RADIO

Radio Reception Forecast

Predictions made twice a week at National Bureau of Standards were furnished during the war to Army and Navy. Now available to public.

➤ LIKE the weather man, radio experts are "sticking their necks out" in an attempt to predict several days in advance if the radio reception on short-wave sets will be good or bad.

A prediction can be made on Wednesday, for example, that owners of short-wave radio sets will probably have trouble the following Monday and Tuesday getting programs broadcast from Moscow, Stockholm and London.

The semi-weekly forecasts, furnished the Army and Navy during the war, are issued by the Interservice Radio Propagation Laboratory at the National Bureau of Standards. During a magnetic storm, high-frequency transmission may be upset. If the storm becomes violent, however, the reception of local broadcasts may become poor and telegraph messages fail to get through.

The first radio paths to become disturbed are those crossing the polar regions such as from New York City and Washington to Moscow, Stockholm and London.

The predictions are based in part on the degree of solar activity. The greater the number of sunspots—and the public is once again to get up-to-date information on sunspots—the more likelihood there is of a magnetic disturbance.

Disturbance in the ionosphere, the complicated layer more than 50 miles high from which radio waves are reflected back to the earth, are associated with the magnetic storms at lower levels. Thus conditions of the ionosphere as well as geo-magnetic and auroral conditions are all studied in venturing a guess as to just how good the high-frequency reception will be several days in the future.

Science News Letter, November 3, 1945

AERONAUTICS

Jet-Push Plus Propellers

Combination of conventional propeller-drive and jet-propulsion features new Navy fighting plane; powered by two engines operating together or alone.

➤ SOMETHING new in aircraft propulsion, a new Navy fighting plane equipped both with conventional propellers driven by a reciprocating engine and jet-push from an improved jet propulsion engine, was demonstrated in Washington before a group of scientists by the U. S. Navy, which also released many of the details of the plane and its power plants.

The two engines may be operated at the same time, to give maximum performance, or either may be operated alone. The unique power combination makes the plane equally efficient at high or low levels. It also combines the advantages of good cruising characteristics with high tactical performance.

The reciprocating engine, a Wright Cyclone radial power plant, is in the front of the plane, and the jet-propulsion engine, made by General Electric, is in the rear. This gives an even weight distribution that contributes to the plane's efficiency. The plane, already dubbed the "Fireball," is a low-winged, single-seat monoplane that at first glance appears to be a single-engine craft. Both engines are completely enclosed, and air scoops for the forward engine are within the engine cowling. The air intakes for the jet engine are in the leading edge of the wing near the fuselage, with the jet exhaust opening coming out under the tail.

This new plane is a product of the Ryan Aeronautical Company of San Diego, Calif., and when the war ended was beginning to roll off the production line. A Navy fighter squadron to be equipped with Fireballs was already in pre-combat training when the Japs surrendered. The Fireball never saw combat, but already the principles developed for its operation are being applied to a possible civilian version.

The General Electric-designed thermal jet engine in the Fireball is far more powerful than a conventional engine of the same weight; working alone, it can streak the plane along at approximately 300 miles an hour. The Wright Cyclone gives the craft a maximum range of 1,500 miles cruising at 207 miles an hour, and can develop a speed of 320 miles an hour. Operational features of the plane are good maneuverability, fast climbing, easy handling and speed.

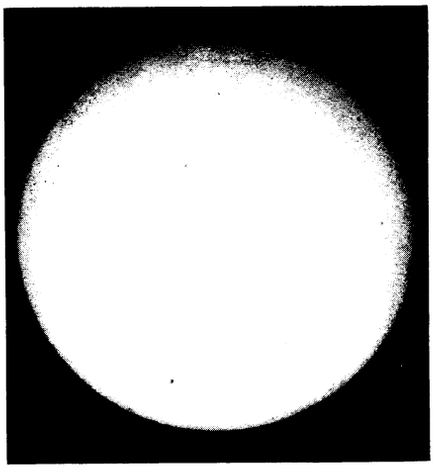
Science News Letter, November 3, 1945

CHEMISTRY

Shark-Repelling Chemical Used for Mackerel Nets

➤ THE SHARK-REPELLING chemical which was developed during the war to save the limbs and lives of "dunked" flyers and sailors promises to be a major money-saver to commercial fishermen. A test made at the suggestion of the U. S. Fish and Wildlife Service by the mackerel seiner *Angie* and *Florence,* operating out of Gloucester, Mass., showed that it was effective in keeping these toothy raiders away from a large net full of mackerel, saving both fish and net.

Shark attacks on heavy netfuls of fish have long been a major problem of commercial fishermen. The loss in fish is serious enough, but damage to the net may be even more so, for a good mackerel net costs several thousand dollars.



NOT A SECRET—The second largest number of sunspots for the year is shown in this photograph by the U. S. Naval Observatory. There are not many large spots, but numerous small ones. The more spots, the more activity there is on the sun. Information about sunspots is no longer a war secret and can be obtained from the Observatory.

Results of the test were reported by Alfred Piscatello, crew member aboard the *Angie* and *Florence*. The vessel had circled a school of mackerel in its long net, when sharks were observed circling near. Two blocks of the shark-chaser were sunk to a depth of 20 or 30 feet in a weighted container, and towed around the net. Additional chemical was spread on the water close to the net. The sharks headed for the catch, but when they came to the black "slick" on the water formed by the chemical they hastily turned tail and swam away.

