

ASTRONOMY

Patches on Distant Star

Light and dark areas bearing some resemblance to sunspots have been observed for the first time on a star beyond the solar system.

► LIGHT and dark patches bearing some resemblance to sunspots have been observed for the first time on a star beyond the solar system, Dr. Gerald Kron, assistant astronomer in the University of California Lick Observatory, reports.

Actually, this is the first time surface features of any star beyond the solar system have been observed.

The patches—Dr. Kron says he is not yet prepared to say they are “star spots”—were observed on the smaller, sun-like star of AR Lacertae, a double star of the seventh magnitude. This star is in the Northern constellation of Lacerta, the lizard, found high in the northwest these winter nights.

The observations were made by means of photoelectric photometry, in which light from a star gathered in a telescope is translated into an electrical current by means of a photocell. This electrical current can be amplified and measured, giving an accurate measurement of the light received.

Astronomers call AR Lacertae an eclipsing variable, that is, a double star system in which the two components are constantly eclipsing each other when observed from the earth. One star is of the same type as the sun and about twice the sun's size. The other is a cooler star about three times the size of the sun. The two stars are about two million miles apart, 160 million light years from the earth, and revolve so rapidly about each other that the larger one totally

eclipses the smaller star once every two days.

During these total eclipses, Dr. Kron measured the amount of light received from the larger star. When the two stars were entirely separated, Dr. Kron measured the total light received from both stars. The amount of light received normally from the smaller star alone was determined by subtraction.

The astronomer noted a light variation for the whole system of about 10%. Having determined that there was no variation in the light received from the larger star when it was totally eclipsing the smaller one, he deduced that the variation must originate only from the small star. Eventually, he found the light variation in the smaller star to be about 20%.

Studies of these variations during five years of research, 1938 through 1940, and 1945 and 1946, showed that they must be caused by the appearance and disappearance of large bright and dark patches on the surface of the smaller star.

The patches form and dissolve, appear and disappear around the edge, and are eclipsed by the larger star, Dr. Kron said.

His evidence so far will not support the idea that these are “star spots” similar to sunspots. He said, however, that some similar phenomena may be operating on “suns” beyond the solar system, and that this might be such an instance.

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ENGINEERING

Sandwich-Panel Houses

► SANDWICH-PANEL construction may soon enter the home-building field. An experimental three-room unit, just erected at Madison, Wis. by the U.S. Forest Products Laboratory, is designed to test the value of this type of factory-built material in housing.

Sandwich panels, first used in aircraft, are made of two thin sheets of wood or metal with a thick layer of light insulating material between, the whole being firmly bonded together with a

special glue. The inner layer, called the core, may be a light wood such as balsa, or it may be paper or even metal.

The favorite type is the honeycomb sandwich. In this the paper or other material in the core is shaped by special machinery to resemble the honeycomb formed by bees. This construction gives special strength and, because of the enclosed air spaces, provides heat insulation. One type of honeycomb construction uses very thin aluminum in the

core. This gives additional strength.

The covering sheets attached to the core may be thin metal, plywood, veneer or some other sheet material. Aluminum is successfully used. With modern glues, these covers can be bonded on so firmly that the glue joint may be stronger than the cover.

A special feature of sandwich construction is its strength. The panels, which may vary in thickness from a fraction of an inch to many inches, are stiff as well as strong, and can be used in a small house without supporting frame. Floors, partitions and ceilings may also be sandwich panels. Houses of sandwich-panel sidewalls will be warm if the proper types of panelling are selected.

The building erected by the government agency is frameless. Panels are held together by temporary joints so that different types of panelling can be substituted for tests. The house rests on a concrete foundation. In one room, without basement, the sandwich floor panels contain copper piping in the core for hot water heating by what is known as radiant heat. In another room, a wood floor is laid on sleepers over a concrete floor in which radiant heating piping is embedded.

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METALLURGY

Coat Nickel and Cobalt on Metal Without Electricity

► NICKEL and cobalt have been successfully plated on metal surfaces without the use of an electric current by a new process developed by the National Bureau of Standards.

The action is brought about by chemical reduction of a nickel or cobalt salt with hypophosphite in hot solution. The reaction is catalytic. No plating takes place unless certain metals, such as steel or nickel, are introduced into the bath. The reduction then occurs only on the surface of the immersed metal with the production of an adherent coating of about 95% purity.

These coatings are of good quality, sound though brittle, and are usually bright. As they can be made as hard as tool steel, the method may be useful where hard, wear-resistant surfaces are required. The process is particularly applicable to the plating of irregular surfaces.

The development is the work of Abner Brenner and Miss Grace E. Riddell of the Bureau's staff.

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