

ASTRONOMY

Universe's Outposts May Be Forever Beyond Reach of Man

Famous Astronomer Believes That Even Larger Telescopes Will Not be Able to See Beyond a Definite Distance

"THE largest part of the universe is forever out of our reach." This is the opinion of the Abbé G. Lemaitre, famous Belgian astronomer, whose ideas of an expanding universe have been one of the recent sensations of astronomy.

In a report to the Royal Astronomical Society, of London, his first paper on the subject to be published in English, he makes this statement, which indicates that even if telescopes are made many times larger than any in existence or projected at present, they would not see beyond a definite limit, even though there might be plenty of stars and nebulae beyond.

Our present-day telescopes are not very far from this limit. The 100-inch reflector at Mt. Wilson, largest in the world, can detect objects as far away as 50,000,000 parsecs, the parsec being the astronomer's unit of distance, and equal to 18 million million miles. About seventeen times this distance is the limit beyond which we cannot see, according to the Abbé.

The reason for the invisibility of very distant objects is that all their visible light is increased to wavelengths so great that they cannot be detected. This shift in the wavelength of light as it is moving towards or away from the earth is well marked for the nearer objects, and is called the Doppler effect. The eye, and the photographic plate, are sensitive only to a limited band of wavelengths.

Spectrum Displaced

An object at a distance of 870,000,000 parsecs would have even its shortest waves so greatly lengthened as to make them invisible. That is, its "whole visible spectrum would be displaced into the infra-red," quoting the Belgian scientist.

It has been suggested in the past that, if our universe is curved in some higher dimension, as the earth itself is curved in three, a beam of light could travel completely around, and return to its starting point. Thus it might seem that we could see ghost images of the

nebulae, or even our own Galaxy, by light that has gone around the other way. The Abbé Lemaitre points out, however, that the great Doppler shift would make this impossible.

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PHYSICS

Radio Reflecting Layer Measured by New Method

A NEW and simpler method of measuring the height of the Kennelly-Heaviside layer of the atmosphere which reflects radio waves, has been worked out by Dr. E. V. Appleton and G. Builder, of King's College, London.

Rather complicated apparatus has been necessary for this purpose in the past. In the new method only a common triode oscillator with a large grid leak is used. This produces the intermittent pulses of radio waves necessary for this work.

The sending and arrival of the pulse were recorded photographically on a

PSYCHOLOGY

Children Know Lindbergh and Andy Gump; but Not Hoover

A HOT political campaign may get grown-ups terribly excited, but it leaves no impression on children of kindergarten age. When the question "Who is Herbert Hoover?" was put to 100 youngsters between five and six years old, not one could answer. Only one knew who Al Smith is. Yet 87 knew what Lindbergh did and Andy Gump was familiar to 74.

These questions were asked in the course of an investigation conducted by Cathryn A. Probst, at the Institute of Child Welfare of the University of Minnesota to find out how much information, and what kind, is the equipment



ABBE G. LEMAITRE

Whose ideas of an expanding universe have set the astronomical world agog. The Belgian cleric says that the wave lengths of very distant light become too great to be detected, and that the great Doppler shift makes impossible the passage of a light wave around the universe.

high-speed oscillograph which was placed at a distance of three miles from the transmitting station. On the record the direct impulses and those which had traveled 70 miles up in the air and back again were clearly recorded.

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of the child when he enters the first grade of the public school. The results of her study are published in the current issue of *Child Development*.

Despite the rarity of the horse, every one of the children knew that this animal has four legs. The only other questions which no one missed were "What do we use to cut cloth?" "What do you use to cut meat?" and "What do you use a saw for?" Among the other easy questions were those dealing with the seasons of the year, the functions of the dentist and barber, the colors of the flag, and a few of the simplest natural history questions. (Please Turn Page.)