

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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have, personally, little doubt that biological research will in due course prove a human virgin birth to be possible. Probably the individual so produced would be haploid, with but half the normal number of chromosomes, and the chances are that its sex would be male. But whether haploid or normal, male or female, it would vary little from the normal mental and emotional make-up of the human race."

If the story of the virgin birth of Jesus of Nazareth be rejected, Dr. Barnes suggests that the moral ascendancy and religious genius which are undoubtedly His might be held to result from a dominant mutation.

If all mutations, which are spontaneous changes within the germ cell, are to be regarded as manifestations of the creative activity of God, Dr. Barnes argues, the spiritual excellence of Jesus would then be from God.

Appeal of Immortality

Immortality appeals to Dr. Barnes. He writes.

"I have realized how vast is our ignorance of the world in which we find ourselves and to which we belong. Can it be, I am compelled to ask, that with such a feeling of ignorance I shall pass to a realm where knowledge is not, because consciousness has ceased? Must we allow that the desire to understand God's works and ways, which is one of the strongest and purest of human passions, is a vain and hopeless by-product of man's search for material comfort? Do we but rise for a moment above the waters of unconsciousness and, after a brief glance around, sink again to eternal oblivion? If such is indeed our fate, then surely the mystery of human life is unfathomable; unreason must sit enthroned above meaningless change."

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Among the most primitive animals living today, science names that egg-laying mammal, the duckbill, and pouched mammals such as the kangaroo and opossum.



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ENGINEERING

More Luxury and Comfort Visioned in Future Automobile

Engineer and Psychologist Discuss Coming Developments Before Meeting of Society of Automotive Engineers

THE AUTOMOBILE of the future that the consumer will demand and get was visualized by William B. Stout, president of the Stout Engineering Laboratories, before the Society of Automotive Engineers in Chicago recently.

A vehicle complete in itself, somewhere between the touring car and the most luxurious trailer and having more space available for passengers and baggage than ever before, was Mr. Stout's vision of the future automobile. He expressed the opinion that individual unit transportation by means of automobiles would be the method of travelling in the future and that the new cars must adapt themselves more and more to longer trip requirements.

Mr. Stout Looks Into Future

Many points in the design of future cars were outlined. Light weight would be a fundamental starting point. Shimmy of the front wheels and the periodic hammering on concrete roads would be eliminated by having individual springs for each wheel. From safety considerations, Mr. Stout argued that the driver's vision must be one of the first things to be improved. The long engine hood that makes it impossible to see around corners is a dangerous element of present-day car design. The corner posts, both back and front, are the cause of many accidents.

The controls of the future car must follow the present trend of easier and easier handling. Perfect brakes are demanded by the drivers. But the demand for smoothness that has led to the development of the doughnut tire has brought difficulties in the ease of handling. The future will see a solution of this difficulty, Mr. Stout prophesied.

One Universal Change

The one change that is going to be universal in all types of cars is that of decreasing weight and so improving performance and riding qualities. Mr. Stout predicted that within five years we will see motor cars without gear

shifts that will be able to climb our steepest highways in high gear without any effort at all.

Health considerations will also govern the future design of automobiles was the opinion expressed by Dr. F. A. Moss of George Washington University. Air conditioning, eye strain and posture were the three points stressed by Dr. Moss. Improvements along these lines will lead to radical changes in the automobile of the future and will repay the company that initiates these advances.

Dr. Moss proposed that rats should be used to test out the air conditions in new ventilating schemes for cars. By hanging cages of rats at various points within test cars it would be possible to measure the amount of carbon monoxide and the injurious drafts present in new designs. Control of the temperature and humidity within a closed car would do much to improve the health of the occupants.

Eye Fatigue Dangerous

Statistics show that accidents are more likely to occur after a long trip and Dr. Moss stated that this can be attributed to eye strain. Tests with various types and makes of cars showed that there was a decided decrease in visual acuity with prolonged driving, particularly after the first 400 miles. Tests of this type will lead the automobile manufacturer to develop cars that create the least possible eye fatigue.

Bodily posture governed by seat design is an important factor in the health and safety of the driver. Dr. Moss stated that no researches had been published on these points and was of the opinion that they would be well worth investigating. He also suggested that some attention should be paid to hard cushions versus soft ones and of cloth versus leather upholstery.

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Apricots, which are richer in vitamin A than any other fruit, lose more than half this food factor when dried.