

ASTRONOMY

# Star Eclipse Reveals Iron, Nickel and Aluminum

## Heavenly Twins, the Binary Zeta Aurigae, Provide Opportunity Thrice Each Eight Years for Observation

**C**ELESTIAL twins, a pair of giant suns revolving round and round each other millions upon millions of miles out in space, are revealing to astronomers secrets of star composition never before known for any other stellar object in the whole universe outside of our own sun.

How scientists found that these distant stars contain such common elements as aluminum, iron, nickel and hydrogen was disclosed to the astronomical section of the American Association for the Advancement of Science.

The celestial twins are the two stars which make up the binary star known as Zeta Aurigae to the astronomers.

One of the two stars in Zeta Aurigae is some 25,000 times as large as the other. As the smaller one passes behind the larger and its light is cut off in the stellar eclipse, astronomers have conditions of observation rivalling the almost ideal one which they might set up in a laboratory if they could.

The perfection of eclipse conditions on Zeta Aurigae makes possible the observations demonstrating what kind of atoms create the light in the outer gaseous layers of the dual star which extend out into space for thousands of miles.

As in the case of a total solar eclipse, the occasion of a stellar eclipse is the only time it is possible to analyze this outer shell starlight.

In three papers by Drs. W. H. Christie and O. C. Wilson of Mt. Wilson Observatory; Dr. P. T. Oosterhoff, also of Mt. Wilson; and Dr. Frank C. Jordan of Allegheny Observatory, the new discoveries about Zeta Aurigae were disclosed.

An analysis of the outer vaporous chromosphere starlight shows that atoms of iron, nickel, titanium and aluminum are present. Light hydrogen gas was also found, plus atoms of calcium and titanium in an ionized state, wherein a charge of electricity—an electron—had been stripped from them.

The year 1934 has been an especially

fortunate one for observing the eclipses of Zeta Aurigae, for only three times in eight years do eclipses occur.

"At these times," explained Drs. Christie and Wilson, "the small hot star is passing behind the extended, tenuous atmosphere of the large one. As a result the spectrum of the smaller star shows the absorption lines due to the atoms composing these portions of the atmosphere of the larger one lying in the line of sight." By analyzing these spectral lines astronomers are able not only to tell what kind of atoms are to be found in the outer layers of the big star but have indications about the heights at which the various kinds of atoms may be found.

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GENETICS-ASTRONOMY

## Genes' Exact Locations Demonstrated to Public

**F**OR the first time, the public were given an opportunity to see the exact locations of genes, the submicro-

scopic units that determine the course of heredity, when the annual exhibit of the Carnegie Institution of Washington opened.

Powerful microscopes carried slides mounting specially prepared cells showing recently discovered detailed structures in their chromosomes. The positions of the genes are correlated with these band-like markings. Enlarged diagrammatic charts show the positions of certain known genes, and tell the particular influence of each. Finally, a collection of "yeast flies," the tiny insects used in the experiments, show the particular heredity effects that follow the loss or displacement of some particular gene.

The exhibit was under the supervision of Dr. Thomas Hunt Morgan, research associate of the Carnegie Institution, who recently was awarded a Nobel Prize for his widely known pioneer work in the study of heredity. With him, and directly in charge of the exhibit, were two Carnegie Institution staff members, Drs. C. B. Bridges and M. Demerec, who have done much research on the newer developments demonstrated.

The sun's forty nearest neighbor stars, all within a comfortably close radius of sixteen light years, were also on display in model form. The model consists of vari-colored little globes suspended in their relative positions in space. Their distances apart are determined to scale, their relative brightnesses are indicated by their respective sizes, and the colors of the stars, blue,



**OUR NEIGHBOR STARS**

*Dr. W. S. Adams, director of Mt. Wilson Observatory, inspecting the model of the sun's nearest neighbors at the Carnegie Institution's exhibit.*

yellow and red, are shown by the colors of the globes.

The model is most decidedly a packing of much into little. The box in which the display is housed is only about three feet on a side. The assemblage of stars within it occupies a sphere of space with a radius of sixteen light years of the sun. A light year is the distance traversed by a beam of light in one year—and light travels at the velocity of approximately 186,000 miles a second. Calculations show that in this group of forty, there is only one star per 440 cubic light years, and that the average distance between the stars is seven and one-half light years.

