chinery so unwieldy and unpredictable as to inhibit severely the further development of this field of research." It contrasts "the dramatic emergence of new fundamental knowledge" reported at the meeting with the absence of indications of "actual hazard. Under these circumstances, an unprecedented introduction of prior restraints on scientific inquiry seems unwarranted," says the letter, which was printed in the July 15 SCIENCE. Finally, the statement urges that if standards are legislated, they be made uniform throughout the country.

A stronger statement emerged last week from another conference, which included some of the same biologists. During the intervening three weeks, Fred Blattner told SCIENCE NEWS, the scientists became aware that the bills in Congress were not simply going to extend the NIH guidelines to private industry, as well as government funded research, but might severely inhibit research. "I think there was a willingness of people at this second meeting (the Gordon Conference on Biological Regulatory Mechanisms) to realize that they've got to fight these bills," Blattner says.

The second letter, signed by most of the 160 biologists at the meeting, states: "The experience of the last four years is important. Despite an increasingly vigorous search to identify precisely the degree and nature of any actual public health or environmental hazard, no indication of actual danger has been uncovered. Instead, many conjectured dangers have been shown not to exist." The letter concludes, "It would be unwise to legislate hazard where hazard has not been shown to exist and indeed [has been] shown to be improbable. We believe that the proposed legislation might well deprive society of needed improvements in public health, agriculture, industry and environmental protection on behalf of fears that are not rationally based on concrete risks." Much of the important research progress reported at the meeting, Blattner says, relied on recombinant DNA techniques.

The second statement, Blattner points out, explicitly opposes both bills before Congress. Both bills would allow local areas to apply for exemption to set stricter regulations. The bills also provide for fines of $5,000 to $50,000 per day for experimentation that does not meet the standards. The House bill would give the regulatory power to a committee under the Secretary of Health, Education and Welfare and temporarily would give the NIH guidelines the force of law, whereas the bill before the Senate would establish a permanent national regulatory commission with the chairman appointed by the President. Support for the House version with modifications has come from officers of several research organizations, including the American Society for Microbiology. The Senate bill should come to a vote late this month, and the House bill will be debated later in the summer. □

Documentation of alleged Soviet mishap

Referring to a large area in the Soviet Union that was allegedly contaminated by radioactive nuclear waste, a noted biochemist claims to have found abundant indirect documentation of the extensive damage involved.

Zhores Medvedev, a Russian immigrant now at the National Institute for Medical Research in London, claimed last November that about 1957 an accidental dispersal of buried nuclear waste had contaminated hundreds of square miles in a southern Urals region. Since his revelation, the contention has been a lively topic for debaters, who are variously surprised, confused or skeptical.

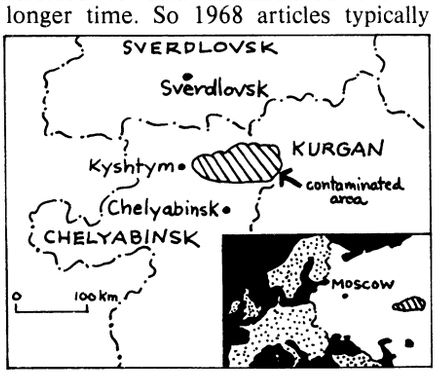
Medvedev's account was subsequently supported by Lev Tumerman, former head of the biophysics laboratory at the Institute of Molecular Biology in Moscow, now living in Israel. He had toured the tainted region in 1960. Except for his eyewitness account, there has been a dearth of firsthand information about what actually happened. Instead, official Soviet secrecy, reckless speculation and hearsay have overwhelmed the subject.

Now Medvedev describes in the June 30 NEW SCIENTIST what he believes is a definitive verification that the alleged disaster indeed did occur during late 1957-early 1958 and that its aftermath left indiscriminate high-level radioactive contamination of soil, soil animals, plants, bodies of water and their inhabitants.

He infers most of this using information gleaned from more than 100 academic-journal articles that report on numerous experiments generally dealing with effects of a radioactive environment on the biology of a large variety of plants and animals.

Except for a single instance—a censor's slip-up, according to Medvedev—the contaminated locales were never identified in the articles. Many authors described them simply as confined areas specially polluted for research purposes. Medvedev contends these references to "experimental" compounds are all really the southern Urals site.

