PHYSICS

Fantastic Gyro Revealed

➤ SECURITY WRAPS have been removed from a fantastic little machine developed to guide the Air Force's supersonic planes and pilotless missiles automatically.

The little machine is a gyroscope which resembles, in principle, the spinning string-walking toys sold in five-and-dime stores. Made by the Minneapolis-Honeywell Regulator Company, Minneapolis, Minn., the gyros are believed to have unparalleled sensitivity.

If the moon were dotted with cities, the little gyro could measure the width of each city block. If a man standing in Los Angeles could read an ordinary sized newspaper in New York, the gyro could measure the angle his eyes turned through as they moved from the left side to the right side of the front page.

Although primarily created for use in military automatic flight guidance systems, including bombing and gun fire control applications, the gyroscope already has proved its worth in ocean-going vessels and in 60-ton tanks.

Described as "hundreds of times more accurate and sensitive than conventional gyros," the new instrument can detect motion 3,000 times slower than the creeping movement of the hour hand on a watch. It can read angles as small as 1/36,000 of one degree of arc.

Its spinning rotor is floated in a specially developed oily fluid which cuts friction almost to zero. Honeywell engineers say a boy could coast 1,000 miles down a one-foot-high hill if he could get the same low friction between sled runners and snow.

One of the secrets to the gyro's accuracy is its precise speed of rotation. It is "tuned" against a highly accurate crystal oscillator and is checked against the National Bureau of Standards' time signals, picked up on short-wave radio equipment at the Honeywell aeronautical laboratories.

Initial design work on the gyro was done at the Massachusetts Institute of Technology under the supervision of Dr. C. S. Draper. Honeywell engineers took over the developmental work five years ago. More than 10,000 gyros have been mass produced to date, although their capabilities were military secrets.

Science News Letter, March 13, 1954

MEDICINE

Betatron Treats Brain

➤ PATIENTS WITH mental disease as well as those with cancer may in the future be helped by the 23-million-volt X-ray beam of the betatron at the University of Illinois Medical School in Chicago.

This appears from a report of work so far. All the work, including the brain cancer treatment already under way, is, however, still in the experimental class.

Some 30 patients with brain tumors, both cancerous and non-cancerous, have had betatron treatment. Ten of the 15 with brain cancers have now survived for a year or more in relatively good condition. Conventional X-ray treatment, the report points out, may only give a few months' lease on life.

The future prospect of using the betatron for some mental patients comes from experiments on monkeys. These show that very large doses of X-rays from the betatron can be used to perform a frontal lobotomy. Frontal lobotomy, done to relieve some kinds of mental sickness and also to relieve the pain of hopeless cancer patients, has heretofore been a surgical procedure. Now, it seems, the betatron's powerful X-rays might substitute for the surgeon's knife to make the cut into the frontal lobes of the brain.

Patients being treated by the betatron are under the supervision of Dr. Arthur Arnold, neurosurgeon, and Dr. Lewis Haase, radiotherapist, of the university's medical school. They caution that all brain tumors which are readily reached should be cut out surgically, and that many brain tumors can be treated just as well by the more generally available X-ray machines as by the betatron.

Advantage of the betatron is that it can produce X-ray beams free from side-scatter, more penetrating and with a more uniform tumor dose. The betatron X-ray beam can be compared to a high-powered rifle, while conventional X-rays are more like a shotgun, says a report from the American Cancer Society which is helping finance the University of Illinois betatron work.

Science News Letter, March 13, 1954

PROJECTS EXHIBITED—Left column, beginning at top: Carolyn Merchant demonstrates models of the animal life found in a fresh water pond; Harold Ward, models of geometrical solids; Charles Stroebel, land formations and fossils found near Rochester, Minn.; Mary Jeanne Kreek, a study of allergies; and Marcian Hoff Jr., synthesizing liquid petroleum type hydrocarbons.

Center column, beginning at top: William Cooper Jr., an inexpensive prism spectrograph; Armand Brumer, complex mathematical curves; Donald Crothers, a study of blood, with emphasis on anemia and leukemia; and Marguerite Burlant, a study of the logarithmic spirals in snail shells.

Right column, beginning at top: Richard Fiddler, computation in systems other than decimals; David Egger, a magnetron for checking the velocity of light; Victor Schmidt, a small, inexpensive planetarium projector; and Susan Lee, crestation, or abnormal growth, in cactus plants. Invited guests viewed the exhibits of the 40 winners.

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