Space may be more populous with stars than that, however, since there may be a number that have not yet been

observed because of their small size or faintness; and there may also be a number of stars within it whose faint light at present deceives astronomers into thinking they are outside the boundary.

This model was one of the exhibits of the Mount Wilson Observatory, where for many years a program of measuring stellar distances has been in progress.

See Front Cover

Among the exhibits of Mayan pottery from Guatemala was the little figurine shown on the front cover of this week's SCIENCE NEWS LETTER. This figure has the interesting device of a slit in the back of the head letting the light show through the eyes. As you walk past the figure, this spot of light appears to move, thus giving the effect of moving eyes following you.

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The linking of intellect and emotion is insisted upon by the new thinking. Study of reason or thought independently of emotion is declared just as objectionable as the separation of space and time or mind and body.

It is reported that the Korzybski system has produced encouraging results when used to treat certain types of insanity based upon false identifications or delusions.

Science News Letter, January 12, 1935

#### OCEANOGRAPHY

### New Current Meter Allows Prediction of Huge Waves

**A** RECORDING current meter, which will keep a complete record of intensity and direction of ocean currents, and by which scientists hope to be able to forecast destructive waves, has been devised by Dr. George F. McEwen, professor of physical and dynamical oceanography at the Scripps Institution of Oceanography, La Jolla, Calif.

No instrument now in use keeps a time record of current changes, Dr. McEwen stated, in explaining his new machine, now in its experimental stage on the pier at the Institution.

The device, which operates on the principle of a pendulum, consists of a perforated sphere set on gimbals free to move in two directions. The extent of the movement is recorded on a revolving waxed cylinder.

"From the movement thus recorded along two lines at right angles to each other we can easily compute the resultant line, which gives us direction and intensity of the current," Dr. McEwen said.

Dr. McEwen explained that the new instrument is designed to compile data on current movements for use in studying causes of the huge waves which have rocked the coast of Southern California and on occasions caused property damage.

Attached to the apparatus, which weighs 200 pounds in all, is a magnetic needle which automatically locks after becoming settled, so that the compass direction of the currents is known.

The disk on which the record is made is rotated by another cylinder filled with oil and containing a plunger. As the oil seeps by the plunger an attached weight slowly lowers, turns the disk, and locks the compass. Dr. McEwen anticipates constructing a similar device for measuring winds and air currents.

#### PSYCHOLOGY

## New Mode of Thought Urged To Replace Aristotle

**A** DEMAND for a new mode of thinking, that junks our most fundamental laws of thought just as Einstein with relativity disarranged the old-fashioned laws of time and motion, was made to the American Association for the Advancement of Science.

As expounded by Prof. Oliver L. Reiser, University of Pittsburgh philosopher, the new non-Aristotelian method of thought blasts the idea that "a thing is what it is" or that it is identical with itself in all respects. For example, you are not the same you that existed a second ago or a year ago. An apple, or a planet, or a human being is constantly changing with time and it is therefore different second by second. Since the attacked law of identity is the most fundamental of the three traditional laws of thought in the heretofore hallowed logic of Aristotle, this new idea is upsetting.

The new mode of thinking may be more far reaching than even Einstein's ideas. It may, Prof. Reiser suggested, answer the demand for practical readjustments in the social order and it may create a revolution in the very theory of science. It may cure the insane who suffer from delusions. It may in time affect our everyday thinking. It may be the mode of thought of the man in the street.

Not easily won will be these possible revisions. Some look with skepticism upon the new ideas.

Non-Aristotelian logic, as it is called, arose out of the new discoveries in physics, the idea of evolution and mathematics. The pioneers are the Dutch mathematician, L. E. J. Brouwer, the Polish investigators Lukasiewicz and Tarski, Count Alfred Korzybski, and Prof. C. I. Lewis of Harvard. Prof. E. T. Bell, California Institute of Technology mathematician, has espoused the cause, claiming that Aristotle handcuffed human thought. Count Korzybski is its leading expositor.

"It is hoped that this new intellectual revolution," Prof. Reiser said, "will free human thinking from its limitations and remove the underlying causes of mental and social maladjustments. The next big development in the mental evolution of the race is already upon the scene and we will undoubtedly hear much of it in the years to come."

One of Count Korzybski's insistences, as explained by Prof. Reiser, is that all names of objects should be dated or numbered, such as apple number one, apple number two, much as a fond parent labels or dates the photographs of a baby. This is to avoid the fallacy of false identification.