Letters

International Peace Week

A distinguished international group of scientists, including Hans Bethe, Bernard Feld, Sheldon Glashow, David Hubel, and Philip Morrison, has endorsed a call for the "First International Peace Week of Scientists" from 10 to 16 November 1986. The aim is to contribute to stopping and reversing the arms race and to enhancing international security by promoting well-informed discussion and creative thinking. The concept is for scientists to organize meetings, lectures, seminars, and other events all over the world, coordinating and publicizing them as one big event.

One major event will be a teleconference satellite summit sponsored by the Union of Concerned Scientists scheduled for 2 to 4 p.m. on 15 November. This will link scientists and others in Washington with a session of the Scientists Peace Congress in Hamburg, West Germany, on "Ways Out of the Arms Race." Another event linked to the Peace Week will be a United Nations University Conference in Osaka, Japan, on "Preparation for a Life of Peace."

Concerned scientists who may wish to cooperate can obtain a prospectus and information from Howard Ris, Union of Concerned Scientists, 26 Church Street, Cambridge, MA 22238 (617-547-5552), or Robin Crews, Bethel College, North Newton, KS 67117 (316-283-2500).

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Water Diversion in the Soviet Union

The News & Comment briefing "Soviet Union suspends plans to divert four rivers" by David Dickson (5 Sept., p. 1036) warrants commentary. These schemes did not "originate under Leonid Brezhnev 20 years ago." Projects for massive diversion of Arctic flowing rivers southward were formulated and seriously discussed as early as the 1930's. A proposal to divert 40 cubic kilometers (km^3) a year from the Pechora River into the Caspian basin was possibly near implementation in the early 1960's (under Khruschev) but was abandoned after an outcry from the Soviet scientific community, who were concerned about environmental and economic damage in northern regions of water export.

New concepts and designs of water transfer were developed during the 1970's with considerable attention paid to mitigating their potential environmental harm. The initial phase of diversion for the European U.S.S.R. (6 km^3 a year) was approved by the highest planning body (Gosplan) in 1983 and by the top party and government organs in 1984. It was included in the Draft Guidelines for the 12th Five-Year Plan (1986–1990) when, reportedly, preliminary construction on infrastructure facilities had begun. The more grandiose first-phase Siberian water transfer project (27 km^3 a year) had not received a final go-ahead by 1985, but was undergoing final design work.

The situation has undergone a dramatic reversal over the past 18 months. There has been a resurgence of public criticism of the diversion projects, muted since the early 1980's, primarily by well-known writers and leading scientists, some of the latter members of the Soviet Academy of Sciences. Proponents (including some respected scientists) continued for some time to defend the water transfers, but steadily lost ground. The initial phase of the European project was deleted from the final version of the 12th Five-Year Plan at the 27th Party Congress in February 1986. As mentioned by Dickson, a resolution stopping work on diversions was passed by the Politburo of the Communist Party in August 1986.

The key to the demise of the water transfer projects is Gorbachev. He may have privately opposed these projects for some time, but was outvoted in the Politburo. After his ascendancy to leadership in early 1985, he was willing not only to listen to the arguments against these projects but to have the debate, once again, go public. Shelving the schemes fits in with his drive for economic efficiency, better use of resources, including water, and opposition to giant, expensive "boondoggle" construction projects.

Environmental concerns, which are serious on a local and regional scale, no doubt played a role in the projects' fate, but were not determinant. These had been investigated in great detail (primarily by institutes of the Soviet Academy of Sciences and of the State Committee for Hydrometeorology and Environmental Protection during the late 1970's and pronounced not of sufficient magnitude to justify foregoing implementation. Indeed, the claim of potential global climatic change (made by scientists outside the U.S.S.R.) was ridiculed. Environmental arguments against diversions appear to be undergoing resurrection to lend further support to a decision made fundamentally on economic grounds.

Severely wounded, the projects are not yet dead. Although further design and construction work is suspended, research on the ecological and economic aspects of water transfers is to continue. If the agricultural and water supply situation in southern European Russia and particularly in Central Asia is not substantially improved by the various "local" measures that are to be taken and if the Caspian Sea reverts to a phase of shrinkage, water diversion projects may again be viewed favorably in the 1990's.

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Galileo and the Catholic Church

David Dickson's article about Galileo (News & Comment, 8 Aug., p. 612) reinforces the widespread misimpression that the Vatican or Pope John Paul II has actually "pardoned" the 17th-century astronomer. In 1633 the Inquisition found Galileo guilty of defending the heliocentric system in his *Dialogue on the Two Great World Systems*, essentially a charge of disobeying orders. Under the circumstances of the day the verdict was probably correct, but from our modern vantage point the sentence—house arrest for the remainder of his life—was vindictively harsh. These historical circumstances leave the papacy with limited options for dealing with Galileo retrospectively, and Pope John Paul II has taken the course of commending Galileo in various public statements (which have been reported in *Science*) and of encouraging Galilean studies under Vatican auspices. But he has not, to the best of my knowledge, pardoned Galileo.

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Vitamins, Fiber, and Cancer

The references presented by Victor Herbert (Letters, 29 Aug., p. 926) to support his earlier contention that excessive amounts of vitamins A and C and fiber may promote cancer (Letters, 4 Apr., p. 11) are not convincing. One of the articles he cites is devoted to the teratogenicity of retinoids and lists 18 cases of human birth defects associated with maternal use of high levels of vitamin A (*1*). No mention is made of the incidence of these defects in the absence of such use, nor do any of the defects appear to be related to cancer.

