

SCIENCE NEWS

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A "STARLIGHT" TUBE

A "STARLIGHT" tube, it is called, a new super-sensitive electronic tube smaller than a 25-watt incandescent light bulb, can be used to measure accurately the feeble quantity of electricity in the light of a star many million-million miles away. It has, however, very practical essential wartime uses in the electro-chemical analysis of metals such as steel, and the detection of impurities in high explosive compounds.

The new tube and its development were described at the New York meeting of the Institute of Radio Engineers by William A. Hayes, of the Westinghouse Electric and Manufacturing Co., who is responsible for its present development.

The minimum amount of electric current which the tube can measure, one one-hundred-trillionth ($1/100,000,000,000,000$) of the electric energy in the light from an average home reading lamp, actually is less than the minute electric current in the dimmest starlight.

When astronomers seek information concerning changes in a planet's direction, speed or other characteristics, they hitch the tube, which is attached to a photoelectric cell, to the "eye" end of an observatory telescope. On the basis of the starlight readings, the distance between the earth and the stars is determined by trigonometric computation.

The sensitivity of the tube, which must be operated in total darkness to keep ordinary daylight from energizing the grid, is derived from its unorthodox design and construction. Glass "pants-legs" are tailored around the stiff metal wires which support the tube's internal structure to prevent stray electrons from getting lost. Functioning like a lightning rod, a tiny tungsten wire is spot-welded inside the tube and pressed against its side to catch unwanted electric charges that might affect its accuracy.

A simple electronic tube contains a wire filament that shakes loose electrons when heated, a metallic mesh called a grid that acts as a control gate through which electrons must pass, and a plate that collects the electrons. In the new starlight tube the roles of the plate and the grid are interchanged; the grid functions as the plate and the plate as the grid.

ITEMS

A TINY floating magnet, that remains in the air without visible means of support over a lead plate cooled to a temperature only a few degrees above absolute zero, itself creates, it would seem, the power that holds it aloft. The probable explanation is that the magnetic field of the magnet sets up incessant induction currents in the lead, which, in turn, repel the magnet. This ability, in a ferro-nickel magnetized bar one centimeter long, was recently discovered by scientists in the Soviet Union and is reported by a corresponding member of the USSR Academy of Sciences. In the experiment, the lead plate had been cooled to 269 degrees below zero Centigrade, approximately four degrees above absolute zero. When the tiny

magnet was thrown on the plate it bounced into the air and remained floating until the temperature of the plate rose three degrees, when it settled on its surface. This action is dependent upon the very low temperature to which the lead was subjected. It has been known for years that at very low temperatures the electrical resistances of some metals drop very greatly. When cooled to this condition the metal is said to be superconductive. Lead becomes superconductive at 266 degrees below zero Centigrade, and mercury at 269 degrees. A current started by an electromotive force in a superconductive lead ring continues to flow for hours after the starting force is removed.

ABOUT the size of a quart milk bottle and mounted on the instrument panel of a B-29 Superfortress, the new air position indicator gives continuous readings of latitude and longitude as the heavy bomber executes its mission to Tokyo. This is the first device to give such readings in the history of navigation on the sea or in the air. Developed by the Eclipse-Pioneer division of Bendix Aviation Corporation, with the cooperation of the Air Technical Service Command at Wright Field and the Navy Department, the device eliminates the need for the navigator to work for hours with charts, basic navigational reference books, star-sighting sextants, and other aids to navigation to calculate the position of his airplane in flight. The navigator of a B-29 can pinpoint his position on the map and keep the plane on the skyroad to any enemy target, by referring to two needles on a small instrument panel dial of the air position indicator marked off in degrees of longitude and latitude. This same dial also gives him a continuous record of nautical miles flown and indicates the correct compass heading of the plane.

PATIENTS with severe streptococcus sore throats start to improve within 8 to 12 hours after the first injection of penicillin and may be well within 24 hours, Army medical officers found in studies reported in the *Journal of the American Medical Association*. Unless the patients continued to get penicillin treatment for six days, however, they suffered relapses. The greater effectiveness of penicillin over sulfadiazine in throat infections with hemolytic streptococci is stressed in the report by Major Norman Plummer, Miss Dorothy Rhoades Duerschner, Major Harold Draper Warren, Captain Francis T. Rogliano and Captain Ruell A. Sloan. "It should be used without delay in any serious, progressive hemolytic streptococci infection," they advise. The most striking finding, they point out, was the disappearance of the streptococci from the nasopharynx within 24 hours. This raises a number of questions such as whether it is possible completely to eradicate the streptococci from the body and what effect this would have on the course of the disease and the development of rheumatic fever or kidney disease as complications of strep sore throat. The study does not answer these questions, though it gave "some indication that complications of this disease can be prevented and effectively treated."