

ASTRONOMY

Ancient Stars Discovered

Three red stars nearly twice the age of the sun have been discovered in the Milky Way galaxy and their chemical nature determined, Ann Ewing reports.

► **THREE STARS** nearly twice the age of the sun, which is about five billion years old, have been discovered and their chemical make-up determined.

The stellar antiques were born during the first billion years after stars started forming the Milky Way galaxy, the gigantic pinwheel of some 100 billion stars in which the sun and its family of planets, including earth, are located. The Milky Way is some 10 billion years old.

Old stars can be told from younger ones by their chemical composition. The antiques are highly lacking in metals, and the amount of the deficiency tells their age. Young stars have a higher proportion of heavy chemical elements, captured when they were formed from material spewed into space by dead stars that were born earlier.

The three red giants have surface temperatures of about 7,000 degrees Fahrenheit, compared to the sun's 10,000. Each is about 20 to 30 times the sun's diameter and they are 500 to 1,000 light years from the sun. A light year is the distance covered in a year by light, which travels at 186,000 miles a second, or six million million miles.

Drs. Jesse Greenstein and Robert Parker

of Mt. Wilson and Palomar Observatories in Pasadena, Calif., George Wallerstein of the University of California, H. L. Helfer of the University of Rochester, N. Y., and L. H. Aller of the University of Michigan investigated the red giants' composition.

Results of the chemical analysis give astronomers a look back in time to the composition of the Milky Way when it and the universe itself were very young. The stars were photographed in the rainbow spectrum of their light with the 200-inch giant telescope atop Mt. Palomar and the 100-inch Hooker telescope of Mt. Wilson and Palomar Observatories, which are operated jointly by California Institute of Technology and Carnegie Institution of Washington.

A spectrum separates light into a characteristic wavelength pattern radiated by atoms, thereby disclosing a star's chemical composition. The star's surface temperature and motions are also revealed by its spectrum.

The three red giants are the most "metal poor" stars ever observed, the astronomical team reported in Pasadena, Calif.

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GENERAL SCIENCE

NASA Industrial "Cities"

► **INDUSTRIAL "CITIES,"** powered by the rising spending of the National Aeronautics and Space Administration, are springing up across the land.

States that will benefit from this type of expansion this year are Florida, Texas, Mississippi, Louisiana and Massachusetts.

"Big-time" accomplishments are not unusual for Florida's Cape Canaveral. However, even old-timers there gasp at the Space Agency's acquiring 80,000 acres on Merritt Island to build manned lunar launch facilities. A whopping \$326,974,000 is being spent on the project this fiscal year, which ends June 30, and another \$312,855,000 is planned for fiscal year 1964. The number of employees is scheduled to rise to 1,200 from this year's 800.

Texas is due to share in a striking example of NASA's expansion. There the Space Agency is building more than 15 major facilities on 1,600 acres of vacant land near Houston. The Manned Spacecraft Center will manage Projects Mercury, Gemini and Apollo. Employees will increase by 784 to 3,980.

The Marshall Space Flight Center at Huntsville, Ala., is scheduled for two big construction projects, one for \$111,690,000

at the Mississippi Test Facility where large rocket stages will be ground tested.

The other project calls for \$10,000,000 to be spent at the Michoud rocket manufacturing plant in New Orleans. At Marshall-Huntsville itself, NASA would spend \$38,496,000 for construction of facilities in 1964.

A new Electronics Research Center is planned for the Greater Boston area. Its specific location has not yet been decided. The Electronics Research Center is scheduled to gain 250 employees and to have \$5,000,000 for its construction operation and personnel by June 1964, if Congress approves.

These are only a few of the construction highlights from the Space Agency's construction and personnel budgets programmed through fiscal year 1964. Employment-wise, NASA expects to have 32,500 full-time employees by fiscal year 1964. That is an increase of 3,953 over the current fiscal year.

The totals for construction jumped to \$737,425,000 for fiscal year 1963, compared to \$358,190,000 for fiscal year 1962. The planned figure for fiscal year 1964 is \$800,000,000.

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PUBLIC SAFETY

International Ice Patrol Warnings Start Soon

See Front Cover

► **ICEBERGS, AHOY!**

The International Ice Patrol will soon start broadcasting its potentially life-saving warnings to ships using the North Atlantic shipping lanes. It will use devices like radar and facsimile, undreamed of 50 years ago when the Titanic was sunk by an iceberg.

Searches for icebergs and other floating dangers in these heavily traveled lanes will start late in February, under the direction of the U.S. Coast Guard. Preliminary aerial reconnaissance has been under way since December 1962, preparing for the iceberg season, March through June.

The International Ice Patrol was initiated a year after the tragic sinking of the Titanic. It is now subsidized by the 17 countries that are major users of North Atlantic shipping lanes. Except for intervals during World Wars I and II, the Patrol has constantly been on guard during the ice season.

For the second year, the patrol will broadcast radio facsimile charts of ice conditions in the North Atlantic. This system provides mariners directly with a chart of observed ice conditions, important for routing ships.

Seen on this week's front cover is a U.S. Coast Guard ice patrol plane out of Argentina observed through the lifeboat lines of a ship keeping track of a large iceberg meandering in the Grand Banks off Newfoundland.

The Coast Guard also conducts studies of ocean currents and temperatures, as well as other sea conditions. This information helps scientists predict iceberg drift and rate of melting.

Although aircraft conduct the major part of the patrol, they are assisted by Coast Guard Cutters Acushnet and Tamaroa as well as its oceanographic vessel, Evergreen.

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DENTISTRY

Fear of Dentist Reduced By Tranquilizing Drug

► **A TRANQUILIZING** drug can be just the thing to calm nerves and restore confidence while in the dentist's chair.

Patients given a dose of the tranquilizing drug, chlordiazepoxide, before sitting in the dentist's chair were on the whole able to tolerate their treatments, Dr. George H. Grant, Rye, N. Y., has found.

The positive effects of the drug were noticed in 54 of the 56 patients under study. The patients chosen to be given the drug were unusually fearful and tense. They were often so emotional that drilling and dental operations could not be done.

After treatment with chlordiazepoxide, Dr. Grant reported in the Journal of the American Dental Association, 66:183, 1963, these patients tended to improve their attitudes and dental work was often possible.

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