

ASTRONOMY

A-Bomb Element in Stars

Surprising discovery of technetium in spectra of red, S-type stars poses problem concerning its half-life, fairly short for earth-known forms.

► **TECHNETIUM**, the first chemical element to be discovered through atomic bombardment, is now known to exist in the stars.

Several lines of technetium have been identified in the fanned-out light of red S-type stars, Dr. Paul W. Merrill of Mount Wilson and Palomar Observatories told the National Academy of Sciences meeting in Washington.

"It is surprising to find an unstable element in the stars," Dr. Merrill stated. This may indicate one of several things:

1. A stable form of technetium actually exists although it has not yet been found on earth.

2. These stars rich in the little-known heavy elements zirconium and barium somehow produce technetium as they go along.

3. The S-type stage of stellar existence is relatively short.

Technetium is an explosion product of the atomic bomb. Also known as element 43, it was first identified in a piece of molybdenum that had been bombarded with neutrons in the University of California cyclotron at Berkeley. Today it is most plentifully obtained as a product of the splitting of uranium atoms in AEC nuclear reactors at Oak Ridge, Tenn.

Samples of this rare element, obtained from Oak Ridge, were heated at the National Bureau of Standards to produce its typical spectrum, and compared with the sun's rainbow colors. Dr. Charlotte E. Moore-Sitterly, working with Dr. W. F. Meggers in the Bureau's spectroscopy laboratory, found at least one identical line in both spectra. This indicates that technetium probably exists in the sun.

Photographs taken by Dr. Merrill with the 100-inch telescope and others taken recently by Dr. I. S. Bowen with the 200-inch telescope show several technetium lines in the spectra of S-type stars. This is particularly true of certain variable stars which regularly take about a year to increase and decrease in brightness, Dr. Merrill reported.

The bothersome problem about the existence of technetium in the sun and other stars is that the period of existence (called "half-life") of any kind of technetium known here on earth is relatively short. It is measured in mere hundreds of thousands of years, a short time for material in a star. If a longer-lived form of technetium were discovered on earth, it would fit into the picture better.

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OCEANOGRAPHY

Sun Tides At Tahiti

► **THE MOON** is largely responsible for the daily rise and fall of most tides, but there are at least two places where the waters rise and fall with the sun, Rear Adm. L. O. Colbert, formerly director of the U. S. Coast and Geodetic Survey, stated at the Smithsonian Institution.

"Although there is a slight variation, in minutes only," Adm. Colbert stated, "we have at Tahiti the unusual feature of high water coming at noon and at midnight, and low water at six in the morning and evening.

"The tide at Tahiti has a small range—on the average of 0.8 feet—so that it is not very impressive," he continued. "More recently a larger solar tide has come to light on Tuesday Island, a small island in Torres Strait about 15 miles from the northern point of the Australian mainland. Here the tide has a mean range of a little over three feet, but comes about the same time day after day."

The geographic land boundaries or sub-

merged ocean features which outline these tidal basins are oriented so that the waters in the basins feel the minimum effect of the moon, but get the maximum effect of the tide-producing force of the sun.

All along the coast of North America from Halifax in Nova Scotia to Cape Canaveral in Florida, and around to the Bahamas, at about the same distance off the coast high water occurs at approximately the same time each day. These tides are governed by the moon, not the sun. High tide occurs every 12 hours and 25 minutes sun time, or exactly every 12 lunar hours.

Six or seven hours after the moon passes over the local meridian, the oscillation of the water brings high water to these regions. But the maximum height of the tide is far from the same. For the outer coast of Puerto Rico, the rise and fall is one foot; for the Bahamas, two feet; and for the Georgia coast, six feet.

Near Anchorage, Alaska, a difference of 35 feet between high and low tide has been

noted. This is not a tidal bore, Adm. Colbert pointed out, but a real range of the tide. This great range is due to its position at the head of a great inlet, located at the end of the major Pacific tidal basin. Just as in a bathtub water sometimes sloshes out at the two ends, so the tides are higher at the ends of a tidal basin.

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MEDICINE

Heparin Improves Angina Patients

► **"DRAMATIC IMPROVEMENT"** in 80% of a group of patients with the heart disease, angina pectoris, was achieved by twice-weekly injections into the veins of the anti-clotting drug, heparin, Dr. Hyman Engelberg of Los Angeles reported at the meeting of the American Heart Association in Cleveland.

The drug was given not because of its anti-clotting action but because of its effect on the fatty protein particles found in the blood of some patients with artery hardening and on fat metabolism in the body. Heparin had previously been shown effective in preventing fatty degeneration of the arteries in rabbits.

Relief of pain in the angina patients and increased ability to tolerate exercise in patients with blood vessel disease were among the good results reported.

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ACOUSTICS

Noise on Airfields Leads to Plane Crashes

► **EXCESSIVE NOISE** on airfields can lead to plane crashes, Lt. Col. Alvin F. Meyer, Jr., of Wright-Patterson Air Force Base, Dayton, Ohio, warned at the Industrial Health Conference in Cincinnati.

The danger comes in the effect of the noise on control tower personnel. Col. Meyer gave one example of a ground accident which destroyed one plane and seriously damaged another. Cause of this accident was traced to wrong instructions issued by the control tower.

"An investigation and special physical examination revealed that half the operators showed symptoms of excessive fatigue, irritability and vague psychosomatic responses despite the fact that they had all satisfactorily passed the annual physical examination six months before," Col. Meyer reported.

"Further investigation of environmental conditions proved that there was an excessive noise level in the control tower."

More careful airfield zoning, better regulation of warm-up and maintenance areas and proper master planning of airfield installations are needed, he declared, to help reduce airplane accidents.

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