

whole scientific world to promote better understanding among men was voiced by Dean Birkhoff in closing his address.

Nervous Breakdown Cause

DIFFICULT problems will not drive you crazy, even if they are completely unsolvable, provided you are not forced to find an answer. Men suffer from nervous breakdown when they are driven by circumstances to take some action but still can find no way to turn, it was concluded by Dr. Norman R. F. Maier, of the University of Michigan from research reported to the American Association.

"Pregnancy and the conflicts arising from sin contribute greatly to neurotic behavior by leaving no avenue for behavior and yet requiring that something be done," Dr. Maier said.

On the other hand, going to the electric chair, while it may produce tensions, does not produce neurosis because the individual knows just what he must do.

Dr. Maier's experiments were conducted with rats that had been taught by reward and harmless punishment to distinguish between two cards. Then, instead of being permitted a choice, the animal was shown only one of the cards and yet was forced to act by a blast of air. At sight of the "punishment" card, the rat might resist action for as long as 15 minutes before he would jump.

Neurotic symptoms resulted. The animals would tear out of the apparatus, run in circles on the floor, show intense fits, and then varying degrees of coma.

The cure for human patients, Dr. Maier indicated, seems to lie in the direction of finding a way for the patient to act.

Maze Test Clue to Learning

THREADING with a pencil a complicated maze, 60 human subjects have led to a revision in the psychologist's general theories of learning.

The experiment was described by Dr. John A. McGeoch of Wesleyan University.

When his subjects had once found the correct path that would lead them successfully through the maze, they could repeat it at will, but their individual movements in threading it might vary with each trip.

The learning, Dr. McGeoch concludes, was not of a stereotyped set of movements. Instead, the student learned how

to cover a general route and reach a certain goal.

A similar situation perhaps exists when you go into a strange town and learn the location of the post office. You may then be able to reach it by traveling any of a number of streets.

Psychologists, in their thinking about learning, Dr. McGeoch indicated, must

take into consideration a factor which is in the nature of a "set", or readiness, to go in a certain direction at a certain point in the activity regardless of the specific acts along the way.

"We know little of its specific character," he said, "but as a useful construct it seems to be required."

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ASTRONOMY—PHYSICS

Nova Star Splits Into Three; May Be Creation of New World

Two Parts Are On Their Way Rushing Out Into Interstellar Space; Observed in South Africa

THROUGH telescopes in Java and in South Africa astronomers are now watching a giant stellar explosion which may be producing new worlds.

This exploding star, known as Nova Pictoris to astronomers, has been split up into three sections which are flying apart at speeds of over a million miles an hour.

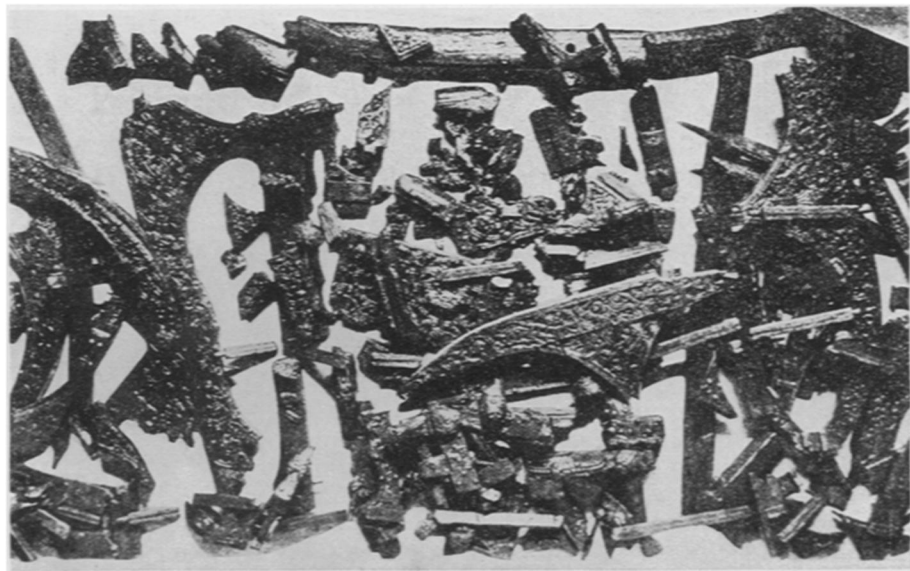
Calculations of the energies needed to bring about this stellar explosion were reported to the American Physical Society in Washington, D. C., by Dr. Ross Gunn of the U. S. Naval Research Laboratory.

Through telescopes in the southern

hemisphere Nova Pictoris looks like three tiny pin-points of light close together. The largest of the three parts has a mass 86 per cent. of that of the sun and the two smaller parts have masses 34 and 30 per cent. respectively of the sun's mass.

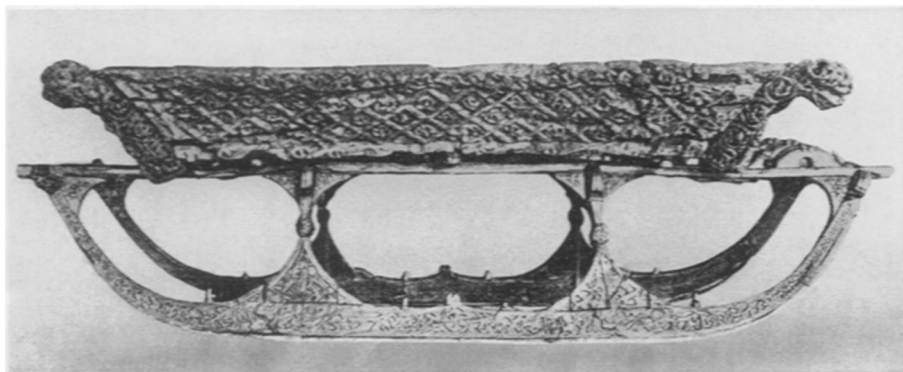
At last measurement the small parts were about three light years away from the larger part and moving rapidly to still greater distances. A light year is the distance light travelling at 186,000 miles a second will travel in a year. In distance a light year amounts to 6,580,000,000,000 miles.