Medvedev noticed that reports published at later dates systematically referred to data accumulated over a longer time. So 1968 articles typically referred to their 10-year studies, 1971 ones to their 14-year studies and so forth: They all seem to have begun their studies during 1957-58. Medvedev believes this is not coincidental, but surrogate evidence for pinpointing the date of the mishap.



Site of possible radioactive mishap.

He locates defense in a 1966 article by F. Rovinsky in ATOMNAYA ENERGIYA (18:379) for the prevailing belief (also his own) that nuclear waste was definitely to blame. Rovinsky describes the intense radioactivity, mainly from strontium 90 and cesium 137, contained in two "experimental lakes" that are 11.3 and 4.5 square kilometers large. One expects the lingering presence of Sr-90 and Cs-137, because they are the longest-lived radioisotopes (each with about a 30-year half-life) found in typical nuclear waste material. Medvedev also expresses skepticism that two such large lakes would have been deliberately contaminated.

Based on information in a pair of papers published during the 1970s in VOPROSY ICHTIOLOGII (10:1127 and 12:174) by A.I. Il'enko, Medvedev surmised that a third lake, also unidentified, was contaminated with a total of 50 million curies of radioactivity (approximately equal to that given off by 50 million grams of radium 226). Medvedev obtained this estimate via a sequence of scientific deductions—an approach that generally pervades his article.

To estimate the areal extent of the nuclear pollution, Medvedev used two 1968-70 studies of contaminated mammals published in ZOOLOGICHESKII ZHURNAL (49:1370) and ZHURNAL OBSCHEI BIOLOGII (31:698). Medvedev noted the studies' quoted sample of 21 deer and guessed that the total contaminated deer population involved was probably about 100. Typically, this many deer require at least 100 square miles, he reasoned. The radioactivity—presumably over this large area—was described in the two articles as varying from 1.8 to 3.4 millicuries per square meter. (Normal background radioactivity is roughly only a millionth as great.

Medvedev cites an "accidental acknowledgement" in one paper by Il'enko and collaborators that specifically reveals "that the animals for their work had been collected in the Chelyabinsk region." Furthermore, the peculiar "mixture of [200] European and Siberian species" of plant and animal cumulatively referred to in the journal articles "point to the Urals," concludes Medvedev.

The subject, plagued as it is by official Soviet secrecy, has been open season for freewheeling speculation. Nuclear scientists and engineers have collectively scratched their heads and better succeeded in eliminating possible explanations than establishing them. Elementary nuclear physics immediately ruled

out that the disaster was caused by a nuclear explosion, but some persons have at times suggested that an earthquake disastrously ruptured the underground nuclear waste repository. An inquiry by SCIENCE NEWS to the National Earthquake Information Service, however, revealed that no significant earthquake occurred within a 130-kilometer radius of Kyshtym during 1957-58. □

HEAO-A awaits long-delayed launching

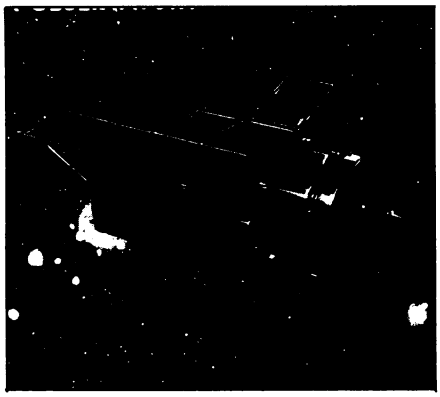
The long-awaited HEAO-A satellite, first in a series of three High-Energy Astronomy Observatories designed to study the X-ray, gamma-ray and cosmic-ray sky, may be launched as early as Aug. 5, or it may slip into the month of September. A series of problems with the satellite's gyroscopic stabilization system has delayed the launch repeatedly from its former April 15 date, and project officials were meeting this week to decide whether further changes or additions to the gyro system need to be made.

The HEAO series has been a major astrophysics priority of the Astronomy Missions Board of the National Academy of Sciences ever since the project was conceived in 1968. Originally planned for only two satellites, each 12 meters long and weighing 9,900 kilograms, the project was less than a year into its first "hardware" contract when it was abruptly suspended, largely for reasons of cost, to reemerge 17 months later with a plan for three satellites, each half the size of the originals.

The total number of experiments was reduced from 13 to 9, and a number of the surviving ones were reduced in size and sensitivity, but the mission is still unusually rich in the proportion of the program that is really devoted to the scientific payload. Of the total estimated $270 million cost of the project, more than 60 percent is devoted to the experiments themselves, and 1,350 kilograms of HEAO-A's 3,150-kilogram weight is taken up by research instrumentation. This is in sharp contrast to many programs in which the bulk of the money and weight are consumed by a spacecraft carrying a relatively small science payload.

