

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

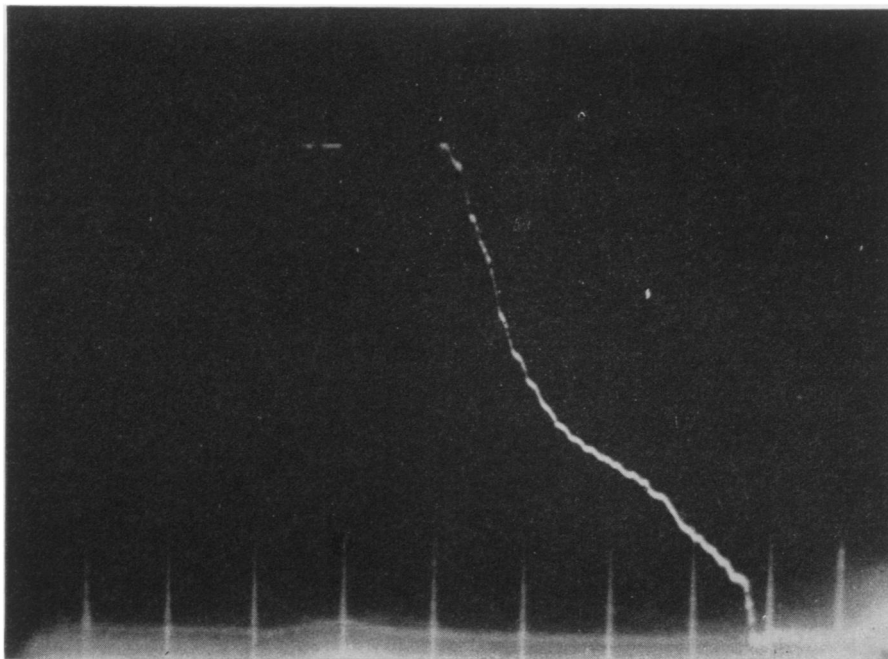
► COMBAT SOLDIERS soon will assemble aluminum and steel into a new series of floating and fixed military bridges that may replace such old stand-bys as the Bailey bridge of World War II fame.

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.

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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

copper bars are hollow so that cooling water can prevent overheating.

Electrical energy for the magnet comes from a 21,000 KVA motor-generator-flywheel unit. A set of 24 large electronic tubes, called ignitrons, serve both as rectifiers, so that direct current is supplied to the magnet, and as inverters so that the major part of the magnetic energy can be returned to the flywheel for storage for the next operation.

Since the presence of air causes the protons to lose energy, they must travel in an evacuated stainless steel box, the vacuum chamber, which rests in the magnet gap. Four large mechanical vacuum pumps located in the center of the ring remove most of the air, but twelve 20-inch diffusion pumps situated outside the ring are needed for final evacuation.

Science News Letter, May 31, 1952

PUBLIC HEALTH

Vaporized Insecticides Are Doubly Dangerous

► A WARNING against improper and excessive use of electric vaporizing devices for insecticides has been issued by the American Medical Association in Chicago.

The devices use DDT or lindane or a mixture of two to kill flies and other flying pests.

The insecticides are placed in a cup and slowly evaporated by a built-in heating element or some other heat source such as an electric light bulb. The insecticide is discharged as a vapor or fumes that ultimately settle in the form of crystals on ceilings, walls and other exposed surfaces. These may later fall on floors or tables, and into food and water.

The dangers from improper use of such devices are that the concentration of the vapor in the air may become too high and the material may get into foods or drinking water in dangerous amounts.

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AERONAUTICS

Navy Wind Tunnel Draws Last Breath

► IT HAS drawn its last breath and it is being decommissioned to the historic heaven to which all good Navy "ships" go. The first of the Navy's wind tunnels, which in 1914 was the world's largest, is becoming a mere memory. From its 8-x-8-foot throat, came design data for such famous airplanes as NC,s, 1, 2, 3 and 4. NC-4, as oldtimers remember, was the first transatlantic airplane back in 1919.

