NUCLEAR PHYSICS

Atomic Radiation Fighters

Need for an offensive attack against the destructive power of the atom has led to the creation of the first atomic medical school at Rochester University.

By JANE STAFFORD

➤ AMERICA'S major medical offensive against exploding atoms that spread death and destruction will get under way in a few months through the creation in Rochester, N. Y., of a new kind of medical school.

There is urgent need for a new kind of doctor, "radiation fighters," to counter one of the most dangerous aspects of atomic bombs, atomic power plants and other man-made radioactivity.

We need a new first-line of defense against atomic radiation injury in peace or war.

If there ever is an atomic war, our Army and Navy will need medical officers trained to treat atomic casualties.

And peace in the atomic age will bring its new and special toll of accidental atomic casualties unless there are plenty of specialists to plan protection against such accidents.

Civilian "West Point"

The first atomic medical school, a part of the University of Rochester and supported by the Atomic Energy Commission, will be a sort of civilian "West Point" for our defenders against the consequences of atomic energy.

Long before the atom bomb, radiation took its toll. A tragic peacetime by-product of World War I was the poisoning of girls who painted the radium watch dials which became generally popular after discovery of their military usefulness.

The general public at that time knew very little about radium, its power and its danger. Only a handful of people, doctors and other scientists who rarely entered a factory, would have known that it was dangerous to use lips and tongue to point brushes dipped in radium paint.

Today the whole world knows atomic radiation is dangerous. But there are still very few persons who can tell girls in a factory how to handle atomic chemicals safely. Nor would the workers themselves know, any more than the watch dial painters of a generation ago, whether there was danger in a new work method they themselves thought up for greater speed or efficiency.

We need experts to protect us from peacetime developments in atomic energy all along the line, from the miners who dig uranium-bearing ore out of the ground to men and women in factories putting atomic chemicals to new uses and including sick people being treated with them and people living in the neighborhood of our future atomic power plants.

Effects of Atomic Radiation

Authorities do not believe that radiation used as a weapon will destroy the fertile greenness of the earth or that the human race will be wiped out in three generations by the effects of atomic radiation on reproductive cells. But they do believe, in fact they know, that much more information is needed on the effects of radiation on all forms of life.

Training scientists who can get this kind of information for us will be one of the jobs of the new atomic medical school.

To get this new information, they need first to study what is known now of the effects of radiation, how it burns and destroys when it hits the body from outside, and what it does to the blood-forming system, the heredity-carrying genes and other body cells when it gets into the body.

Courses in the new science of health physics will be taught. Knowledge of physics and electronics is needed for making safety measurements that guard against dangerous radiation.

How gases, dusts and aerosols spread must also be studied, since these may carry radioactivity in the air.

Chemistry, toxicology and legal medicine will be other subjects taught in the new atomic medical school.

Medical courses will include both treatment of radiation injury and methods of using the new radioactive chemicals to treat other kinds of diseases, such as cancer.

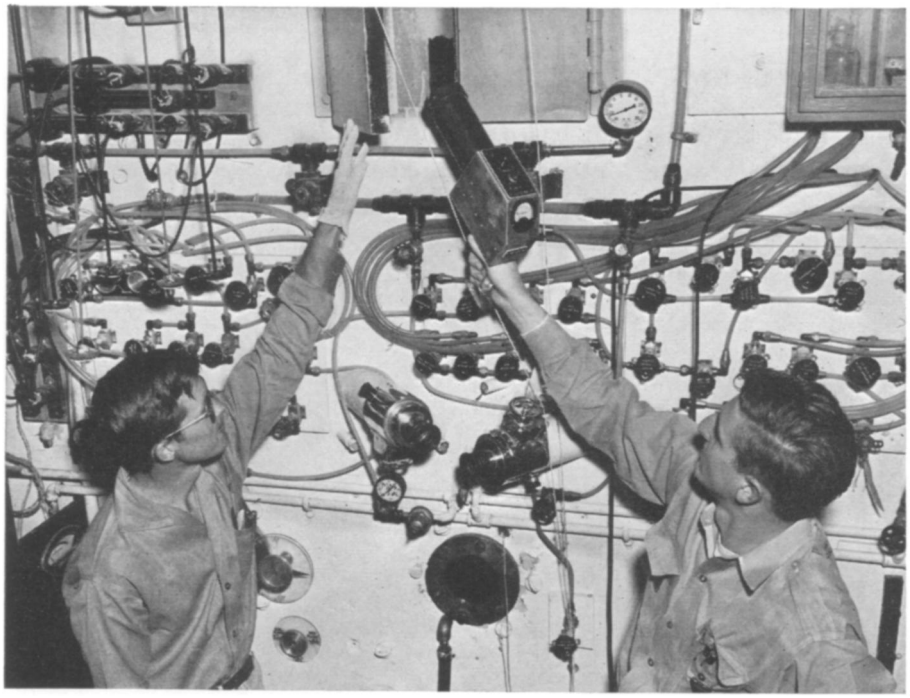
At Rochester they tell the story of a four-year-old boy brought to the hospital with a cancer of the thyroid gland. Surgeons removed this but the cancer had spread back into his throat and the boy had to have a tube put into an opening cut through his neck from outside so he could breathe. He was given a tracer dose of radioactive iodine and this showed that, fortunately, the cancer was the rare kind that picks up and concentrates iodine. The University of Rochester at that time had only a small cyclotron, so their supply of radioactive iodine was very small indeed. But one of the scientists was just then going to a scientific meeting in St. Louis. He got one of the scientists in that city to run his big cyclotron for the four days of the meeting and brought back with him enough radioactive iodine to save the child. Today, two years later, he is alive and well.

