

Smith states that he has even seen these fish dislodge small lizards with these water bullets.

The range of the shooting fish's projectiles has not yet been accurately determined. Dr. Smith says that he has seen the fish make good scores at a distance of a yard, and has known of cases where the projected drops spattered against the ceilings of verandas three or four times that high. He has a number of these fish in a pond in his yard in Bangkok, on which he expects to make further observations. They are sociable fish, he says, and like the attention of human beings.

Science News Letter, March 7, 1931

CHEMISTRY—AGRICULTURE

Public Gets Benefit Of Poison Gas Patent

AN INTERNATIONAL race for a patent on a poisonous gas has been won by the U. S. Department of Agriculture, and the public will get the benefit.

Two scientists of the Department, Dr. Ruric C. Roark and Dr. Richard T. Cotton, discovered that ethylene oxide is an exceedingly effective destroyer of weevils and other insects that infest stored food products. A well-known German dye company patented the gas for use as a fumigant abroad, and applied for a patent in this country. However, the priority of the American scientists' claim was recognized by the U. S. Patent Office, and their patent has been dedicated to public use.

Science News Letter, March 7, 1931

ASTRONOMY

11,000 Miles Per Second Is New Heavenly Speed Record

Astronomers, Not Believing Nebula Really Travels That Fast, See Explanation in Einstein's Curvature of Space

ELEVEN THOUSAND miles per second is the new record "apparent" velocity reported detected in the red-dened light from a distant "island universe" viewed through the world's largest telescope at Mt. Wilson, Calif.

The faint nebula discovered to seemingly recede from earth at this tremendous speed is so far distant that light traveling six trillion miles a year would need 120 million years to reach earth.

This new research result is declared by Dr. John C. Merriam, president of the Carnegie Institution of Washington, to be "of special interest at this time because of Einstein's visit and the bearing that it will have on his conception of the universe." Dr. Walter S. Adams, director of the Carnegie Institution's Mount Wilson Observatory, reported the discovery to Dr. Merriam who announced it.

Milton L. Humason, in photographing with the great hundred-inch telescope the spectrum of the faintest nebula yet observed, discovered by a fellow astronomer, William H. Christie, learned that its spectrum lines were shifted to the red in such a way that a rushing away at eleven thousand miles a second would be necessary to produce it. This

is sixty per cent. greater than any so-called apparent velocity so far observed.

But astronomers do not actually believe that the far-distant cluster of stars is receding into space at any such tremendous velocity. They see the true explanation in the curvature of space, as postulated by Prof. Albert Einstein, now at Pasadena working with the astronomers who made the discovery. Space, he says, is curved in dimensions higher than the three familiar in everyday experience, just as a ball is curved in three dimensions. Very distant objects like the nebula just discovered give effects of great speed not because they are moving rapidly but because they are so distant that space gets a chance to produce its effects.

Science News Letter, March 7, 1931

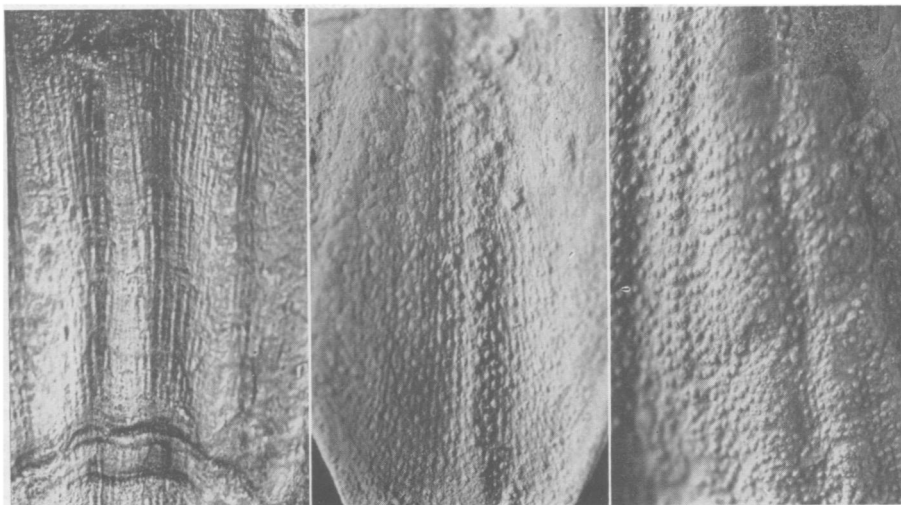
EVOLUTION

Evolution Depends on "Health Level"

THE evolution of a species is determined in considerable measure by what might be termed its general health level. The rate at which it develops new features, like the rate at which the individual grows, is largely a measure of the rate of its metabolism.