The speed of recession of the small



ARCHAEOLOGICAL JIGSAW

In the grave of Queen Aase at Oseberg, Norway, were found 1,068 pieces like these. Prof. A. W. Brogger tells how University of Oslo scientists dug the pieces out from where they had been since 850 A.D. and boiled each scrap in alum and lacquered them with linseed oil to prevent shrinkage.



SUCCESS

When the archaeologists had painstakingly put together all the fragments shown on the facing page, they had this Viking sleigh.

parts from the parent is about 540 kilometers a second or well over a million miles an hour.

Such speeds, Dr. Gunn points out, are over 300 times the needed critical velocity to enable the receding parts to fly out from the gravitational field off into space. The two parts of Nova Pictoris, therefore, are on their way out into the depths of interstellar space and eventually will be lost from the larger part.

This situation is comparable to Dr. Gunn's hypothesis of the origin of our own solar system. He believes that in Nova Pictoris even now very small pieces may be thrown off from the original masses and become planets.

Dr. Gunn has suggested that the splitting of some large star created our sun, the planets and at least one additional, but now missing, star which originally was part of the sun's parent.

As the sun's original parent star split up, its two huge parts started whirling around one another and, at the same time, started to separate. Due to mutual gravitational forces the two parts created enormous tidal waves on each other. These waves tossed off what might be called "spray" that flew off into space and eventually became the planets when the pieces cooled.

Nova Pictoris, Dr. Gunn states, has the luminosity of the usual nova type star. While it is far brighter than most common stars its brilliance is still far less than the so-called "super" nova stars.

Yet mere brightness of a nova star is not the sole criterion of the energy which is liberated in the explosion that called it into being, maintains Dr. Gunn.

Nova Pictoris, in fact, furnished an excellent example of a star that liberated an enormous amount of energy and yet did not attain super brightness. The rea-

son is that much of its liberated energy went into scattering its three great masses off into space. What was left over appeared as light.

The total energy to do all this, Dr. Gunn calculates, is just about the same order of magnitude as is the energy liberated by the so-called "super" nova stars.

All this means that the difference between a nova and a super nova star may well be only in the distribution of the liberated energy and not because some different cataclysm occurred to create super nova stars.

Dr. Gunn's report, in this respect, differs from the hypothesis of Drs. Fritz Zwicky and Walter Baade, of California Institute of Technology and Mt. Wilson Observatory, who have suggested special kinds of stellar explosions to account for super nova stars.

Cosmic Rays Discussed

COSMIC ray day at the meetings of the American Physical Society was marked by reports of studies of these piercing, baffling radiations from outer space.

1. Cosmic ray electrons entering the earth's atmosphere have energies greater than 2,000,000,000 electron volts.

2. The development of automatic apparatus to record the "showers" of atomic debris caused by cosmic rays striking materials on earth.

3. Improved apparatus for determining cosmic ray intensities high in the atmosphere during robot stratosphere balloon flights has been developed.

4. No observed difference between day and night cosmic ray intensity at high altitudes.

5. Measurements of the "life" of the heavy electron (mesotron) particles that

show they last only a few millionths of a second.

Prof. R. A. Millikan and Dr. H. V. Neher of California Institute of Technology reported the results of 10 new balloon flights almost to the top of the earth's atmosphere which give a lower limit of energy for cosmic ray electrons as 2,000,000,000 electron volts.

The automatic "shower" records were described by Dr. W. F. G. Swann and Dr. W. E. Ramsay of Bartol Research Foundation of the Franklin Institute, while National Bureau of Standards scientists Drs. L. F. Curtiss, A. V. Astin, L. L. Stockmann and B. W. Brown told of their improved recording circuits devised for studies of cosmic ray intensities at high altitudes.

In papers with Drs. S. A. Korff and M. A. Pomerantz, Dr. Thomas H. Johnson, assistant director of the Bartol Research Foundation, described high altitude attempts to find a night-day difference in cosmic ray intensity and experiments on the absorption of the mesotron particles in air and lead which indicate new estimates of the "life" of these new-found atomic particles.

Cancer-Causing Chemical

A NEW biological method of detecting the presence of the cancer-causing chemical methylcholanthrene, 100 times more sensitive than any previously known, was reported by Drs. Alexander Hollaender and Peter A. Cole of the Washington Biophysical Institute, National Institute of Health.

The new studies, under way only six months, have already been applied to study the lethal effect of methylcholanthrene on living things. The killing of yeast cells by the chemical in the presence of ultraviolet light has been accomplished. For the future lies work on experimental rats and—if continued work shows present promise—eventually on human beings.

The new method, a biological one, may supersede previous tests in detecting methylcholanthrene which have made use of the fluorescent and absorption spectrum of the chemical. By the biological method concentrations of methylcholanthrene to only one part in a billion can be detected. Fluorescent spectrum methods of detection can spot concentrations of methylcholanthrene of one part in ten million.

In their studies the National Institute of Health scientists placed colonies of yeast cells in test tubes containing physiological salt solution. To this they added