These thyroid gland cancers that can be cured by radioactive iodine are very rare. But scientists hope to find other radioactive chemicals that can destroy commoner varieties of cancer without damaging the rest of the body. Preparation to search for such chemicals and for the best way of using them will be included in some of the courses at the new atomic medical school.

Protection of Public Health

Public health departments may be sending men and women to this school for training. Suppose a truck or train or plane carrying radioactive material is wrecked and the contents spilled on the roadside, right of way or, in case of a plane accident, into a community water supply. Protecting people from a water supply contaminated with radioactivity is probably just as much a function of health departments as protecting them from water supplies contaminated with typhoid fever germs. But the methods of testing for contamination and protecting against it are entirely different.

The school will take about 100 students at a time. About 30 of them will be taking short courses in health physics and protection techniques, including dust counts and other radiation measurements and blood chemistry. Another 30 will be college or university graduates studying for Ph.D. degrees. These will spend at least three years at the school. The remaining 40 will be doctors, either M.D.'s or Ph.D.'s or West Point graduates. Army and Navy doctors in this group will probably take a one-year course, civilian doctors a two-year course.



GUARD AGAINST RADIATION DANGER—Laboratory workers are shown inserting a gun-shaped detector into a thick-walled concrete cell where the most dangerous of the radioactive materials are kept at Oak Ridge.

Taking part in national defense against radiation danger is not an entirely new thing to the University of Rochester. The Manhattan District borrowed its professor of radiology, Dr. Stafford Warren, now at the medical school of the University of California at Los Angeles, to head its health protection and medical activities. And in 1943 the Manhattan District set up a medical research unit across the road from the University of Rochester's School of Medicine and Dentistry. The unit subsequently became the first and, so far, the only project of its kind operated by the Atomic Energy Commission. Its present director is Dr. H. A. Blair.

Discovery of a potential medical weapon against radiation damage, from the atom bomb or from non-military sources, has just been announced by two of this atomic energy project's staff. They are Drs. Paul E. Rekers and John B. Field. Their discovery is that rutin, obtained as a bright yellow powder from the green buckwheat plant among other sources, might save radiation victims by strengthening the walls of their blood vessels. This chemical, they reported, has protected dogs from the uncontrollable and fatal bleeding which is a primary factor in the deaths of humans and other mammals exposed to sublethal and midlethal doses of total body radiation.

But Dr. Rekers and associates are not stopping with this discovery. It came as part of a study of hemorrhage and the effects of radiation on the blood and blood-forming system. That study is continuing and promises further important new knowledge.

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Atomic Power in Industry

➤ ATOMIC energy will have many industrial applications, but it will certainly not be immediate, the American Society of Mechanical Engineers, meeting in New Orleans, was told by Dr. Lyle B. Borst, chairman of the Nuclear Reactor Project, Brookhaven National Laboratory, Upton, N. Y.

It will be 10 to 20 years before atomic energy can compete favorably with coal as a source of industrial power, he said. Many problems are to be solved first, but the development of atomic power is one of the most direct and foreseeable future industries. The earliest applications will probably be for mobile use, as for ships, submarines and airplanes. Atomic powered automobiles are not deemed feasible.

The generation of power from the atom for peacetime use will be demonstrated at Brookhaven within the next two years, it is expected, he said. Since the nuclear reactor, of which he has charge of design, construction, and operation, is planned for research rather than for a power plant, the power generated will be a by-product. The nuclear pile will power a steam plant which will generate electricity to be used in driving cooling fans and other apparatus.

Among current problems is that of operating reactors at sufficiently high heat for the conventional engine. Dr. Borst declared that scientists have looked long and hard, but unsuccessfully, for a trick method of getting electrical energy directly from the chain reaction. We acknowledge generally, he said, that electrical power, for the foreseeable future, will be generated by means of the general heat engine.

Another problem is concerned with the economy of the fissionable material employed in getting atomic energy. In the utilization of uranium, only one atom in every 140 is the isotope U235 which undergoes thermal neutron fission, he stated. The other 139 are all U238 which absorbs neutrons to make plutonium.

Principal reactors throughout the country are based on the fission of U235. Thorium is not used at all. High-grade uranium is scarce. For a large-scale power industry, we must learn to use U238 as well as thorium. Then we will have enough raw material to generate power for centuries.

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ASTRONOMY-RADIO

Decline in Sudden Storms Seen in Next Few Years

➤ FEWER sudden storms in the ionosphere that for a few hours completely knock out all communications and also fewer violent storms that black out all paths for many hours may be expected during the next six or seven years. But the band of usable radio frequencies for world-wide communication will become ever narrower during this period and from this trouble may arise. These trends are foreseen because the peak of sunspot activity, associated with shortwave radio disturbances, was reached last summer.

As activity on the sun decreases, the ionosphere also becomes less densely ionized so that it will not reflect the higher radio frequencies back to the earth, the