

Universe Dying Unless Matter Created

Astronomy

Creation of matter in some outlying part of the universe, by some process of which we have no inkling, is necessary or else the universe will return to the condition described in Genesis, "without form, and void."

This is the opinion of Dr. Walter S. Adams, director of the Mt. Wilson Observatory of the Carnegie Institution of Washington.

It is based on modern conceptions of the source of energy in stars, which suppose that their matter is being transformed to energy. Eventually, unless some such process exists, all the matter in the universe would be transformed.

Ordinary sources of energy are entirely inadequate for the stars, said Dr. Adams. Transmutation of elements, in which the electrons and nuclei of the atoms are redistributed into forms involving less energy, is one possible method.

"If, in this process, several atoms of the simplest of all elements, hydrogen, were to be combined to form one atom of a more complex ele-

ment, about 0.008 of the mass of each atom would be lost in the change and would be released in the form of energy," said Dr. Adams.

"For example, were a pound of hydrogen transformed into helium, an atom which is made up of four hydrogen atoms, the result would be 0.992 pound of helium and 0.008 pound of energy. This last figure sounds very small, but 0.008 pound of energy is rather more than 430 billion horse-power a second.

"So if we can think of the sun as originally a mass of hydrogen gas which has gradually been transformed into the various elements that we now find within it, the energy released in the process would keep the sun shining for about 10 billion years. The time-scale provided for in this way seems to be ample even for the vast periods required by cosmological history.

"A second conceivable way by which energy is supplied in the stars is that which would take place if matter were being annihilated. If

instead of concluding that a part of the atomic energy is released by the transmutation of elements, we assume that all of it may be made available by the complete annihilation of matter, our supply of energy would become very much greater.

"In this case our pound of hydrogen would give us a pound of energy instead of 0.008 pound, and our total supply would be multiplied by a factor of 125. Our sun, on this hypothesis, would be radiating away its mass at the rate of 120 thousand billion tons a year and the material now contained in it would be sufficient to maintain the present rate for about 15 thousand billion years longer. At the end of that time, however, no mass would be left.

"One final consideration of profound interest is that of the possible reversibility of the process of radiation. If matter can be annihilated to produce energy, can energy recombine, as it were, to form matter?

"Of the energy poured out by the sun less than one (*Turn to next page*)

Aztec Treasures From Mexican Pyramid

Anthropology

By EMMA REH STEVENSON

Earthenware pots containing charred human bones, together with ornaments of gold, obsidian, and polished stone, and dozens of fine obsidian arrow heads and knives, have just been unearthed on the west or main side of the Aztec pyramid at Tenayuca, near Mexico City.

The pyramid proper has been completely excavated by the Mexican Direction of Archaeology and restoration has been carried as far as knowledge permits, but in clearing the platform at the foot of the west pyramid face where great double stairways ascend the structure, three additional steps were discovered leading down to a still lower level. It was in the earth at the bottom of these new stairs that the funeral pots were found.

They are three in number. The first is of plain red ware, about nine inches in height and diameter with a handle half way down on each side. The second is of the same shape and style, but has ornate black line drawings on its upper half.

The third is the most interesting

of all, for it is in the shape of a grinning pot-bellied beast sitting on its haunches, which the Indians of Tenayuca recognize as a female fox. Her cheerful grin shows all the side teeth, and from the front protude two fangs, between which hangs the tongue. There is a look of perverted glee on her face as if she were highly pleased with the funereal contents of her distended stomach. The opening of the vessel is in the top of the animal's head, which has been broken off.

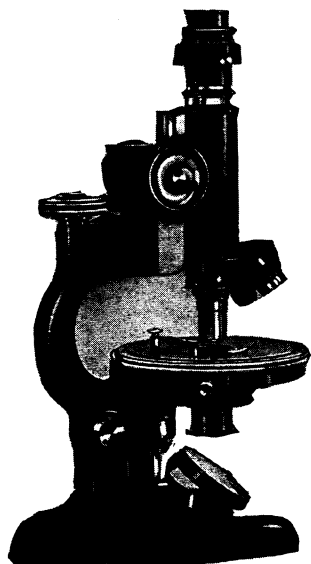
Each of the jars contains its mass of human bones, ashes, charcoal, and a variety of articles which were probably the precious possessions of the personage within during his lifetime. One of the jars contains wads of half-burned cloth, black from carbon but preserved for centuries by the surrounding ashes. Such finds of genuine pre-Columbian fabrics are rare. The material is quite finely woven of well-twisted thread, two threads being interwoven one way of the goods by a single thread the other way, making an attractive weave. The nature of the fiber is not known.

In the burned mass in the jars, nine articles of gold were found. The largest is in the form of a flat fluted shell, and another comparatively large bit is fused out of shape. There is a piece of chain made of gold-wire circlets about a quarter of an inch in diameter. Another similar length of chain has been fused by the heat of cremation. There are two earring-like ornaments of stone suspended from similar gold ringlets. There are several other metal objects, apparently copper.

Some of the ornaments, which perhaps once formed a necklace, are of polished obsidian or volcanic glass. One of these, pierced like a bead, is perfectly made in the form of a miniature pumpkin, and is beautifully polished. A small stone plaque, perforated for suspension, is grooved in the image of what is perhaps a goddess.

The dead men in the jugs were buried with a large number of obsidian arrow heads. Many of these had points as sharp as needles. There is also a good supply of obsidian knives or razors. Other treasures in the jars (*Turn to next page*)

The Chemist's Right-Hand Man



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Universe Dying?—*Cont'd*

two-hundred-millionth part is intercepted by the planets, and a quite negligible amount by the stars, while the flood of radiation from the stars themselves passes out into remote space quite unchecked except for the small quantities absorbed by the nebulae.

"Is it possible that radiation is finally reflected back from the boundaries of a limited space, or do we have in the nebulae some mechanism by which the energy released from matter can be stored up once more in the form of atoms and electrons?"

"Such considerations are purely speculative, for we know of no process of this kind. If it does exist, we can picture our physical universe as renewing itself and perpetually changing; if it does not exist and energy is finally dissipated, the end will be that pictured in the first chapter of Genesis: 'And the earth was without form, and void; and darkness was upon the face of the deep'."

Science News-Letter, April 6, 1929

A young gorilla is a more solemn animal than the frisky chimpanzee.

Rabbit farming has become an important industry in the Southwest.

Possible admission of airplanes in National Parks is being considered.

Aztec Treasures—*Cont'd*

include a half-calcined seashell, some broken pottery pieces, and a small finely made three-legged dish, covered inside and out with carefully applied drawings in black lines. The dish may have been an incense burner.

The pyramid of Tenayuca, so near Mexico City where most of the Aztec relics were very thoroughly destroyed by the Conquistadores, is an exception in its line, for it has yielded very important materials during the last two years. Today it is the most complete Aztec site known, with details of architecture and decoration that have not survived elsewhere. Excavation and restoration here have been conducted by the Mexican government, under the direction of José Reygadas Vértiz.

The pyramid is mentioned by Bernal Diaz, one of Cortes' soldiers, who described the famous serpent border for which the pyramid is now known. By being covered with earth soon after the Conquest, rare details have been preserved.

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