In the second paper (an abstract) cited by

Herbert (*2*), the size but not the number of preneoplastic foci in livers of rats given aflatoxin was increased by vitamin A to an unspecified extent. Unmentioned by Herbert was the finding that selenium supplementation reduced the focal area by a factor of 5. The third citation reports the effects of ascorbic acid on the in vitro growth of human leukemic cells from bone marrow aspirates (*3*). From 259 cases studied, 169 aspirates were successfully cultured, and in these growth enhancement was seen in 53 and growth suppression in 28. In the discussion section the author cites six studies demonstrating in vitro tumor suppression and one demonstrating tumor enhancement by ascorbic acid.

The fourth of Herbert's references (*4*) is to a dietary study of human colon and rectal cancer patients and their case controls. In this work mean fiber intakes were reported as 22.4 ± 0.8 grams per day in the female colon cancer cases and 19.7 ± 0.6 grams per day in the controls, on the basis of a dietary questionnaire. The difference does not appear to be meaningful. A dose-related positive association between fiber and colon cancer was reported in women when fiber intake was broken down into quintiles with no figures given for the number of individuals in each quintile. A protective effect of vitamin C against rectal cancer was found but was not mentioned by Herbert.

I believe the four references provided by Herbert give little support to his original contentions. This area of research deserves more profound analyses of the literature before public statements are made.

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Hazardous Waste Disposal

Philip H. Abelson (Editorial, 1 Aug., p. 509) has expanded on his earlier editorial about hazardous wastes (7 June 1985, p. 1145). Incineration and biodegradation are indeed preferable to dispersion and deposition, but can be both encouraged and discouraged by technical, economic, environmental, and regulatory constraints (*1*). Concentrated forms of hazardous wastes are destroyed in incinerators; dilute forms are biodegraded in wastewater treatment plants. Halogenated organics are reductively dehalogenated, dehydrohalogenated, and microbially metabolized to CO_2, H_2O, and inorganic halides. Other examples include biodegradations of CH_2Cl_2 (*2*) and $C_6H_6X_6$ mixtures (*3*) and conversions of CH_3CCl_3, $CHCl_3$, and CCl_4, to lower chlorinated homologs by iron (II) porphyrins (*4*).

Reported shortfalls in incineration capacity apply more to commercial offsite operations than to private on-site operations. Most solid wastes generated by the chemical industry over the past 30 years have been successfully managed on-site in currently active facilities under the direct management of the original generators. These include the bulk of on-site incineration capacity. Several large corporations, including the Dow Chemical Company, committed themselves to waste minimization and waste treatment before the current public regulatory focus. Recoveries of energy or material values from process intermediates minimize wastes before they are generated; incineration destroys organics in wastes after they are generated (*5*). Both operations reduce ultimate waste volumes and hazards. Long-term monitoring and remedial actions are mitigated by immediate destruction of combustible portions. Noncombustible residues may require secure land disposal. Wastewater treatment and air emission control are also integral to overall solid waste management.

Priority testing should be mirrored by proper data evaluation. Real-world data often are ignored, "worst-case" despoilage scenarios are assumed, technology-forcing controls are thrust upon the regulated community, and confirmations of environmental improvements are not attempted. The "troublesome" aspects of small halogenated hydrocarbons at Superfund sites are not manifestations of hazard or developments of control technologies, but "selected presence" at very low levels. Because of their unique chemical "fingerprints," they are "found" because they are "sought." Environmental ubiquity at some level above "zero" then triggers extended debate and calls for "action."

I support the resolution of socially troublesome aspects of hazardous waste disposal by multidisciplinary science and engineering. "Multimedia" approaches to defining the distributions, fates, and effects of the significant constituents of air, water, and land have recently been addressed (*5*). We must understand how much of which, where and when, and for how long, might do what to whom and then determine if, how, and what action is appropriate. The hazardous waste "problem" is as much definition and interpretation as it is practice and remediation. The negative perceptions of "dumps for toxics" perpetuated by some of the public and the media must be supplanted by the positive realities of "proper hazardous waste management facilities" practiced by scientists and engineers.

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Mystery Cloud: Additional Observations

After the appearance of our article "Kaitoku Seamount and the mystery cloud of 9 April 1984" (8 Feb. 1985, p. 607), the original data base was supplemented with additional testimony from Captain Van den Berg (KLM Royal Dutch Airlines flight 868) and another pilot (Captain Presley of Flying Tiger Airlines flight 022). Huub Eggen, editor of the Dutch publication *Aarde & Kosmos*, located Van den Berg and supplied us with a transcript of his interview along with six drawings depicting the event as viewed from the cockpit window. We submitted a number of additional questions which were subsequently answered by Van den Berg (*1*). To summarize the drawings we divide the event into four stages: (i) a towering cumulus-like cloud appearing to rise out of the stratiform layer; (ii) fading of the cloud tower and replacement with a small semicircular halo segment; (iii) expansion of the halo to a full circle; and (iv) further expansion and dissipation. The time elapsed from (i) to (iii) was approximately 5 minutes. Stage (iv) lasted for another 10 to 15 minutes, giving a total observation time of about 20 minutes from Van den Berg's vantage point. At the time Van den Berg was flying on air route A90 near the PAWES intersection at a speed of 500 knots. The change in Van den Berg's position from the beginning to the end of his observations, along with Captain McDade's observations (Japan Airlines flight 036; 33 minutes behind Van den Berg on air route A90; approaching the intersection designated PAWES by the Federal Aviation Administration when he first sighted the cloud at 1349Z Greenwich mean time; 48 miles