Exploding Star an Astronomical Mystery—*Continued*

it is small compared with the lifetime of a star, and so many stars may have been novæ several times in their history.

Whether the sun has been a nova or not, or whether it will become one a year, a hundred years or even a million years hence, no astronomer can say. After a new star has burst out, it gets fainter again, and finally ends up pretty much the same as before the explosion occurred.

What is the cause of a nova? One of the first of the modern theories was that the outburst is due to the collision of two stars. All the stars are moving, and occasionally two might hit. Travelling at immense speeds, something would be bound to happen when they hit, and thus, it was said, caused the appearance of a nova. Simple as this theory might seem, it has one serious objection. The distribution of the stars in space is known, and they are so scattered that such a collision could not occur oftener than about once in a million years. And novæ happen much oftener than that.

Nova Pictoris, however, is unusual in more ways than one, and presents peculiarities never before observed in a nova. One is the doubling. Another is the multiple system of rings that has appeared. The third is the slowness of the changes. The usual nova returns pretty much to the *status quo* within a few months after the otburst, but here is nova Pictoris, three years later, and still of the seventh magnitude, far brighter than it was before it blew up. In fact, some astronomers think that possibly it may never return to the original brightness. This all indicates that something pretty serious happened to it, and different from the usual run of novae. Some astronomers have expressed the opinion that this is an actual collision. Perhaps, despite the infinitely remote chance estimated at once in 10,000,000,000 years, the thing has actually happened before the eyes of present-day man.

Another theory, that is widely accepted, takes account of the dark stuff that is scattered through the stellar system. These dark nebulæ, as they are called, are only visible when they happen to be in front of some brighter objects. Then we can see the outline of the dark stuff. Elsewhere it is probably present, though it is not visible. If a star comes along, and enters a cloud of this dark matter, the friction created will cause an outburst such as that of a nova. The alternate brightening and fading several times, as occurred in nova Pictoris, would be explained on this view as the result of the star encountering denser and rarer portions of the dark nebula.

But the latest ideas of astronomical science propose quite a different sort of origin, at least, for the typical novæ. Instead of the energy of outburst coming from outside sources, it is within the star itself, stored up in the atoms of which it is constituted. As yet physicists, and astronomers also, confess themselves in the dark as to just how this store of energy operates, but the continuous emanation of energy from radium, as it breaks up into simpler elements, gives a glimpse of the energy in the atoms.

What would cause this stored energy to be suddenly released at a given time? One suggestion is that the collision not of another star, but a small body, perhaps no larger than a meteor, might act as the trigger to set off the explosion.

Prof. Henry Norris Russell, famous Princeton astronomer, has given a picture of the way this might occur. A meteor hits the star, and travels deep into the star's interior before encountering layers dense enough to stop it. Then the energy that it had by virtue of its motion is changed to heat and a "pocket" of extremely "hot stuff" is formed. It might be millions of degrees in temperature. This great temperature might then cause further release of energy from the atomic sources, then the gases of which the star is made at that point expand so rapidly that there is a literal explosion, carrying with it the higher layers of the star. This causes an expanding shell of matter that seems to be characteristic of all novæ.

After the explosion the temperature drops back to an ordinary stellar magnitude, the pressure is relieved, and, on the whole, the star is pretty much the same as before. True, the great amount of heat suddenly liberated might travel to a set of planets surrounding the star. There might even be living creatures on the planets who would be instantly killed. But this is a trivial incident. What are a few million human beings compared to the life history of a star?

Science News-Letter, July 14, 1928

The first person to have his portrait on a coin was Alexander the Great.

New Airship Era Seen

Aeronautics

Remarkable demonstrations of the airship will be made before the end of this year, Gilbert Betancourt, airship engineer of Detroit, predicted to the aeronautic division of the American Society of Mechanical Engineers at its recent Detroit meeting.

"Two British airships and one German, all larger and better than any heretofore built, are to be completed and launched for demonstration flights all over the civilized world within the present year; and a naval contract for two American Zeppelins of great size is soon to be signed, and construction will be started before the end of the year," he said.

A real issue before the country at the present time, he said, is whether this nation shall strive for the lead in rigid-airship development and construction, or continue trailing behind the three airship-wise European nations.

