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LETTERS

Nickel Carbonyl: Prenatal Exposure

In the 9 February issue of *Science*, Sunderman *et al.* (p. 550) report that exposing Fischer-344 rats to nickel carbonyl for only 15 minutes on the seventh or eighth day of pregnancy produced a high incidence of eye malformations in the progeny. Other fetal anomalies were rare. The authors stated that increased numbers of women are now working in nickel refineries and chemical plants where accidental exposure to nickel carbonyl is possible. They conclude that their work has "important implications in regard to the recognition of a previously unsuspected teratogenic hazard in industry."

Experience gained in operating a carbonyl-process nickel refinery in Clydach, Wales, for more than three-quarters of a century has not suggested the presence of a teratogenic hazard. Women were employed there during World War I and between 150 and 200 women worked in all areas of the refinery throughout World War II. Many of these were recorded as having been accidentally exposed to nickel carbonyl, but neither the population nor the two local ophthalmic surgeons nor the local pediatrician were aware of any cases of anophthalmia related to employment in the refinery. It is unlikely that such an unusual birth defect or an elevated incidence of any kind of birth defect could have escaped detection in this small community after so many years of operation.

The discrepancy between Sunderman *et al.*'s experimental results and the human experience in Clydach could be fortuitous, the result of species differences, or evidence for a dose-response relationship. The rats were exposed to nickel carbonyl at concentrations of 11,000 to 42,000 parts per billion, concentrations far greater than the 75 to 100 parts per billion measured in the refinery during the late 1950's. Perhaps these very high concentrations produced results qualitatively different from those of much lower exposures encountered at Clydach. Even if the 15-minute experimental doses were acquired over an 8-hour period, the calculated equivalent concentrations would still be about 3 to 18 times those experienced in the refinery.

The concentration of carbonyl in Inco's two carbonyl-process nickel refineries—the only two in the world—is very much lower than it was in the 1950's. Inco's experience at Clydach suggests that nickel carbonyl is not a human teratogen

under such conditions. Nevertheless, it has been Inco's policy since 1976 to exclude women from working in areas where accidental exposure to nickel carbonyl is possible. This action was taken because of concern for the possible toxicity to the fetus of diethyldithiocarbamate, the therapeutic agent for carbonyl poisoning developed by Sunderman and his father. Sunderman was informed of Inco's action several years ago.

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Good Menus and Fine Recipes for Absent Cooks

A conference for nongovernmental organizations (NGO's) in preparation for the August 1979 U.N. Conference on Science and Technology for Development (UNCSTD) was held in Singapore from 22 to 26 January. It was attended by 137 delegates and observers from such NGO's as the International Council for Scientific Unions, the British Association for the Advancement of Science, the International Federation of Institutes for Advanced Study, the U.S. National Academy of Sciences, the World Bank, the International Institute for Applied Systems Analysis (U.S.-U.S.S.R.), and so forth—13 of them from Africa, 39 from Pacific Asia, 8 from Western Asia, 9 from Latin America, 7 from Eastern Europe and the Soviet Union, 28 from Europe, and 17 from the United States. The delegates received about 3 kilograms of papers at the start, and in six plenary and 12 specific subject sessions held simultaneously produced a final 0.5 kg of new papers containing recommendations. The subjects were for the most part those dealt with at other such conferences attended by delegates from the same types of organizations. Technology transfer and "appropriate" technology were discussed less than at other meetings. For me, a pleasant novelty was the attention given to "social, political, economic, cultural and other contexts of development" in relation to science and technology. It was recommended that UNCSTD consider, "What *specific social* innovations (new laws, organisations, professions, codes of conduct, patterns of behaviour, intelligence systems, patterns of incentives and combinations thereof) should the LDC [less developed country] make in order to import, adapt foreign and/or create domestic technologies in order to contribute

the maximum possible to their specific development needs and goals."

By my count this is the tenth mammoth international conference held in preparation for UNCSTD. Taking into account the regional, national meetings involving about 170 countries, I surmise that never in the history of humanity—with the possible exception of the Tower of Babel—has so much effort in the form of words, papers, meetings, and travels, in so many tongues been invested to prepare for an event as for the 2-week-long UNCSTD. All this effort has produced good menus and fine recipes for how to cook together science, technology, and development. But even the "social, political, economic," and so forth sessions in Singapore, as in many of the previous UNCSTD preparation efforts, did not take into account the heads of states and other holders of power in the 170 LDC's. It is they and no one else who have to combine this knowledge in the form of science, technology, and development menus and recipes with the political power and intelligence available to cook them into dishes suited to their national pocketbooks, appetites, and palates. So far these 3000 cooks have not participated in the UNCSTD preparation efforts. Yet without them there won't be any good meals.

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Review of Rasmussen Report

Both the Nuclear Regulatory Commission's 19 January policy statement disclaiming the executive summary and the risk estimates of the Rasmussen report on nuclear reactor safety and the review (News and Comment, 29 Sept. 1978, p. 1196) which motivated that policy statement are remarkable. Even so, they may have been overly generous and insufficiently explicit about the abuses of scientific ethics and the violations of the public trust that appear to have surrounded the study and the high-pressure public relations that uses it as a prop (1).

Hearings before the Committee on Interior and Insular Affairs of the House of Representatives were recently held to ascertain how and why, without adequate review, the report was given credence by the Atomic Energy Commission and its successor, the Nuclear Regulatory Commission, and to determine the extent to which the report influenced regulatory policy concerning reactor safety.

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