SCIENCE NEWS

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ECLIPSES, COMETS AND EROS IN 1931

THOUGH 1931 will be more generous in the matter of eclipses than are most years, no astronomers are expected to travel to see them. Their main attention, during the early part of the year at least, will be devoted to a tiny speck of light in the sky too faint to be seen without a telescope. Several comets are due, but, as far as astronomers can tell at present, none will be visible to the unaided eye.

Five eclipses are on the 1931 program, but none will be seen from the United States. Three are of the sun, but all are partial, so the corona, and other features that appear when the moon completely covers the sun, will be absent. Therefore, astronomers will make no efforts to observe them. If they did, they would have to do some traveling, for the first, on April 18, is visible from Siberia and the North Pole. The second, on September 12, will be seen from Alaska, while the third will be seen on October 11 from the southern tip of South America and the South Pole.

The eclipses of the moon are total, that is, the moon will completely enter the shadow of the earth. The first will occur on April 2, the second on September 26. Both will be seen mainly from the Eastern Hemisphere. However, eclipses of the moon are of little scientific value, though of considerable popular interest as a spectacle.

The tiny planet Eros, probably only 15 miles in diameter, is now closer than at any time since its discovery in 1896. On January 29, Eros will be only 16,200,000 miles away. This is closer than any permanent celestial body ever comes, except the moon. The moon, on the average, is 240,000 miles from us, but the sun is about 92,900,000 miles. The close approach of Eros gives astronomers the opportunity to make accurate measures of its distance, and from these they can calculate other dimensions of the solar system, and the distances of the stars. Therefore a wide variety of observations are being made, even though the planet is too faint to be seen without a telescope.

Among the periodic comets that are expected to return to the vicinity of the earth are: Encke's, last seen in 1928; Tempel III–Swift, last seen in 1908; Neujmin's, last seen in 1913, and Schorr's, last seen in 1918. Of course, there is always the possibility that a new and unheralded comet may appear, and that it may be of extraordinary brilliance. None of these mentioned, however, are likely to become bright enough to be seen with the unaided eye.

If the promise given by the fine display of Leonid meteors, or "shooting stars," last November is realized, next November should see an even finer display about the fifteenth. If this happens, it, in turn, may forecast a still greater exhibition a year or two later, possibly rivaling the famous showers staged by these meteors in the past, especially 1799 and 1833. The Perseid meteors, in August, will probably be moderately numerous, as usual.

DR. CRILE'S "AUTOSYNTHETIC CELLS"

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To the biologist concerned with the form and architecture of the living cell, the announcement of the results of Dr. Crile's researches on masses of stuff which show some of the properties of living matter will come as something of a shock.

The physiologists, however, especially the group who are engaged in studying the properties and the ultimate arrangement of particles in protoplasm, find in Dr. Crile's results many things of absorbing interest. Furthermore, there is a growing belief among workers that we may within the near future be able to set up small masses of material in the condition of a jelly in which many of the activities characteristic of living matter may take place.

Thus, for example, I have definite recollection that Jacques Loeb, whose researches are well known to all biologists, expressed high hopes that something like living matter would be compounded within the laboratory within a very few years.

Many of the experimental attempts in this direction have gone no further than the making of minute blobs of colloids which on the glass slide and under the microscope gave resemblances to the indefinite and constantly changing forms of the amoeba. The physiologist is primarily concerned with the energetics, performances or processes which go on unceasingly in living matter. In my own experiments in this direction, begun in 1922 at the Desert Laboratory of the Carnegie Institution, in Arizona, I went no further than making capsules of cellulose, lining them with mixtures of jellies made up of the materials which enter into the composition of the plant cell.

Although the intimate arrangement of these materials could not be said to have been identical with that in living material, except in a general way, yet these experimental devices displayed two forms of activity quite similar to that of the absorbing hairs of roots. In an often-repeated series of experiments the permeability of these jelly layers was found to be similar to that of the tissues of living plants. The common mineral nutrient elements sodium, potassium, magnesium and calcium entered these "artificial cells" at the same relative rates as in a piece of living tissue.

The second performance in which the activity of living stuff was imitated was one in which these "artificial cells" maintained their acidity for days at a time when immersed in an alkaline solution, after the manner of the protoplasm of a plant growing in an alkaline soil.

Some of these experiments were shown to Dr. Crile at the Desert Laboratory. I have therefore viewed these exhibits of Dr. Crile's results at the Cleveland meeting of the American Association for the Advancement of Science with considerable interest.

