

Heavy water is made up of combinations of the heavy hydrogen and the heavy oxygen with the common lighter constituents. In a given sample of heavy water the amount of increased weight due to the strange hydrogen and the amount due to the heavy oxygen has never been known previously.

Prof. Lewis took a sample of water from a still that concentrated heavy water and weighed it. He found that its density was 0.000182 in excess of light water. He saturated it with ammonia when the water was at 0 degrees Centigrade and then pumped off the ammonia when the water was at room temperature. By repeating this process he was able to remove 99 per cent. of the heavy-weight hydrogen. The remaining heavy water now had an excess density of 0.000085, so that the heaviness of the original sample was due to 0.000097 of heavy-weight hydrogen.

He then started again with another sample of the same heavy water and treated it with sulfur dioxide to remove the isotope of oxygen of mass 18. His measurements showed that of the original excess density at least 0.000073 was due to this oxygen.

Adding up the figures for hydrogen and oxygen Prof. Lewis accounted for 0.000170 of the original 0.000182. He states that an improvement of this simple experiment will provide an exact method for the analysis of water containing isotopes of both elements.

Science News Letter, September 2, 1933

BOTANY

Urn Pattern Existed Long Before Urns Were Made

See Front Cover

URNS, whether for flowers or for funeral ashes, have always had much the same pattern; so much so, that the shape immediately and automatically evokes the name. But that shape existed on the earth long before the earliest neolithic potter smoothed out the walls of the first urn with skillful, muddy fingers. Numerous species of plants, and of animals of the lower orders as well, found that it met the problems of their existence admirably. Here, for example, is a kind of puff-ball that has been making perfect little urns for nobody knows how many millennia, as caught by the lens of Cornelia Clarke's magnifying camera. And here as elsewhere, the shape evoked the name; for the botanist who christened the genus called it *Urnia*.

Science News Letter, September 2, 1933

PHILOSOPHY

Bishop and Scientist Writes on Scientific Theory and Religion

IT IS SELDOM that bishop and scientist are combined in one mind and body. Peculiar interest therefore attaches to the voluminous book *Scientific Theory and Religion*, written by Dr. Ernest William Barnes, the Bishop of Birmingham, (published by Macmillan). Dr. Barnes is a Sc.D. (Cambridge) and he is a Fellow of the Royal Society of London. As Bishop of Birmingham he is, of course, a leader in the Church of England.

The book is an elaboration of twenty lectures delivered at the University of Aberdeen, and they range over all details of space and time, matter and stars, life and evolution, man and mind.

Dr. Barnes' lucid and comprehensive summaries of the present state of knowledge in physics, astronomy and biology are convenient and useful but not controversial in the same sense that his religio-scientific discussions may be.

Clear Beginning and End

For instance, how did the universe originate? The law of entropy, Dr. Barnes points out, points clearly alike to a beginning and to an end of those processes of material change which make life possible.

"Must we then postulate Divine intervention?" Dr. Barnes writes. "Are we to bring in God to create the first current in Laplace's nebula or to let off the cosmic fire-work of Lemaitre's imagination? I confess to an unwillingness to bring God in this way upon the scene.

The circumstances which thus seem to demand His presence are too remote and obscure to afford me any true satisfaction. Men have thought to find God at the special creator of their own species, or active when mind or life first appeared on the earth. They have made him God of the gaps in human knowledge. To me the God of the trigger is as little satisfying as the God of the gaps. It is because throughout the physical Universe I find thought and plan and power that behind it I see God as creator."

Gloomy on Future

As to man's future on earth, Dr. Barnes takes the gloomy viewpoint. When we reflect upon the evolutionary history of animals upon the earth we cannot, because we are human, easily refuse to regard man as the crown and final end of the process, Dr. Barnes writes. Yet he regards man, like the cereals and the orchids, as an episode in evolution. The supreme species today will have become extinct fifty million years hence, just as the horses that multiplied and developed forty million years ago in North America have become extinct on this continent. But Dr. Barnes believes that absolute values are never destroyed and that therefore those which humanity carries must be preserved elsewhere than on this globe.

In discussing the modernist-traditionalist controversy on the virgin birth of Jesus Christ, Dr. Barnes says, "I

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