One shark was caught in the net. Ordinarily this would have resulted in serious damage, for a netted shark lashes out furiously in efforts to escape. But this shark was very much subdued and was easily lifted out by hand.

Science News Letter, November 3, 1945

MARINE BIOLOGY

DDT Fails to Check All Ship-Fouling Organisms

➤ DDT, THOUGH proven able to prevent barnacles from growing on submerged steel plates, is nevertheless of little value as the main active ingredient for anti-fouling paints to be used on ships' bottoms, G. W. Seagren, M. H. Smith and Dr. G. H. Young of the Mellon Institute declare. (*Science*, Oct. 26). They base their conclusions on an eight-month series of experiments on the Florida coast, where the anti-fouling effectiveness of paints containing DDT and the time-honored anti-fouling copper compounds were compared.

In these experiments, as in earlier ones by other workers, the DDT did prove effective in preventing barnacles from taking hold on the steel test panels. The catch lies in the fact that barnacles are not the only organisms that foul up ships' bottoms. Other animals that help to form the troublesome crusts are included in several zoological orders: mollusks, annelids or jointed worms, hydroids, bryozoa and tunicates. The plant kingdom is represented in the growth complex by several kinds of algae or seaweeds. DDT had no measurable effect on any of these, save only barnacles, whereas a conventional-type copper-containing paint was effective against all of them.

The three researchers therefore conclude: "It thus seems unlikely that this toxicant (DDT) can effectively displace cupriferous and/or mercury pigments in the usual ships' bottom paints."

Science News Letter, November 3, 1945

ELECTRONICS

100,000,000-Volt Betatron

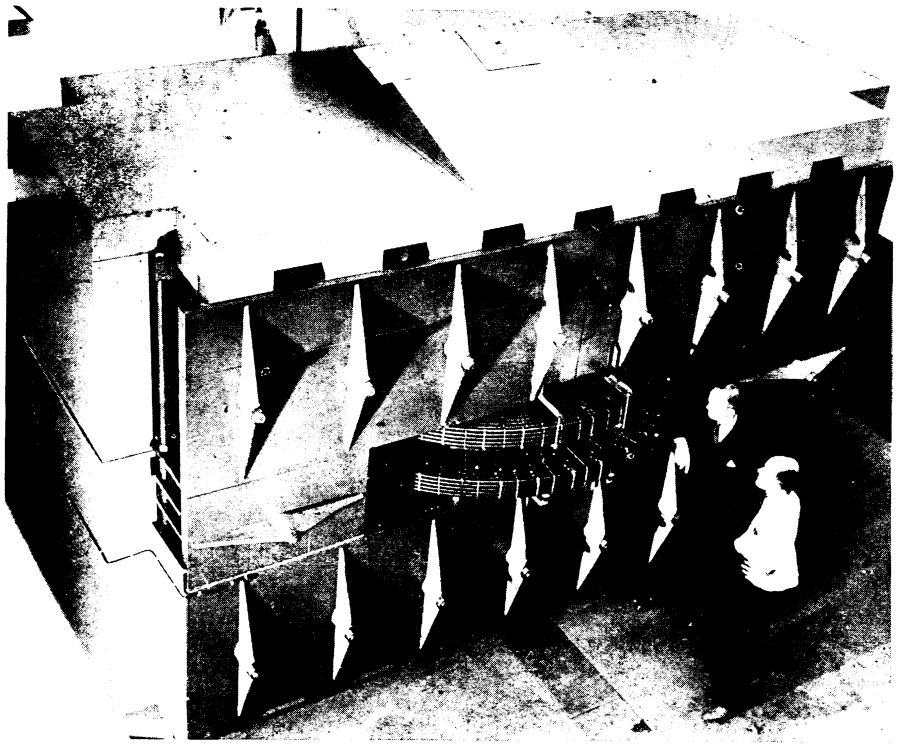
Details of this war-secret instrument are now revealed. It gives out X-rays of power never previously approached.

➤ DETAILS of the war-secret 100,000,000-volt electron accelerator, or betatron, were revealed at the General Electric Research laboratory in Schenectady to a group of newspaper science editors and technical writers who inspected the instrument.

"The new machine gives out X-rays of a power never previously approached," declared Dr. C. G. Suits, director of the laboratory, "and these will penetrate a thickness of metal considerably greater than the rays of our 2,000,000-volt industrial X-ray unit. But even more exciting to us are the possibilities that with the 100,000,000-volt electron stream that produces X-rays of the same energy we can produce other interesting forms of radiation. In fact, we have now arrived at the stage where we can generate in the laboratory radiations which formerly were available only in the cosmic rays, and we are just passing the borders of an entirely new field of atomic research."

The principal part of the betatron is a huge electromagnet, made of 130 tons of laminated silicon steel. In a rectangular opening passing through the magnet from front to back are the pole faces, 76 inches in diameter, surrounded by large coils of insulated one-inch copper conductor. As electric current at 24,000 volts surges through these coils from a bank of condensers, the magnet is energized, the intense magnetic field being concentrated in the horizontal space between the pole faces.

The heart of the machine is a doughnut-shaped vacuum tube of glass. The doughnut has an over-all diameter of 74 inches, while the elliptical tube itself measures eight inches horizontally and



100 MILLION VOLTS—This machine will speed electrons to energies of 100,000,000 volts and produce X-rays of the same power. Dr. E. E. Charlton, left, and W. F. Westendorp are the two scientists at General Electric who have been responsible for the design and construction of this new super X-ray machine.