

GEOPHYSICS

Oldest Solids Discovered

► **PEA-SIZED** structures locked inside stony meteorites may well contain the oldest solid material in the solar system.

The tiny structures, known as chondrules, were formed less than 100 million years after the birth of the solar system elements, calculated as 4.7 billion years ago by Craig M. Merrihue, graduate student in physics at University of California, Berkeley.

The evidence was obtained by indirect measurement of an "extinct" element in pieces of the Bruderheim stony meteorite that fell in Alberta, Canada, in 1960.

The findings help clarify the sequence of events postulated in the "solar nebula" theory, according to which the bodies that make up the solar system were formed more than 4.5 billion years ago from a primordial cloud of gaseous elements.

Mr. Merrihue's paper, which won jointly the 1962-63 Ninninger Meteorite Award, describes work in a long-term investigation of meteoritic elements headed by Dr. John H. Reynolds, professor of physics at Berkeley.

Three years ago, Dr. Reynolds reported the first successful measurements of tiny amounts of excess xenon-129, a rare isotope of this elemental gas, in meteoritic material.

Much of the xenon isotope had formed from the radioactive decay of iodine-129 during the early period of the solar system, and this allowed the deduction of the relative amount of the "extinct" iodine present when the meteorite was formed, and the calculation of the approximate age of the iodine, and presumably of the other elements.

As a result of this work the age of the solar system elements has been calculated at 4.7 billion years and the age of the oldest types of meteorites at about 4.6 billion years.

Mr. Merrihue's recent work concerns the 100-million-year time interval between the birth of the elements in gaseous form and the beginning of their solidification.

By breaking and pulverizing the chunk, he separated a number of the pea-sized chondrules, spherical silicate structures, from the rest of the meteoritic material. He heated the chondrules and the remaining material to a very high temperature, and released the entrapped xenon and other elements.

Relative amounts of the elements were measured with a mass spectrometer, which separates atoms according to weight.

The chondrules are found to be considerably richer in xenon-129 than the surrounding meteoritic material.

Mr. Merrihue concluded that the chondrules were formed while there was a greater abundance of the decaying radioactive iodine-129, the "extinct" parent element of xenon-129, in the solar system, and therefore that the chondrules may have been the first objects to solidify.

Scientists who accept the solar nebula theory generally believe that many elements in the solar system were "born" through the occurrence of supernovae, or giant exploding stars.

• Science News Letter, 83:52 January 26, 1963

PHYSIOLOGY

Dogs Found Color-Blind

► **SOME ANIMALS** are able to distinguish colors but others are practically color-blind, Dr. Gerti Duecker, zoologist of the University of Muenster, West Germany, has determined by a series of tests.

Dr. Duecker found cats and dogs to be color-blind, although there is some evidence that some dogs have a faint sense of color. The color vision of mice, rats and rabbits is also not positive. The golden hamster and the opossum are definitely color-blind.

Horses, deer, sheep, pigs, squirrels and martens can perceive colors, but only in certain parts of the spectrum. A few species are receptive only to reds and greens.

The mongoose appears to excel in color vision, and the mink can be taught to detect yellow and blue in addition to its apparent affinity for red and green. Deer and giraffe can tell any color from gray but fail to differentiate between certain non-gray colors. The giraffe, for instance, confuses green, orange and yellow. Most monkeys and apes resemble man in their capacity to see colors, and the chimpanzee is the most versatile of all.

Dr. Duecker's experiments consisted of variations of the standard method of train-

ing animals to look for food under the lid of an easily-opened box of a certain color.

To be sure that the animals were not guided by smell or the position of the containers, all the test boxes were stocked with food and their position was changed in relationship to each other after the animals had undergone an initial period of training.

The most difficult part of the experiments was to ensure that the animals were not guided to a box merely by the degrees of brightness or intensity of the color on the lid.

That possibility was countered by placing the "positive" box, the one of the color under investigation, between others of different degrees of brightness. Gray, for instance, was prepared in several degrees of intensity. To qualify as a distinguisher of colors, an animal had to show that it could choose between boxes painted with different pigments.

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A *fuel cell* converts chemical energy directly into electrical energy, while in conventional powerplants, chemical energy is converted into heat, mechanical power and then into electricity.

Questions

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SCIENCE NEWS LETTER

VOL. 83 JANUARY 26, 1963 NO. 4

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., North 7-2255. Cable Address: SCIENSERVC.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; ten or more copies in one package to one address, 7/2 cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage. Change of address: Three weeks notice is required. Please state exactly how magazine is addressed. Include postal zone number.

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Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U.S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member of Audit Bureau of Circulation.



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