"The development of the rigid airship started in Germany some thirty years ago," Mr. Betancourt said, "and as yet there is but one such craft in this country, the Los Angeles, and this was built in Germany. Great Britain, Germany and Italy are some three to five years ahead of us in airship building since the war. The reasons are obvious. As a German invention, the rigid airship was energetically developed into an efficient and safe craft which was used by the Germans during the war. England was near enough to the development of this new machine to give it serious study; but America was too far away to realize the possibilities of this form of aircraft. One good rigid airship was built in this country some five years ago; since then attempts have been made to interest the government in building more, but the people of the country at large do not know yet what the airship can do, or its possible use in our transportation system.

"No doubt, the world-wide demonstration of the three new European rigid airships will aid materially in clarifying the practical uses of airships. But it is certainly not to our credit to lag so far behind Europe in the development of airships.

"Another serious handicap is the cost of manufacturing this type of aircraft. Either Germany or England can build a rigid airship for about half as much as we can at present, because *(Turn to next page)*

No Matter

Logic

DR. VERNON KELLOGG in *Human Life As the Biologist Sees It* (Holt):

In Stanford University a number of years ago I used to walk down an avenue lined with trees—I believe they were trees—to the beautiful quadrangle of buildings, with a companion, now a distinguished professor of philosophy in an important Eastern University, who proved during our walk each morning by what was to me a verbally irrefutable logical argument that there were no trees along our way and no quadrangle before us. However, when after successfully avoiding the tree-trunks, we reached the quadrangle we entered it quite naturally and unsurprised, and went on under its arcades to take up our duties in our respective class rooms in it. We, or rather the professor of philosophy, had simply had a pleasant after-breakfast exercise in mental gymnastics. We had done our other gymnastics before breakfast.

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Study as a Student Activity

Pedagogy

MAX MASON, ex-president of the University of Chicago, in his farewell address:

The American undergraduate shows great interest and energy in his self-managed extra-curricular affairs—the so-called "student activities." Our goal will be reached, when, in this sense of the word, the intellectual work of the college becomes a "student activity." Under such conditions the undergraduate college will stimulate and be stimulated by the work in graduate teaching and research. In graduate work, and in Senior College as well, students must study subjects rather than take courses. I believe that the University of Chicago has the opportunity of abandoning the childish game of marks and grades, and emphasizing the fact that education is fundamentally self-education, and that the university may well be defined as a set of personalities, capable of inspiring curiosity in students, together with physical facilities which enable students to satisfy their own curiosity by their own effort. While appreciable improvement has been produced in the institution of honor courses, we have still far to go in the direction of stimulating students to independent interest. The more able students in the Senior College may well be allowed participation in minor capacities in research work of the Faculty. The ideal toward which it is desirable to work is that of a group of problem-solvers, united in a real fellowship of learning—a group comprised of both Faculty and students participating in the solution of problems as their abilities allow, the students inspired to obtain knowledge because of their interest in the application of knowledge and technique which they see around them.

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Scale in Architecture

Psychology-Architecture

WILLIAM ROGER GREELEY in *The Essence of Architecture* (Van Nostrand):

Great size is often impressive. There may be, in a given case, no insincerity in it. It may be proper, it may be "in style" and yet not "in scale" with the human element, or with its surroundings.

The new library in the Harvard Yard is a case in point. It is large; it needed to be. It is large because of a sincere and proper regard for the requirements of the problem. The style is accommodated to the size. Nevertheless, it is wrong in scale. It is like a grand piano in a two-room flat. The fault isn't with the piano or the flat, but with the "scale". The Harvard Yard has been established for centuries. Its choicest buildings are small in scale—almost domsetic. Its area is limited. The sudden intrusion of the great new library building is the same kind of violation of scale as the introduction of a trombone into a mandolin club. The fact that it is a perfectly good trombone doesn't help matters much, nor does the fact that it is well played. To be sure, involved in this violation of scale is a violation of propriety, also.

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New Airship Era—*Cont'd*

this craft is still a largely hand-made product, and as yet machinery production methods have not been used. Our salvation will lie in expediting the development so that we can build our ships in groups of five or more from the same design, and of the same size, in order to be able to employ mass production methods and machinery. Our only ship, the Los Angeles, already some four years old, is small for demonstration work and though it is still doing wonderfully in the skilled hands of our little airship navy, it is so constantly employed in training personnel that it cannot be sent over the country to show people the possibilities of rigid airships.

"With these obstacles, the handful of the airship-wise and the airship engineers of the country have turned to academic problems. New experiments, unsupported by full-size tests and demonstrations have given rise to the discussion of academic problems while neglecting the opportunity for concerted effort to secure support to build full-size ships for demonstration purposes."

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