Located at the U. S. Naval Gun Factory in Washington, the wind tunnel is making way for more modern, more secret structures that help design the new Navy.

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PSYCHOLOGY

Find Who "Wears Pants"

Questions to children about who makes what decisions around the home give numerical score showing how well husbands and wives get along.

► IN YOUR family, who decides whose job it is to do the dishes? Who decides when the lawn is to be mowed, whose job it is to put out the milk bottles, where to go for the holidays? Who decides what groceries to buy? Is there disagreement?

Based on these and other similar questions, P. G. Herbst, psychologist of the University of Melbourne, Australia, has developed a scale which will give a numerical score on how well wives and husbands get along. Originally developed for use in the UNESCO study of Australian cultures, the scale is suitable, with minor changes, for use in most western urban communities. It was decided that interviewing either husband or wife might result in biased answers and so the questions were put to the children.

Most common pattern of family life in Melbourne is that in which both husband and wife are their own bosses, but where one dominates the other, it is usually the wife who "wears the pants" of the family.

Friction is greatest where either husband or wife tries to boss the other. It is least where both decide together and work together on family affairs.

Family activities, it was found, can be grouped into areas according to the activity of different family members and leadership of husband or wife.

In social activities such as inviting visitors to the home, all members of the family may take part. Earning the money and deciding how to spend it is generally the husband's responsibility. In fact, in Melbourne, if he gives up this area he generally stops living with his wife.

Household duties divide themselves into man's work, woman's work and common tasks. It is the man who mows the lawn and it is he who decides about it, too. But the wife is the one who does the ironing. Either may take a hand at the dishes.

Both parents look after the children, but decisions about them rest with the wife.

By the time they are four years old children take part in the social activities of the family, but even at that early age, boys have learned to let the woman's work alone and girls do not interfere with the man's work.

Details of the study are published by Tavistock Institute of Human Relations, London, and the Research Center for Group Dynamics, Ann Arbor, Mich.

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TECHNOLOGY

Latest Army Wrinkle: Adjustable Locomotive

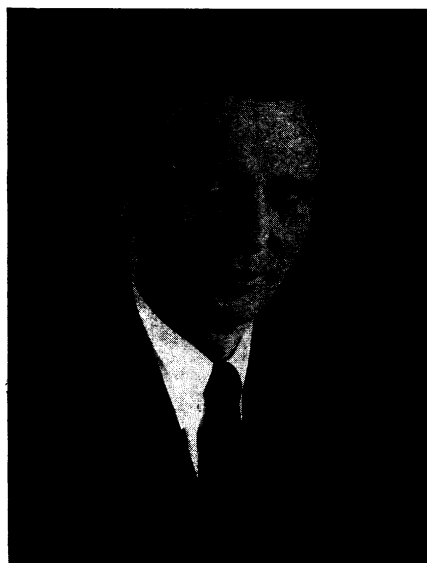
► THE LATEST army wrinkle is an adjustable diesel locomotive.

It can run on tracks varying from the United States standard up to the widest gages in use. A simple mechanical adjustment of the wheels on their axles does the trick.

Locomotive statistics include a 16-cylinder, two-cycle diesel engine rated at 1600 horsepower; a top speed of 77 miles an hour; satisfactory performance in temperatures from minus 40 degrees Fahrenheit to 125 degrees, and consumption of 40-cetane fuel oil or lower.

Known as the MRS-1, the adjustable locomotive was built to the U. S. Army Transportation Corps specifications by General Motors. Thirteen of the units are scheduled for delivery.

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NEW STANDARDS HEAD—Dr. Allen V. Astin, acting director of the National Bureau of Standards since last September, has been nominated by President Truman as the new director. During the war, Astin helped to develop the proximity fuses, which have been rated second only to the atomic bomb in winning the war.