There are four experiments aboard HEAO-A. A Large X-ray Survey will map the sky for X-ray sources from 0.15 to 20.0 kilovolts, following in the steps of pioneering satellites such as Uhuru (see p. 36) but with increased accuracy and sensitivity. Another instrument will measure the precise positions of selected sources over a similar energy range (1 to 15 keV), while a third records the diffuse "background" of cosmic X-rays for the whole sky over a 0.2-to-60-keV range. The remaining experiment has the widest range of all, monitoring the distribution and intensities of "hard" X-rays and gamma rays from 10 to 10,000 keV (10 MeV).

Next year, HEAO-A is scheduled to be followed by HEAO-B, a single-minded spacecraft carrying only one experiment: an X-ray telescope designed to take closer looks at sources identified by its predecessor. The 1979 HEAO-C will concentrate on cosmic rays and gamma rays.



First High-Energy Astronomy Observatory satellite-Waiting in the wings.

Fortunately, says HEAO-A project scientist Frank B. McDonald of the National Aeronautics and Space Administration's Goddard Space Flight Center, HEAO-A's science plans are not suffering appreciably from the protracted delay. Unlike planetary probes such as the upcoming Voyager spacecraft, HEAO-A is not dependent on a precise launch date for its targets to be in view, nor is degradation of the experiment packages expected to pose a problem. The mission's scientists are thus able to fully support the project engineers in seeking the safest possible resolution of the satellite's gyro problems, rather than fearing that they will miss some time-critical astronomical event.

This does not mean that the delay in launching poses no serious consequences, however. Investigation of the problems has involved three NASA centers, TRW, Bendix (the gyro contractor), another company and the University of Tennessee, with costs running more than $1.5 million a month. □

Improved nuclear security proposed

To improve the safeguards against criminal intrusion of nuclear facilities, the Nuclear Regulatory Commission has proposed extensive revisions of current controls. They are published in the July 5 FEDERAL REGISTER and would affect "companies licensed to fabricate nuclear fuel and conduct scrap recovery operations" and transport the materials. They do not pertain to nuclear reactors, for which security improvements already began earlier this year.

Proposals affecting the conveyance of special nuclear material (plutonium, U-233, or uranium enriched in U-233 or U-235) would restrict access to and activity around transport vehicles and strengthen the effectiveness of armed escorts. They would also assure that proper communications are maintained between a convoy's vital elements.

Shipments by road, like those most generally envisioned, would be hauled by either armored cars or special penetration-resistant vehicles that could be immobilized in an emergency. Deflating the tires of a besieged truck, for instance, would hamper efforts to hijack it with the contents.

Convoys would not stop except for refueling, rest, or emergency, and would always be accompanied by nine armed escorts. A present convoy is typically protected by fewer escorts, and radio communication occurs less intensively than the NRC proposals would have it. Similar regulations pertain to shipments by sea, rail and air.

Shipments by truck would occur over main highways only. In this respect, there is an acknowledged trade-off between traversing well-policed main arteries but simultaneously exposing a greater population to risk, or using remote secondary roads but also being removed from local police support.

Propositions from the NRC affecting the physical protection of fixed sites permit access to and handling of nuclear material by authorized personnel only in a restricted area. This would be enclosed within at least two physical barriers, like fences, and circumjacent, illuminated isolation zones. These would be continuously monitored, for example, by elevated human sentries and closed-circuit television cameras.

There would be two continuously manned alarm stations designed so that no single act could sabotage both simultaneously. Although existing facilities generally have at least guards and closed-circuit television, an overall security system as depicted by the NRC proposals is now just in the prototype stage.

All authorized personnel within a facility would wear a numbered picture badge that is coded to indicate those areas to which the wearer is allowed access. Employees' whereabouts could be monitored by and stored in a computer. Furthermore, all individuals and vehicles trafficking across controlled check points would be searched.

The NRC is also proposing minimum physical and mental quality standards by which to judge a facility's security personnel. Once hired, they would be required to participate in various training programs and be subject to annual re-evaluation.

Spokespersons for several of the companies affected by the announcement generally had a favorable reaction to it, saying the proposed regulations were essentially expected. The General Electric Co., in fact, is already complying with several of them, according to William A. Smith, manager of nuclear safety and quality assurance. □