White House, EPA Agree on Leaded Gas

The White House and the Environmental Protection Agency (EPA) reached an agreement on 18 August to go ahead with a controversial EPA plan for controlling lead in gasoline. Lead is a cheap octane booster, but also a toxic agent that poses a specific threat to children's health.

The Office of Management and Budget (OMB) at the White House at first resisted the EPA's proposal, asking the agency to delay action until 31 December and to consider revising its proposal (*Science*, 27 August, p. 807). The OMB now agrees that the lead controls should go into effect before the general election this fall.

The compromise essentially does two things: it endorses the new limit the EPA would like to impose on gasoline producers, and at the same time grants a 1-month reprieve to certain companies—recently launched gasoline blenders—that would have been forced to meet an early deadline on 1 October. According to EPA officials, blenders and virtually all other refiners will have to meet a uniform standard on 1 November. The OMB claims that the compromise is an improvement over the original plan, which would have required blenders to meet the standard before it was applied to the rest of the industry.

EPA officials say the final rule, to appear in the *Federal Register* on 26 August, sets a maximum limit of 1.1 grams of lead per gallon, the average amount large refiners are now permitted to use. Only about 74 companies will be excused from this standard. These are the smallest refiners (10,000 barrels of production daily), which were operating before October 1976, when Congress required the EPA to begin its crackdown on leaded gasoline. These companies will be allowed to add 2.5 grams of lead per gallon, slightly less than they are allowed now.

The EPA estimates that this program could reduce the amount of lead used in gasoline by 31 percent below the level set by current rules over the next 8 years, provided the demand for leaded gasoline continues to decline. Environmental groups generally support the EPA's strategy, although they warn that its success depends on the wishes of the marketplace. There is no guarantee therefore that the demand for leaded gas will fall.

One immediate effect of the EPA's proposal is that it will close two loopholes, one that allows imported gasoline to escape regulation altogether, and another that allows new companies to enter the business as blenders and take advantage of the special exemption given to small refiners. Cutting off these exemptions, the EPA believes, will quickly reduce the amount of lead used in gasoline.

—Eliot Marshall

Fields Medals Announced

On 8 August, the International Congress of Mathematicians announced the award of the Fields medals—mathematics' most prestigious award—to three young researchers. The recipients are Shing Tung Yau of Princeton's Institute for Advanced Studies, William Thurston of Princeton University, and Alain Connes of the Centre Nationale de la Recherche Scientifique in Paris.

Fields medals are presented at the International Congress of Mathematicians every 4 years to mathematicians under age 40. But this year, the congress, which was to be held in Warsaw, had to be postponed because of the political situation in Poland. Therefore, the winners of the Fields medals will not receive the prize until the congress is rescheduled. The international congress hopes to hold the meeting next year in Poland.

Yau, 33, is known for his contributions to the solution of the Calabi conjecture (*Science*, 17 June 1977, p. 1308) and the Smith conjecture—and for his recent work applying the methods of geometry to a problem in general relativity. It is known that the energy of an isolated system must be positive, but it has been unclear whether the mass must also be positive. Yau showed that it must.

Thurston, a 36-year-old topologist, works on the relationship between three-dimensional differential geometry and three-dimensional topology. In two dimensions mathematicians have developed three sorts of geometries—Euclidean, spherical, and hyperbolic. In three dimensions there are eight geometries. Thurston has been trying to show that every three-dimensional space, or manifold, can be modeled with one of these geometries. So far, he has made substantial progress, showing that many manifolds can be modeled with a three-dimensional analog of two-dimensional hyperbolic geometry.

The third winner of a Fields medal, Connes, who was born in 1947, is known for two major pieces of work. First, he solved some of the most outstanding problems in operator theory, which was originally developed in the 1930's by Jon von Neumann and F. J. Murray in their attempt to put quantum theory into a mathematical framework. Connes has published a series of papers solving a number of outstanding questions posed by von Neumann and Murray.

Connes' second major work was his recent proof of a version of the Atiyah-Singer theorem, a generalization of the fundamental theorem of calculus that unites the fields of topology and analysis. Connes used what are called C* algebras to prove a version of this theorem for certain infinite surfaces.—***Gina Kolata***

Washington Set to Act on Heptachlor in Milk

The federal government is on the brink of lowering the permissible limit of heptachlor, a carcinogenic pesticide, in milk. The action stems from intensified concern that infants and children in Hawaii have been exposed to hazardous amounts of heptachlor-contaminated milk.

The concern first arose last spring, when officials in Hawaii first revealed the pesticide contamination (*Science*, 9 July, p. 137). State and federal officials asserted then that no adverse health effects would result because the period of heavy contamination was brief, perhaps only 6 months or so. Since then, the Environmental Protection Agency (EPA) has unearthed frozen Hawaiian milk samples from a federal laboratory, dating from April 1981. Tests at two other laboratories found the samples to be contaminated with heptachlor well above

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the federal limit. Thus, exposure has probably occurred for the last 16 months.

