ASTRONOMY

Earth Dwarfs Some Stars

Most white dwarf stars have diameters ranging from one-half that of the earth to four times the earth's. These stars are easy to identify but hard to observe.

➤ THE EARTH on which we live is larger than some of the stars shining in the heavens. Probably none of those picked up, even with the world's most powerful telescopes, are as small as the moon, but a few are not much larger.

The smallest star discovered to date, a white dwarf, is only 2,500 miles across. This means its diameter is only about 350 miles greater than that of the moon and about one-third that of the earth. Another of these midget stars is known to be about the size of Mercury, the smallest of the planets and only 3,000 miles across. Several others are known to be smaller than the earth, which is some 7,900 miles across.

The diameters of most white dwarf stars lie between one-half that of the earth and four times that of the earth, Dr. W. J. Luyten of the University of Minnesota estimates. The sun and the larger planets such as Jupiter and Saturn are giants in comparison.

White dwarf stars are noted for their small size, high surface temperature and fantastically high densities. So much matter is packed into these tiny stars that a cubic inch of them, if brought down to earth, might weigh anywhere from one to 1,000 tons.

"The paradox of these stars is that they are at once the easiest stars to identify and the hardest to observe," Dr. Luyten reports in the *Astrophysical Journal* (Sept. 1952). Nearly all of them are so extremely faint and so blue that they are most difficult to find.

The color of these stars appears to be the best key to their real brightness. Besides being easier to observe, color is much more reliable than a study of the star's spectra or fanned-out light, the Minnesota astronomer points out.

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ARCHAEOLOGY

First American Tools?

➤ MAN-MADE TOOLS found in California may have been used by man there more than 100,000 years ago, Dr. George F. Carter, archaeologist and geographer with Johns Hopkins University, Baltimore, reported in the *Southwestern Journal of Anthropology* (Winter Issue).

The simple stone tools which must have been formed by human hands, Dr. Carter said, were found buried in gravel beds laid down sometime before the fourth and last glacier, more than 100,000 years ago.

The most generally accepted estimates as to the age of man in the western hemisphere up to now lie between 10,000 and 20,000 years ago.

Dr. Carter believes the first Americans crossed over the Bering Straits at the onset of the third glacier, when a land bridge connected Siberia with Alaska. This could set a possible date for man's invasion of the western hemisphere as far back as 400,000 years ago, Dr. Carter said.

Archaeologists once thought relics of the Folsom man were the oldest indications of man in America, dating the Folsom relics at about 20,000 years old. But recent research using the method of radiocarbon dating showed the Folsom remains to be only about 4,300 years old. The oldest human objects from America dated by the radiocarbon method were a pair of sandals, found to be about 9,000 years old.

Dr. Carter employed two yardsticks to determine the age of the sites. The first was an analysis of the chemical content of the soil. Because of the presence of certain minerals and the absence of others at various levels, he concluded that the soil had been in place during the humid, rainy glacial times, as well as recent arid times.

The second method is based on the variations in height, where cut by roads and gravel pits, of interglacial terraces.

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100,000-YEAR-OLD TOOLS? — Dr. George F. Carter of Johns Hopkins University points to markings on a large rock that he believes shows it was chipped by the earliest humans in America, over 100,000 years ago. This is about 80,000 years earlier than other archaeologists estimate man was on the continent.

PHOTOGRAMMETRY

Military Needs Maps Even for Atomic Warfare

➤ THE AGE of atomic warfare where great nuclear explosions can sear vast areas in one devastating blaze will not put painstaking map-makers out of business.

Instead, the atomic age offers a great challenge to the map-maker's imagination and ingenuity, Maj. Gen. Herbert B. Loper, chief of the Armed Forces Special Weapons Project, told the American Society of Photogrammetry meeting in Washington.

The idea is not true that exploding an H-bomb anywhere in the general vicinity of the target is satisfactory. Considering all the money involved in creating such a bomb and in delivering it to the enemy, military strategists want to hit their target "right on the nose."

Gen. Loper cited an example in which one bomb, costing $10,000,000 to make and deliver, could produce 100% destruction. But, in his example, if the bomb exploded 400 feet to one side of its intended mark, it would be only 75% effective. That, he pointed out, would mean a waste of $2,500,000.

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BIOPHYSICS

Fight Cancer With New Radioactive Chemical

➤ TREATMENT OF cancer patients with the radiations from cesium 137 is being planned at the University of Michigan's Medical School. At only one other place in the country, Oak Ridge, Tenn., will a cesium source be used to aid the fight against cancer during the next few years.

The radioactive cesium, a by-product of the uranium fission process in the pile at Oak Ridge, has to be separated from the other radioactive substances produced, so only a limited amount is available. If the cesium treatment is successful, however, it would mean the addition of a valuable source of high-powered, long-lived radiation to the anti-cancer arsenal.

Results of the cesium therapy will be compared with those from X-ray and cobalt-60 treatment, Drs. Fred J. Hodges and Isadore Lampe of the University report. In the Atomic Energy Commission's research on cesium therapy at Oak Ridge, the radioactive source will be rotated about the patient.

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