

of national defense but also for the advancement of public welfare."

"The vast reservoirs of man-power now going to waste is the grievous shame of today," the editorial declared. "The disintegration of personality that attends this wastage is simply damnable.

"It is a satirical reflection on our best of possible worlds that only in times of national emergency does human ability stand out as the basic national wealth."

*Science News Letter, March 18, 1939*

#### PHYSICS

### Larger Atoms Eons Ago Allow Non-Expanding Space

**A**TOMS eons ago might have been larger than they are now. That is the latest hypothesis suggested to save science from an expanding universe.

The experimental fact that needs explaining is the famous red shift in the spectra of far distant nebulae. When astronomers with their giant telescopes view the great aggregations of stars they find that the rainbows of their light are a bit different than they would be if their light originated closer to us.

The obvious way to explain this is by the Doppler effect, that is, that the frequency of the light changes as the source rushes away, just as the pitch of a locomotive whistle or automobile horn changes as it rushes past. The greater the change, the faster the speed. In the case of the nebulae, the greater the red shift the faster the speed of recession. These speeds of recession appear to be very closely proportional to the distances of the nebulae from us.

Einstein's general theory of relativity provided a simple explanation of such a recession, but introduced some dilemmas. One of these is the time that the universe has been in existence. If the red shifts of the nebulae represent real motions of recession as relativity theory requires, then the age of the universe can hardly be more than a few thousands of millions of years. This would be decidedly embarrassing to both astronomers and geologists. For radioactivity of rocks points to an earth age of two to three thousand million years, and evidence from stellar motions seems to point to an age of millions of millions of years for the universe.

Perhaps the trouble is that constants have been inconstant. There have been several suggestions along this line; for example, the half-period of radium's life, now 2000 years, may have been

something quite different in past ages, the gravitation constant has changed as the universe aged, etc.

From Prof. S. Sambursky of the Hebrew University of Jerusalem comes the idea that the atoms of the universe have

decreased in size with time. Larger atoms emitted millions of years ago the spectra that now appear to be shifted to the red. The universe is static and we cannot judge its size.

*Science News Letter, March 18, 1939*

#### MICROBIOLOGY

## World in a Water Drop Shown at New York Fair

### Microvivarium, Which Packed 'Em in at Century of Progress, Is Expected to Repeat Success During the Coming Summer

See Front Cover

**T**HE WORLD in a water drop, magnified so that minute microbes look as big—and as lively—as jackrabbits, will be shown to visitors at the New York World's Fair in the Microvivarium, of which Dr. George Roemmert of this city is inventor and exhibitor. The Microvivarium will be housed in the Westinghouse building.

This instrument is a combination of microscope and projection lantern. Powerful beams of light, projected through trains of lenses, project the images of living one-celled plants and animals on screens so that the audience can see the intense dramas of their little lives plainly and on the largest scale. Dr. Roemmert will have twelve of these projectors in operation at once, so that the show will be large and varied. A Microvivarium of an earlier model was one of the outstanding successes of the Chicago Century of Progress, so that it is anticipated that thousands of people will flock daily to the larger auditorium which has been erected here.

#### Strange Mating

Among the manifold scenes of life in the usually invisible world is a display of the mating of the slipper animalcule, or paramecium, a one-celled animal that lives in stagnant fresh water. This is something that not even scientists had been able to demonstrate until recently.

Usually the paramecium reproduces by simply dividing in two, each half then swimming off and rapidly growing to full size. But in this microscopic romance two individuals swim alongside of each other for a while, exchange half-nuclei, and then go their separate ways again.

Contrasted sharply with this primitive

foreshadowing of that which makes the world go round is a swift scene of tragedy that ensues when Dr. Roemmert releases into a field where paramecia are swimming about a number of fierce little carnivorous microbes, called nose-animals because of the little beak-like projections they bear. Although they are smaller than their prey, they attack with the ferocity of tigers and quickly devour the hapless slipper animalcules.

Other tiny animals shown in the Microvivarium are shaped like tiny bells, that stand bottom side up at the end of long, slender stalks. A fine muscle-like fiber runs down through each stalk, so that when the little animal feels danger near, or just wants to for any other reason, it pulls itself down like a flash by contracting the usually straight stalk into a tight spiral like a coiled spring.

The Microvivarium is also used to show the details of the inner lives of some of the smaller many-celled animals, particularly minute worms, insect larvae, and microscopic relatives of crabs and crayfish. It shows, for example, the writhings of vinegar worms, the swallowing movements and heartbeats of a mosquito larva and the unborn young in the brood-pouch of the minute crustacean known as the water-flea.

*Science News Letter, March 18, 1939*

## ● RADIO ●

H. T. Herrick, assistant chief of the Bureau of Chemistry and Soils, U. S. Department of Agriculture, will be guest scientist on "Adventures in Science" with Watson Davis, Director, Science Service, over the coast to coast network of the Columbia Broadcasting System, Saturday, March 25, 6:15 p. m. EST, 5:15 p. m. CST, 4:15 p. m. MST, 3:15 p. m. PST. Listen in on your local station. Listen in each Saturday.