

PHYSICS

Physics Turns Time Backwards; Mind Again Eludes Analysis

Minus as Well as Plus Time is Logical to Physical Science, Eddington Points Out, But Ridiculous to Consciousness

SCIENCE has difficulty in determining whether the physical sign-posts in our universe point to the future or to the past.

Sir Arthur Eddington in the Messenger Lectures at Cornell University asked:

"Do you get up in the morning and shave off the night's whiskers or do the whiskers that you think you have shaved off hop back onto your face and grow back into the roots from which you think they were cut while you sleep from morning back until evening?"

Both descriptions of the events may be true and scientifically sound, Sir Arthur emphasized. It is not that science has no way of telling the difference between the two descriptions, but that it has no way of attaching more significance to one than to the other. It uses both directions in time, just as mathematics uses plus or minus quantities, without considering that from a common sense point of view, such a quantity as minus time is nonsensical. While we are used to imaginary numbers in mathematics, expressed as the square root of minus one, which have no place in the ordinary scheme of digits, the use of minus time in physics, which is analogous, is shocking for man has depended for centuries upon physics to give him an account of the world about him.

The explanation is due to the position modern physicists have taken that matter, or the external world viewed by the mind, is somehow of the same stuff or quality as the mind itself, that it is an extension of the mind or of an entity similar to the mind.

The one thing known about the mind is that it goes forward not backward, that is, that it is evolving not devolving. Thus it is difficult for both the scientist and the common man to grasp that the external world of modern science shows no evidence of the state of evolution as opposed to devolution.

The evidence upon which science bases its distinction between "going forward" and "going backward" rests upon what is known as the second law

of thermodynamics concerning entropy or the increase of the random element in the universe. The law states that entropy always acts in "plus time," that is, in time going in the only direction in which common sense says it goes.

Thus in two isolated events the one which has the greater amount of the random element is the later in time. We must imagine that the action of the universe is somewhat like a pack of cards being constantly shuffled. As the shuffling goes on the cards become more and more mixed, less and less organized in suits and sequences. Thus it is with atoms. In other words "the random element" is continually increasing, never decreasing.

Thus, in "plus time" we come to one end of the world. For a time comes at last when no matter how much longer the cards are shuffled "the random element" can increase no more, as everything is completely random. This entropy, or the increase of the random element, results in increasing radiation of energy or heat in the universe, so that scientists sometimes speak of this end of the world as the (Turn Page)

GEOLOGY

Layers Found in Asphalt May Describe Prehistoric Weather

SEARCHING for the bones of extinct animals that ages ago had become bogged down in asphalt deposits at McKittrick, Calif., V. L. VanderHoof came upon something that may be useful in forming an estimate of the kind of weather that was "unusual" on the Coast in those remote times. He found a succession of layers in the asphalt, which are comparable in a way to the annual growth-rings in trees, and may have been due to the same causes.

The yearly bands, he told members of the Geological Society of America, represent a yearly recurrence of physi-



BOULDER DAM AT NIGHT

The world's greatest dam is now rising during every hour of the twenty-four, as this striking night view of construction attests. The photograph was taken by Dr. Morton Mott-Smith of Hollywood, Calif. According to latest reports, more than 1,543,000 cubic yards of concrete had been placed in the dam by March 31 bringing the structure to a height of about 330 feet. A new record for concrete pouring was set on March 20 when 10,462 cubic yards went into the dam and auxiliary structures. The hardening concrete is being cooled by pre-cooled and refrigerated water. More men are working on the project than ever before, nearly 5,000 being employed. According to present progress, the pouring of mass concrete for the main dam will be finished by May 1935, and the \$49,000,000 contract of the Six Companies will be completed in May 1937.

cal conditions which are influenced by climate. Winter cold increases the viscosity of the tar so that it solidifies, while high summer temperatures render it fluid and able to flow down slope. Winter rains cause enough sheet wash to blanket with dirt the previous summer flow, thus sharply marking off one year's layer from another.

Mr. VanderHoof has measured and plotted a series of 180 of these bands, and efforts are now being made to correlate the resulting curves with similar curves resulting from studies of tree rings and of varves.

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