Dr. Crile brings together proteins, lipoidal brain extracts and mineral salts in small cavities on glass slides. Masses of material resembling unicellular organisms of various types appear in a few seconds.

The chief interest, however, lies in the fact that when quantities of this material sufficient for chemical and physical tests are accumulated, with characteristic electric potentials, stainability and other physical properties are readily measurable, and respiration data similar to those of masses of living tissue are secured. The transformation of energy indicated is at a rate which changes and runs through a cycle after a manner shown only by living organisms.

Only the worker who has engaged in experiments of this kind is in position to appreciate the enormous amount of wearisome labor necessary to secure the most meager results. It may be regretfully said that the difficulties attending a repetition of Dr. Crile's experiments will delay a checking-up of his results by other workers, which is so highly desirable in all scientific research.

Neither Dr. Crile nor any one else makes the claim that he has actually "created life" in the laboratory. But the way is indicated along which we must travel in the endeavor to gain a fuller understanding of the nature of living matter.

REACTIONS OF NON-LIVING MATTER

THE ability to learn and remember is probably not confined to living organisms.

An important mathematical investigation by Dr. N. Rashevsky, of the Research Laboratories of Westinghouse Electric and Manufacturing Company, has shown that certain mixtures of lifeless fluid substances ought to show behavior indistinguishable from what we call memory. Properly chosen combinations of liquids will respond to repeated changes in the temperature, pressure or other conditions to which they are subjected, as if they were sensitive to their past experience and could put two and two together.

Apparently this unique behavior is possible in a system which may come to rest in more than one position. For instance, a rectangular block may be in equilibrium when resting on any one of its faces. In addition, however, there must be a lag in the changes within the mixture itself, by which when the substance is displaced from its resting condition an appreciable time is required for recovery. Dr. Rashevsky has actually proved that such mixtures would show Pavlov's famous conditioned reflex which is the foundation of behavioristic psychology.

It is not suggested that this is the exact physical mechanism of memory in living animals. Further, no such mixture has yet been made and tested in the laboratory, though the mathematics makes that sequel probable. However, this is one of the most daring and well-informed attempts to handle a question of psychology and biology by the method of mathematical physics.

THE FIGHT ON CANCER

OPTIMISM and determination were the guiding spirits which pervaded the cancer symposium held in Washington on January 7 under the auspices of the National Institute of Health.

Seven of the leaders in the fight against the disease which is the second greatest killer of mankind described their part in the combat and their war plans. All of them admitted the strength and power of the enemy. But they all were determined to make this a fight to the finish.

Not even the statement by Dr. J. W. Schereschewsky, of the U. S. Public Health Service, that cancer has undeniably increased, dampened the hopeful, fighting spirit of these men. He said: "The conclusion was reached that in the 21-year period from 1900 to 1920, about two thirds of the increase observed in the cancer death-rate of persons 40 years and over was due to an actual increase in the mortality from the disease."

"We may venture to hope that the cancer death-rate will not continue to grow indefinitely." All physical, chemical and biological processes tend to a state of equilibrium. Even without the discovery of preventive measures, the cancer death-rate will sooner or later become stabilized.

The fact of the increase in the cancer death-rate, however, should serve as a spur to stimulate research and to justify its extension. Dr. Schereschewsky described the work in his laboratory at the Harvard Medical School where the effect of high-frequency electricity on tumors is being studied. Transplantable tumors in laboratory animals dry up and disappear when placed in the field of these currents which are similar to the short waves of radio. However, deep-seated tumors are not so easily influenced by the rays. The amount necessary to affect them is apt at the same time to damage neighboring healthy tissue.

Chemists and pharmacologists are also engaged in the fight on cancer. At the National Institute of Health, Dr. Carl Voegtlin and his associates are studying the chemistry of the cancer cell, hoping to learn from this the reason for the tumor's destructive action on surrounding normal tissue and its infiltrating growth.

In Baltimore, Dr. Geschickter, of the Surgical Pathological Laboratory of the Johns Hopkins Medical School, has also been working with chemicals, trying to produce a stain which will show up the cancer cells in a microscopic section of tissue. He described a new method of staining such tissue, but stated that this is not a specific stain for cancer diagnosis. That remains to be discovered.

