for historians; but, in fact, neither the authors nor others now working in this area question the general value of such oral histories. As for the manuscript materials (of which over 10,000 items are listed), professional historians of science with interest in the history of the physical sciences from about 1875 to 1935 will recognize the value of having this extraordinary source guide within arm's length.

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Ph.D.'s: Pesky Foreign Languages

Feininger's opinions (Letters, 2 June) concerning the value of Ph.D. foreign language requirements lead me to express some observations of my own, gathered from years of teaching language reading courses to Ph.D. candidates. The old arguments for studying foreign languages (notably German and French for "scientific" reasons) are no longer viable. English is strongly entrenched as the medium through which contemporary scientific research is made known internationally. The English-speaking scientist is under no special constraint to write in any other language, while his non-English-speaking colleague may feel a very strong compulsion to use English if he wishes to advertise his work beyond the boundaries of his own country or language community. This state of affairs underlies the sentiment that the foreign language requirement is "something extra" in our Ph.D. curricula. Little progress has been made toward changing the archaic and sometimes informal method of testing via written translation of selections chosen for their special difficulty. I have yet to find proof that the skill to translate is a proper measure of fluency and I suspect that few Ph.D. candidates in the so-called "hard" sciences are willing to use the foreign language actively once they have passed that pesky translation exam. The candidate in the non-English speaking country, by contrast, remains ever aware of the lasting importance of English to his career.

While I approve Feininger's plea for better style and expression in the scientist's native language, I am not ready to sacrifice foreign languages. Why should our scientists be deprived of the intellectual pursuit of learning another man's way of expression and his different cultural values? For one who must always be concerned with logical processes, what justification is there for disallowing the stimulating mental activity of having to reformulate and validate his thinking in another language? Many a physicist or chemist participating in an international convention or doing foreign research has felt the need to converse in any number of languages. Learning to speak or write a foreign language admittedly takes valuable time. Therefore let us make certain that our fledgling scientists get their language training early in the undergraduate years and let us give them greater latitude in selecting the language they wish to study.

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As a technical editor I am aware that many a keen scientific mind has not been trained to put together a concise and logically organized paragraph or even a grammatically correct sentence. It's a pity that our age of specialization should permit—even condone—such ill-balanced development. I would not, however, want English composition to be stressed at the expense of a foreign language requirement. Having observed members of the European scientific community speaking (not only reading) three or four different languages, I have become vividly aware of the language shortcomings of our U.S. education. I should like to see the pendulum swing toward true command of both English and some other language.

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Measles Vaccines: Assured Safety

In Albrecht's letter (26 May) "Can measles be eradicated?" he states that "to the best of my knowledge" the duration of the controlled field trials of live attenuated measles virus vaccines have been for only one month's duration. Obviously, he is not familiar with the large amount of data on controlled studies now available (*1–6*). The controlled field trials of the new live