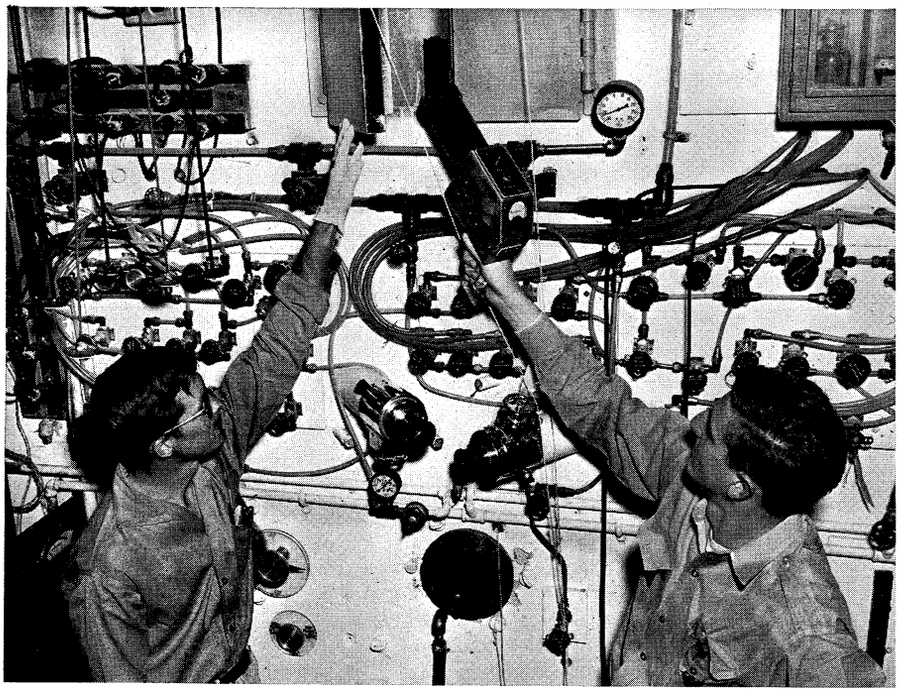

GUARD AGAINST RADIATION DANGER—Laboratory workers are shown inserting a gun-shaped detector into a thick-walled concrete cell where the most dangerous of the radioactive materials are kept at Oak Ridge.

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.

Science News Letter, March 13, 1948

NUCLEAR PHYSICS

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.

Science News Letter, March 13, 1948

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

Do You Know?

A hen takes some 80 pounds of *feed* a year whether she lays or not.

A radio-equipped *helicopter* was recently used to direct highway traffic.

Paper pulp, supplemented with molasses and soybean protein, is a good *cattle feed.*

Decks of American vessels of the future will be made of resin-treated compressed American woods instead of Far-East teakwood.

The moth that is seen flying around the house does not eat clothing itself; it is the tiny caterpillar-like larva that does the damage before it changes into the winged adult.

A "sustained yield" *forest* unit is one in which permanency is maintained by the cutting of only the fully-grown ripe trees and the adding of replacements if necessary.

National Bureau of Standards states.

The first effects of sunspot decline will probably be felt on the 50-megacycle amateur band. Within a few months communication on this frequency will no longer be dependable for distances much greater than 75 miles.

The overall effect will be to jam all radio communication into an ever narrowing band of frequencies for world-wide communication. From a usable frequency band whose upper limit is now around 50 megacycles, it will narrow down, at sunspot maximum, to an upper limit of approximately 20 megacycles for continent to continent transmission.

This narrower band makes it possible for relatively slight disturbances to be more disastrous than at sunspot maximum when the usable range of frequencies is larger. At sunspot minimum, a minor storm in the ionosphere may effectively crowd out all usable frequencies. At maximum, it takes a violent storm to completely disrupt communications.

During the last year or so there have been both more spots on the sun and some of the largest sunspot groups of all time. The three largest groups ever photographed appeared in February and July, 1946, and in March-April, 1947.

Science News Letter, March 13, 1948

NUCLEAR PHYSICS

Atomic Particle Created

Major step in the exploration of matter is the first artificially created meson or mesotron. Consider it key to mystery of atomic heart.

➤ THE elusive atomic particle, called both meson and mesotron, has been created artificially for the first time in the largest of the University of California cyclotrons. (*See SNL,* Jan. 10, Feb. 14.)

Hearts of helium atoms (alpha particles), accelerated to energies of 400,000 electron-volts, were used to give rise to mesons. Cosmic rays of similar energy create them naturally in the upper reaches of the atmosphere. It is understood that word of the achievement was passed out to some of the investigators of the atomic nucleus in this country. It is recognized as a major step in the exploration of matter.

The meson is considered the key that may unlock the mystery of the forces that hold the atomic heart together, just as the neutron discovered in 1932 was the key to atomic energy release in the first chain-reacting pile a decade later, and the atomic bomb in 1945.

There are theoretical grounds for hoping that the meson can blast energy out of heavy elements even more effectively than the neutron. The future may bring a meson atomic bomb, now that the scientists can create mesons under control.

Actually there are probably four or more varieties of particles called mesons. The most usual one found in cosmic ray bursts is about 200 times the weight of the electron. All of the kinds of mesons are intermediate between the electron, lightest subatomic particle, and the proton, heart of the hydrogen atom. The proton and the neutron are each about 2,000 times the weight of the electron.

Now that mesons can be made in the Berkeley giant "atom smasher" much more should be learned about them. Although mesons live only a fleeting fraction of a second, they can be studied and used as experimental tools once they are created at will.

Theoretical physicists suspect that mesons are a sort of go-between in allowing neutron and proton to turn into one another. They have evidence for this strange performance but do not yet understand what happens. The closest picturization would be the meson being passed back and forth like a ball between two basketball players.

Within the year four other accelerators—those building at Columbia, Rochester, Cornell and Harvard Universities—should be able to create mesons artificially. When these new machines come into use there should be greatly accelerated inquiry into the nature of the forces within the atomic nucleus.

It may be discovered that the proton and the neutron, both considered in the past as ultimate particles, may themselves be able to give rise to other, as yet unidentified, particles.

Science News Letter, March 13, 1948

MEDICINE

Ephedrine Found To Have Pain-Killing Effects

➤ FOR your next operation you may get as anesthetic the modern version of an old Chinese drug, ma haung. Ephedrine is the name of the modern drug extracted from the same Chinese plant. It is related chemically and in its effect on the body to adrenalin and has been used for many patients with allergies, low blood pressure or other conditions in which adrenalin is also sometimes used.

The anesthetic and pain-killing effects of ephedrine are reported by Drs. J. Eugene Ruben, Patricia-Mary Kamsler, and W. Lyall Howell, Jr., of Philadelphia General Hospital in the journal, *Science,* (Feb. 27).

A 43-year-old woman with diabetic infection of the foot had two toes amputated and extensive cutting and drainage of the foot under the anesthesia produced by a dose of ephedrine injected into her spinal canal. The drug did not put her completely to sleep, and she felt the operation but had no pain.

The use of ephedrine to prolong the effects of other spinal anesthetic drugs is now rather common practice, the Philadelphia group points out. But except for one scientist who found that ephedrine was a spinal anesthetic in frogs, no one has investigated the drug's anesthetic effect when used alone.

Science News Letter, March 13, 1948