GEODESY

Twinkling Lights Help Geodesists Map Antilles

➤ IN FIVE weeks the Inter-American Geodetic Survey spotted Cuba, Haiti and Jamaica on the map more accurately than ever before by searching for twinkling spotlights at night. Survey officials estimated it would take six months. Skeptics said it could not be done at all.

The islands were put into their accurate places on maps by first-order triangulation, a surveying-mathematical process accurate to about one foot in 25 miles. At night powerful 500-watt, ship-type searchlights winked at each other from island mountain-tops. Instrument crews on the three islands each took 32 readings on all visible stations to average out errors.

At that time the record distance for line-of-sight triangulation stood at 190 miles. But Inter-American geodesists pushed the figure to 214.5 miles.

The "shot" was made between station Pico Turquino in southeastern Cuba to station Macaya on the western tip of Haiti. Special 1,000-watt aircraft beacons, equipped with redesigned mountings and reflectors, were required to bridge the night.

The object of the Antilles Tie, as it was called, was to find the exact location of the three islands with respect to themselves and to established triangulation networks that had been extended into Cuba.

The project was part of a gigantic charting program that ultimately may lead to photo-mapping of nearly every square inch of land in the western hemisphere.

Science News Letter, May 31, 1952

ENGINEERING

Lighter New Bridges Assembled More Quickly

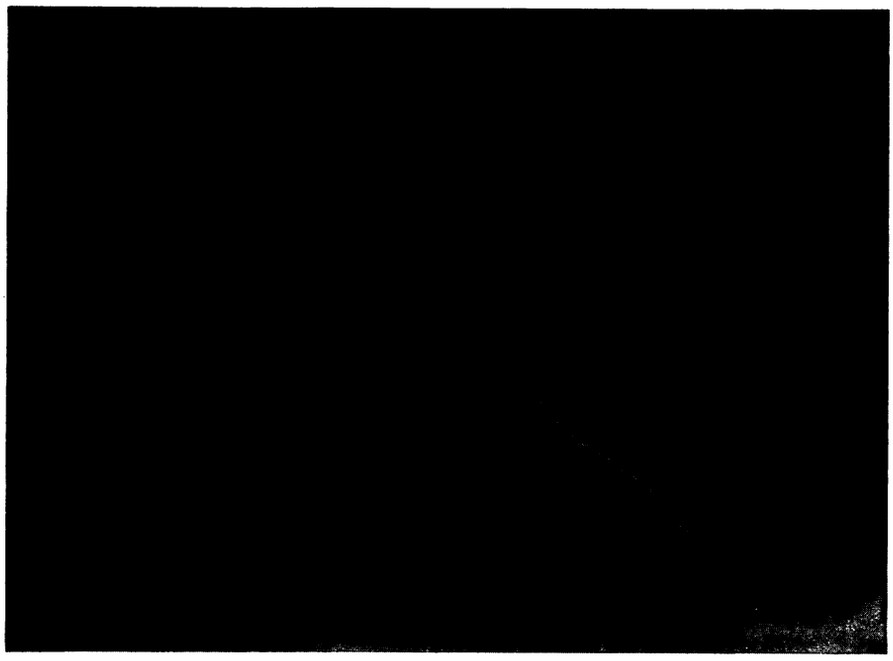
➤ COMBAT SOLDIERS soon will assemble aluminum and steel into a new series of floating and fixed military bridges that may replace such old stand-bys as the Bailey bridge of World War II fame.

The new series, just announced by the Defense Department, is designed to permit the heaviest field or division army equipment to cross swift-moving water. Soldiers carrying field equipment can dash across the bridges at double-time.

The floating structures are buoyed by heavy-duty pontoons that hold up well under strafing and that do not depend upon minimum water depths.

Much more stable in high currents than present-day types, the bridges can be hand-assembled quickly under combat conditions because of the simplicity of design, the Army reported. The series was developed by the Army Corps of Engineers and can handle either single or two-lane traffic.

Science News Letter, May 31, 1952



BEAM INTENSITY RECORDED—A photograph of the screen of an oscilloscope showing the 1.3 billion volts to which atomic particles, protons, were accelerated by the Brookhaven cosmotron. Trace indicates the beam intensity as it is being accelerated in the magnet gap, the lateral extent showing the length of time the beam travelled around the magnet.

PHYSICS

Cosmotron Fires 1.35 Bev

Brookhaven's particle accelerator speeds up protons to energy of 1.35 billion electronvolts. Instrument designed to achieve 2 Bev, heretofore available only in cosmic rays.

See Front Cover

➤ THE GIGANTIC "atom-smasher" at Brookhaven National Laboratory, Upton, N. Y., has achieved 1.35 billion electron volts on the way to its designed energy of more than 2 billion.

The cosmotron atomic accelerator reached this level on May 20 during its preliminary operating tests. The purpose of this accelerator is to speed up protons, hearts of hydrogen atoms, until they acquire an energy in excess of 2 billion electron volts (Bev), an energy available heretofore only in cosmic rays.

The protons can be directed against various targets, such as blocks of copper or graphite, and the results of these collisions studied; or, they can produce other nuclear projectiles, such as neutrons or gamma rays. The cosmotron, shown on the cover of this week's SCIENCE NEWS LETTER, will produce particles of energies over five times that of existing accelerators. Experiments using such particles may produce new information about the forces between nuclear particles.

Once every 5 seconds, a pulse of protons is injected into the cosmotron from a 3½ million volt electrostatic accelerator. A doughnut-shaped magnet with an outside diameter of 75 feet then forces the protons to travel in almost circular paths within the magnet gap, an exterior notch 36 in. wide and 9½ in. high.

Each time these protons make one revolution around the magnet, they are given a small increase in energy, about 1000 volts, by a radio frequency transformer. The magnetic field increases continually so that, as the protons gain energy, they are still kept on approximately the same circular paths.

After some 3 million revolutions and after a travel distance equivalent to five times around the world, half the distance from the earth to the moon, the particles have acquired full energy. The process takes about one second.

The magnet itself is composed of 288 flat steel blocks, 8 feet high and 8 feet wide. Each block weighs 5¾ tons and consists of 12 half-inch laminations insulated from each other. The magnet is energized by a total of about 70 tons of copper bus bar carrying a peak current of 7000 amperes. The