Edwin Johnson, EPA's director of pesticide programs, says that this finding has prompted EPA to seek a reduction in the acceptable level of contamination to half the current amount, or lower. The Food and Drug Administration is expected to concur, as are Hawaiian state officials.

—R. Jeffrey Smith

Age of Nuclear Terrorism

There are those who believe the dawning of the age of nuclear terrorism is at hand—a time when terrorists will steal radioactive material for blackmail purposes or threaten to set off a homemade nuclear device. The subject was recently discussed on Capitol Hill at a panel sponsored by Senator Edward Markey (D–Mass.), which featured the views of three experts on the topic.

The Administration spokesman, Robert M. Sayre, director of the State Department's Office for Combating Terrorism, was the most sanguine of the speakers. He observed that terrorists don't fancy widespread destruction and tend to rely on simple weapons. Nuclear materials, he thought, are too difficult to obtain and hazardous to handle and would create too many casualties to suit terrorist purposes. "Terrorists have not yet gone to the limit of existing nonnuclear capabilities," he observed, and therefore he felt a "quantum jump" to nuclear was unlikely.

The other two speakers, however, saw some cause for alarm. Terrorist expert Robert Kupperman, former chief scientist at the Arms Control and Disarmament Agency, saw a changing world situation in which the era of "bipolar zero sum games with the Soviets" would be overtaken by an era punctuated by "horrendous crises" precipitated by fractionated groups around the world. As he saw it, the world is becoming "increasingly blasé" about terrorism and terrorist groups will respond by "mutating" to new and more virulent forms, which he foresaw could involve the use of biological as well as radioactive agents to achieve their ends.

Weapons expert Theodore Taylor was also pessimistic. He emphasized that it is very easy to make a crude nuclear device with information that is publicly available. He had hard words for the new Reagan nonproliferation policy which is designed to loosen restrictions on the export of nuclear technology and materials. Said Taylor: "If plutonium and enriched uranium are not made much more difficult to steal than anything else in the world" the world would soon be witnessing the phenomenon of a small group of people "holding up a superpower." Taylor denounced as "reckless" the Administration policy of making nuclear materials more easily available without first seeing to it that a much improved system of international security has been established.

Sayre, however, reflected confidence on the part of the Administration that safeguards are such that nuclear materials will not fall into irresponsible hands. The Department of Energy has sunk more than $100 million since 1974 into a Nuclear Emergency Search Team, a cadre of experts who stand ready to be called upon in the event of a nuclear accident or threat. Yet, as Sayre acknowledged, there has been no attempt by the government to involve the terrorism office with any deliberations relating to nuclear nonproliferation.

—Constance Holden

Thumbs Down on Use of Defoliants in Amazon

Environmentalists recently scored a victory when the Brazilian government, in effect, vetoed the use of defoliants on an enormous tract of Amazon rainforest. Environmentalists feared approval of the herbicides' use would have set a precedent leading to wider destruction of the world's rainforests.

In August, Brazil's Minister of the Interior Mario Andreazza ordered a halt to a study that would have determined which defoliant should be sprayed on an 800-square-mile section of the Amazon so a huge hydroelectric project could be developed. The project, Tucurui Dam, will supply energy to a nearby coal-mining operation. Andreazza's action was largely in response to protests from the public led by the Secretary of the Environment Paulo Nogueira Neto.

Nogueira's opposition arose when it was revealed that government officials in charge of the dam's construction proposed spraying the area with herbicides rather than cutting the jungle. Authorities from the government-owned company, Electronorte, contended that use of the chemicals was the only way to complete the dam as scheduled by September 1983. Electronorte then asked another government body, the National Institute for Amazonian Research, to study which defoliants to use.

At that point, Nogueira voiced objections to the study, arguing that the chemicals would contaminate the water and eventually poison area wildlife. More importantly, the undertaking of the study in and of itself was a fait accompli that would have virtually guaranteed the future ruin of rainforests because herbicides facilitate their clearing, he said. "There are all kinds of research, but some go against ethics. This is an example," Nogueira commented in an interview from his office in Brasília. In fact, a representative of Dow Chemical Company, the manufacturer of one of the herbicides under consideration, recently met with Nogueira and assured him that the company would not involve itself with such a research project.

Nogueira stirred up tremendous support to oppose the defoliant study. "The force of public opinion was too great," he said, so the study was squashed. Nogueira's opinion gained wide recognition, no doubt, because he, along with another Brazilian official, Maria Tereza Jorge Padua, received this year the World Wildlife Fund's annual conservation prize, the $50,000 J. Paul Getty Award.

Nogueira said that he would press the nation's National Environmental Council to establish water quality standards as double assurance that defoliants would not be used.

Brazil has increasingly taken actions to protect the environment and won praise from many groups. An editorial in the August issue of *Smithsonian* points out that 10 years ago Brazil was a "prime example" of a developing country that resisted conservation efforts. Now, it is one of many "well aware of the need for control and long-range restraint on simple exploitation."***—Marjorie Sun***