This is the theory developed in an article in *Science* by Dr. Carroll Lane Fenton of the University of Buffalo. Dr. Fenton was led to his conclusions by studies on a large series of fossil sea-shells, called brachiopods. These, by the simplicity or elaborateness of their markings, indicated at once the evolutionary status and the degree of vigor possessed by the animals that formed them.

In any series of shells, Dr. Fenton found, the animals started out with very simple and austere ideas of exterior decoration. As the millenia rolled by, the markings became more elaborate, reaching a climax indicating full vigor. Then a decline would set in, marked by the development of bizarre decoration schemes (*Turn to page 156*)



YOUTH, MATURITY, OLD AGE

Reading from left to right, three evolutionary ages of a brachiopod line, as traceable in the ornamentalations of their shells.

Health Levels of Evolution

From Page 151
and at the same time by the inability of the animals to recover from injury and repair breakages as quickly and completely as their ancestors in the palmier days of the species. After that, extinction.

Dr. Fenton states that in all his series he has found only indications of a straight-through, determinate course of evolution. There is no indication that the effects were brought about by changes in environment, and there is no sign of the operation of natural selection considered by Darwin to be necessary in bringing about evolutionary changes.

Science News Letter, February 14, 1931

Manganese was much in demand in the days of Egyptian civilization.

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ASTRONOMY

Many Sunspots Reported By Mt. Wilson Astronomers

SUNSPOTS decorate the sun in large numbers, reports to Science Service from the Mt. Wilson Observatory, Pasadena, Calif., reveal.

Thursday, Feb. 26, there were 32 spots arranged in seven groups, while the day before there were 40 spots in six groups.

Visitors to the National Academy of Sciences building in Washington were able to see many small spots spread over the image of the sun as projected within the rotunda of that building.

On the first day of February the sun was entirely free from disturbances although usually during the past few months there have been a few spots reported by the Mt. Wilson Observatory.

The sun rotates on an axis from west to east just like the earth. The gigantic and complex disturbances in the outer

layers of the sun which cause the spots therefore seem to pass across the face of the sun, sometimes reappearing some 13 days later after having travelled around on the other side.

Sunspots occur in cycles with a maximum number appearing every eleven years or so. As the last maximum occurred in 1928 or 1929, it is now about half way between a maximum and minimum. By 1934 the sun's activity should be quiescent.

The effect of sunspots upon the earth has been one of the most active questions in astronomy for many years. There seems to be good evidence that spots, or the solar conditions causing them, in some way affect radio reception, magnetic disturbances, and that sometimes they put telegraphic lines out of commission by setting up earth currents.

Some spots are very large and visible to the unaided eye when the sun is viewed through heavily smoked glass. Others are very small, the smallest detectable being about 300 miles across. Some of the largest have measured 60,000 miles across. They may last for several months or they may disappear in a few hours.

Science News Letter, March 7, 1931

ASTRONOMY

Astronomy Medal Awarded To Universe Maker

ONE of the universe makers of today, Dr. Willem de Sitter, director of the Observatory at Leiden, Holland, has been awarded the 1931 Catherine Wolfe Bruce Gold Medal of the Astronomical Society of the Pacific.

This honor is conferred for "distinguished services to astronomy." Dr. de Sitter's concept of the universe has received wide discussion among astronomers and philosophers. He conceives that space would have curvature even if it were totally devoid of matter, whereas Prof. Einstein's original theory of relativity supposed the presence of matter to be the only cause of the bending of space.

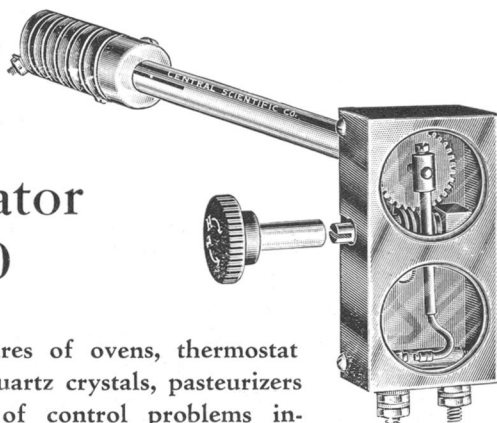
Science News Letter, March 7, 1931

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