Radiation toxicity data may be revised

Gamma radiation—and even diagnostic X-rays — may be more biologically destructive than had previously been thought if new government studies prove correct. Those studies, about to be published publicly for the first time this week at a meeting of the Radiation Research Society in Minneapolis, offer new dose estimates for survivors of the atomic bomb dropped in Hiroshima during World War II. And bomb data are important because historically they have been used as the foundation for extrapolating the expected human-health effects for radiation from other sources, including medical X-rays.

It was originally thought that most of the radiation from the Hiroshima bomb consisted of neutrons, a type of particle radiation four to 10 times more biologically hazardous than gamma radiation or X-rays. But new calculations of the radiation fields probably associated with the weapon downgrade estimates of the neutron-exposure dose to humans by a factor of as much as six or 10. This suggests that gamma radiation may account for many more of the cancers associated with that weapon.

And the upshot of these controversial calculations may be a rewriting of many basic tomes on the health effects of radiation — most notably the BEIR (biological effects of ionizing radiation) report. A revised version of the report, known as BEIR III, was issued last July by the National Academy of Sciences (SN: 8/2/80, p. 74). Its publication came a year late because of "a profound ideological difference" among its authors over methods for estimating the human-health risks to persons receiving whole-body exposure to levels of low "linear energy transfer" radiation — primarily X-rays and gamma rays.

One of the report's authors who eventually dissented from its findings, Harald Rossi of Columbia University, did so over the issue of old Hiroshima-radiation data, notes the May 22 SCIENCE. Rossi argued that BIER III's estimate of cancer risks should have been lower than in the previous version; in fact, the cancer-risk estimate that appeared in BEIR III for low-LET radiation was higher.

Recalculation of the Hiroshima-bomb radiation fields — and hence, radiation-dose estimates — began at Los Alamos Scientific Laboratory (now Los Alamos National Laboratory) in 1976, says George Kerr. Kerr, who works at Oak Ridge National Laboratory, began similar calculations in 1977, but eventually stopped, according to SCIENCE. Kerr resumed that work when the studies by William Loewe and Edgar Mendelsohn at Los Alamos became known.

Why recalculate data for a bomb dropped 36 years ago? "The weapon dropped in Hiroshima was the only one of its type ever fired," Kerr explains. Its construction was unique, and "the construction of the weapon affects the radiation output," he told SCIENCE NEWS. Unlike the type of bomb dropped on Nagasaki, which was tested several times, there were no test data for the Hiroshima bomb. It had been proposed after the war to build and test fire a Hiroshima-type device, Kerr says. But before a decision to do so was made, a test-ban treaty was signed prohibiting above-ground nuclear testing. And being able to compare data from modern-weapon tests with data known about the Hiroshima device, Kerr points out, requires sophisticated calculations. He says many of the techniques have only been improved in the past few years. □

Science adviser chosen

Univ. of Calif.

For six months the science and engineering establishment has been pressing the new administration to name a science adviser. Last week the President named his candidate. But Ronald Reagan's choice, George Keyworth, has at best elicited only lukewarm enthusiasm from those who had lobbied most visibly to get that post filled.

Keyworth, currently physics-division leader at Los Alamos National Laboratory in New Mexico, has been active in the laser-fusion development program there. An accomplished and respected scientist, several scientific leaders have nevertheless sniped at his rumored nomination in recent weeks with charges that he lacks the professional stature and visibility they deem requisite for a director of the Office of Science and Technology Policy, and that his military views — as expressed in a recent quote: "I am very interested in a strong defense and in making sure the nuclear deterrent is the cornerstone of defense" — are too hawkish.

Keyworth, a reputed favorite and friend of New Mexico's Harrison Schmitt, who chairs the Senate subcommittee on science, technology and space, is not expected to have trouble winning Senate confirmation. □

New drugs for rheumatoid arthritis

Prostaglandins are a family of chemicals in the human body that exert their effects on tissues locally rather than long-range, as true hormones do. Prostaglandins have been implicated in an astounding variety of effects, among them the joint inflammation of rheumatoid arthritis (SN: 9/16/72, p. 181). Although several antiprostaglandin drugs are already on the U.S. market for treating rheumatoid and are reasonably effective, a new, even more effective generation of such drugs appears to be in the works. They are called boron analogs because they can substitute the element boron for carbon in certain amino acids.

The boron analogs were actually first designed as possible cancer drugs, but proved to be only mildly successful for this purpose. Then Iris Hall, associate professor at the University of North Carolina School of Pharmacy in Chapel Hill, found that the compounds can block the release of prostaglandins and decided to test them for their possible antirheumatoid effects. She gave them for three weeks to rats that had a form of arthritis comparable to rheumatoid in humans. The drugs brought about many months of arthritis remission in the rodents, she reports.

Because the analogs are considerably more potent as antiprostaglandin agents than are those already on the market for rheumatoid, they may eventually prove to be even more effective in rheumatoid patients than those now available, Hall told SCIENCE NEWS. What's more, doses comparable to what rheumatoid patients could receive some day have not shown any harmful side effects. A drug company now plans to test the drugs further in animals. □

EPA approves PCBX

The first chemical process for destroying polychlorinated biphenyls (PCB's) won approval from the Environmental Protection Agency for use in tackling PCB-contaminated transformer oil. The process, called PCBX (SN: 9/27/80, p. 202), was developed and tested by Sunohio Corp. of Canton, Ohio. So far, EPA's approval to use PCBX extends only to four firms.

Roughly 750 million pounds of PCB's — whose production has been banned since 1977—are now in use or storage within the United States. Most are mixed with oil and used in electrical transformers. PCBX removes PCB's from that oil and transforms them into a "safe, chemically inert residue," EPA claims.

PCBX-cleansed oil can be recycled. Reactors to carry out the PCBX process can be mounted atop tractor trailers and transported to any site. □