

## PHYSICS

**High Altitude Stations  
Number at Least 42**

► **THERE ARE** at least 42 high altitude research laboratories and observatories around the world, Dr. Serge A. Korff, cosmic ray physicist at New York University, reported.

Uncertain is the number of such stations behind the Iron Curtain. The Russians probably "operate one high altitude laboratory in the Caucasus," but what others, if any, are not known, Dr. Korff pointed out in describing the world's lofty research facilities.

High altitude is defined in the report, financed by the National Science Foundation and UNESCO, as about 7,500 feet or above. Meteorology, cosmic rays, radio astronomy and sun-earth relationships are a few of the fields that benefit greatly from research at high altitudes.

Highest station covered in the report is the 18,000-foot Chacaltaya Cosmic Ray Laboratory in Bolivia.

The northernmost, and also the newest, high altitude station is Mt. Wrangell Observatory on a 14,006-foot Alaskan peak, which is run jointly by New York University and the University of Alaska. It was established in 1953.

Southernmost observatory is Argentina's Cosmic Ray Station in the Argentine sector of the Antarctic.

The United States has seven high-altitude research observatories, more than any other nation. The highest of these is the 14,150-foot Mt. Evans, Colorado, laboratory.

Dr. Korff's report includes such data on each station as location, scientific and living facilities, climate and weather, photographic equipment, available electric power and library facilities.

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## INVENTION

**Wrinkles Made to Order  
Hide Unwanted Wrinkles**

► **THE PROBLEM** of what to do about wrinkled clothes has been partially solved by Albert S. Jones of Webster, Mass., who received a government patent for his invention which puts permanent wrinkles in textile fabrics.

Mr. Jones' method, which produces unidirectional wrinkles in an extended sheet of textile, is simply done by pressing in many directions a sheet of fabric moistened with a fixing agent. The material is then passed through high pressure mangle rolls and dried to set the wrinkles.

The inventor claimed that the permanent wrinkles tend to conceal other wrinkles and that, for this reason, it is not necessary to iron the fabric after washing.

The wrinkle-making method, which received patent No. 2,695,653, was assigned to the Cranston Print Works Company of Cranston, R. I.

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**MOUNTAIN-TOP RESEARCH**—The Pic du Midi high altitude laboratory in the French Pyrenees is one of the 42 stations of its kind in the free world. The site, used for studies in astronomy, cosmic rays, geophysics, botany and meteorology, is at an altitude of 9,370 feet.

## RADIO ASTRONOMY

**Absorption Lines Found**

► **RADIO WAVES** being broadcast by heavenly sources show absorption lines just as light from the stars does. Astronomers around the world are excitedly discussing this discovery, which opens up a new era in astronomical research.

Discovery of these absorption lines in radio waves from otherwise invisible points in the sky gives astronomers another yardstick for measuring distances within the Milky Way galaxy in which the sun is but one of hundreds of millions of stars.

It also tells them about the amount and distribution of the hydrogen gas filling the space between the stars.

Drs. John P. Hagen and Edward F. McClain of the Naval Research Laboratory in Washington were the first to spot the absorption lines in radio waves of 21 centimeters, or about eight inches. Dr. A. Edward Lilley and Miss Nannielou Hepburn, also of the Naval Research Laboratory, have now joined them in an intensive search for other sources showing the same absorption lines.

From their studies so far, Dr. Hagen and his associates have concluded that interstellar hydrogen is probably distributed in clouds in interstellar space, rather than continuously as has been thought.

These hydrogen clouds have diameters of several parsecs, one parsec being the distance light travels in 3.26 years. Within such clouds, the hydrogen atoms are comparatively dense for interstellar space, 100 per cubic centimeter, according to their calculations, compared to the one per cubic

centimeter assumed for uniform distribution of the hydrogen.

The radio wave absorption lines result when such hydrogen clouds come between the relatively bright background of a heavenly radio source that is broadcasting at a wavelength of 21 centimeters. The clouds, which also radiate on their own at 21 centimeters, cut out that particular wavelength when they are between the earth and the bright radio source.

This is absorption and is familiar to optical astronomers who work with light waves. It is caused by atoms and molecules taking up, or absorbing, the energy of a source whose temperature is higher. Just as stars emit light waves, so also do certain heavenly sources send out radio waves.

These radio sources have a "temperature," or energy level as visible stars do. When the temperatures of such sources are considerably higher than the estimated 120 degrees Kelvin of interstellar hydrogen, the resulting absorption can be detected by delicate electronic instruments.

So far, only four radio "stars" showing absorption lines have been discovered, although the Naval Research group searches daily for others.

These sources are in Taurus, Cassiopeia, Cygnus, and Sagittarius.

Within the next few years, studies of radio wave absorption in the 21 centimeter region should lead to a more complete chart of the small-scale structure of the Milky Way galaxy than previously possible.

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