RADIO ASTRONOMY

Universe Expansion Rate

Radio astronomers may measure the speed of the expanding universe from the red shift of objects moving so fast their spectrum lines are not in the visible range.

➤ HOW FAST the universe is expanding may be answered by radio astronomers tuned in on the cosmic "noise" reaching earth from outer space.

Radio waves may be the only means by which the extremely high velocities of the ever-expanding, very far distant galaxies can be measured.

Astronomers find the rate at which the universe is expanding from the displacement in certain lines of the fanned-out light of receding galaxies. Just as the sound from a train whistle or an automobile horn is lower in pitch as the vehicle moves away from an observer, so the frequency of light waves shifts toward the red, or lower, end of the spectrum as the object emitting them recedes.

By measuring the amount of this shift, astronomers can tell how fast stars, nebulae or galaxies are dashing away from the earth.

So far as astronomers can now probe the outer reaches of space, they have found that the farther away the nebula, the faster it seems to be receding from us, as measured by the red shift. Velocities of 45,000 miles a second, or about one-fifth that of light, which travels 186,000 miles per second, have been found using the giant, far-seeing 200-inch telescope on Mount Palomar.

Light from some of the most distant extra-galactic nebulae may have such a large shift that it would no longer fall in the visible range. It is such large shifts that astronomers hope to measure in the radio region.

No radio observations of receding galaxies are yet being made, however. The field of radio astronomy is so new that scientists are just learning to spot the various sources of radio noise. These include the moon, sun, meteors, hydrogen in interstellar space, and other sources both within and outside of our Milky Way galaxy.

Separation of these various sources from each other and from background radiation will be necessary in order to tell which radio waves are coming from the far distant extra-galactic nebulae. To do so will involve a refinement both of present apparatus and techniques.

From the estimated distances of the receding galaxies and the speeds at which they are moving, astronomers believe that at some time in the past, all nebulae were quite close together. From then until now, the time required to give the present expansion is about 4,000,000,000 years. This is roughly equal to the known age of the earth, now believed to be about 3,500,000,000 years.

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ZOOLOGY

Streamline Animal Naming

➤ THERE ARE new rules for name-calling among zoologists. These rules, the result of decisions at the International Congress of Zoology in Copenhagen, are designed to end confusion in the zoological literature through international agreement on the naming of certain animals.

Dr. J. Chester Bradley, president of the International Commission on Nomenclature and professor emeritus of entomology at Cornell University, has accepted the job of putting the new rules into workable order. His job will also be to streamline the old 1904 international code on zoological names with the Copenhagen rules. The new set of rules may be published in final form in about three years.

Dr. Richard Blackwelder, entomologist of the U. S. National Museum, who was a member of the U. S. delegation, explained that for a half a century there has been scientific dissension among zoologists over correct names for certain animals.

These controversies over the years finally built up the triple-barreled problem of seeing that:

1. Every kind of animal has a distinctive scientific name.
2. Each kind be known everywhere by the same name.
3. Scientific names not be changed unnecessarily.

Problems arose under the old system of naming. They will be reduced in number under the new system.

Here is an example:

There was a time when everybody agreed that the correct scientific name for the European commercial shrimp was *Crangon* and that for the snapping shrimp *Alphaeus*. Then someone found out that a hundred years or more back the name *"Crangon"* had actually been given to the snapping shrimp. Under the old rules, priority would determine the correct name.

The Americans therefore felt the name *Crangon* should apply to the snappers and gave the name *Crago* instead to the edible shrimps. But for the sake of convenience European scientists kept right on using *Crangon* and *Alphaeus*. Consequently, when someone used the word *Crangon*, there was a question as to what he was referring.

When the newly proposed changes go into effect, such a name for an animal may continue to be used even if an earlier name is dug up from the records. Thus, no Crangon-Alphaeus-Crago bewilderments will occur.

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MEDICINE

Doctors Told to Learn About Folk Cures

➤ MODERN DOCTORS should know something about patent medicines and such folk cures as "stump water," Drs. Lyle Saunders and Gordon W. Hewes of the University of Colorado advise in a report to the *Journal of Medical Education* (Sept.).

Since patients may consult 50 or more sources of medical advice and treatment other than licensed practitioners, the Colorado doctors think physicians should know about these, too, so as to be prepared to protect their patients from the harmful ones and correlate the harmless ones with the best of scientific medicine.

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GENERAL SCIENCE

When Is a Calorie 1,000 Times a Calorie?

➤ WHAT IS the difference between a calorie, a calorie and a calorie?

The question is not as silly as you may think. The calorie that dieting persons watch with so much apprehension is actually 1,000 times bigger than the calorie usually talked about in industry.

Technically, the calorie is a unit of heat. The small calorie is the amount of heat required to raise a gram of water one degree Centigrade, from 15 to 16 degrees. The small calorie is also called the "gram calorie" and the "standard calorie."

The calorie also can be the amount of heat necessary to raise a kilogram, 1,000 grams, of water from the 15th to the 16th degree on the Centigrade scale. This is the large calorie, sometimes called the "great calorie" or the "kilocalorie." This is the unit that applies to foods.

The third member of the calorie family is the "mean calorie." This is one one-hundredth of the heat required to raise one gram of water from zero to 100 degrees Centigrade.

A tasty bar of chocolate may contain 500 calories. When eaten and oxidized in bodily tissues, it releases that amount of energy to be used by the body.

When a person eats so much food that his body does not need all the calories it contains, the excess is stored as fat. Dieting persons eat somewhat less food than their bodies need. This causes the body to call upon its "food" reserve and thus to take off part of that waistline.

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