Approaching the problem from another angle, George O. Gey, of the department of embryology of the Carnegie Institution of Washington, has been "culturing" or growing human cancer cells in his laboratory. This has been attempted a number of times, but the difficulties are great. Mr. Gey has succeeded in cultivating certain types of cancer cells, the sarcoma cells, for many generations. It appears that he will be able to carry this strain on indefinitely. Moving pictures of these and other cancer cells were shown by Dr. Warren H. Lewis, in whose laboratory Mr. Gey has carried on his work.

EPIDEMICS OF INFLUENZA

A SLIGHT increase in influenza this year over last, with no big outbreak until 1932, is the probable forecast for this disease, based on a survey of the past ten years made by the Metropolitan Life Insurance Company.

The statisticians of the company point out that because ten years is not a very long time in the history of the disease, and because the great pandemic of 1918 does not exactly fit into the picture of a three-year cycle, no definite prediction can be made.

"From such a short period it would be hazardous to draw any sweeping conclusions," they stated. However, their records show that every three years since 1920 has seen a big increase in the cases of influenza. The big years, 1920, 1923, 1926, 1929, were followed by two years of comparatively few cases of the disease.

The seasonal peaks in all the years correspond closely in the company's records. In the second year after an outbreak, the seasonal peak is a little higher than in the first. Such a seasonal increase during the next few months would indicate that the disease is following its usual cycle. So far, no increase in cases of influenza has been reported to the U. S. Public Health Service at Washington.

While the 1918 pandemic does not fit into the three-year cycle, it had many unusual features, which indicate that it may stand alone as an exception to the rule. For instance it did not follow the usual seasonal course, but broke out suddenly in September and continued high for about 8 months. The three-year outbreaks, on the contrary, start in about the first of the year and reach their peak in February or March.

"If the general character of the triplets of annual waves observed in the past ten years should continue to show itself in the future, then the year 1930, with its low death-rate from influenza, would be typical in its position immediately following the high crest of 1929"; the company's report stated. "It would be followed in 1931 by a wave of somewhat higher but still moderate crest; and the year 1932 would then follow with another maximum death-rate, not to be equaled again for two years thereafter."

Officials of the U. S. Public Health Service do not think the occurrence of influenza epidemics can be described by the term cycle, and they likewise state that no prediction as to the time of the next epidemic can be safely made.

Their records show epidemics in the years 1920, 1922, 1923, 1926, 1928 and 1929. These records are compiled from reports of state health officers and include the general population of the country. The insurance company's records, based on illness among their policy holders, are limited to the industrial population. This probably explains the difference in naming epidemic years.

ITEMS

HUMBLE but hardy plants able to grow in a soil utterly without the all-necessary nitrogen salts are described by Professor Robert F. Griggs, of George Washington University, who has just returned from a botanical expedition to the Katmai volcanic region of Alaska, conducted under the auspices of the National Geographic Society. When Katmai exploded, about twenty years ago, it devastated a great area of country, covering it with raw, naked volcanic ash. How plants could gain a roothold on this new desert, devoid as it was of some of the indispensable elements for plant life, was a question that interested botanists. The plants have been answering. The pioneers have been liverworts, which are a group of green creatures related to the common mosses, but a step farther down the evolutionary ladder. Though the soil they grow on contains no nitrogen the plant bodies themselves have it. It must therefore be assumed either that the liverworts themselves capture this element from the air or that some microscopic plant or animal associated with them does it for them, just as the nodule bacteria capture nitrogen for the clovers on whose roots they form their colonies. Professor Griggs will study his liverworts in the laboratory in an endeavor to find an answer to this question.

CHEMISTS at the University of Missouri, under the supervision of Dr. Herman Schlundt, have started the only known factory in the United States for refining radium from the paint off luminous dials of old watches and clocks. Already several thousand of dollars' worth of the precious element has been recovered in this manner. Out of several hundred pounds of paint about one hundredth part of an ounce is radium. At the present market price this element is nearly $70 a milligram, or almost $2,000,000 an ounce. A refining plant for mesothorium, another commonly used radioactive element, was also established by Dr. Schlundt, at the University of Missouri and has been in operation several years. Last year between $25,000 and $50,000 worth of mesothorium was refined.

HUMAN skin is more than a mechanical protection against infectious diseases. It is an efficient external organ for killing pathogenic microorganisms, or disease germs. Drs. Harry A. Singer and Lloyd L. Arnold, of the Research Laboratory, State Department of Health, Chicago, applied broth cultures of disease-producing bacteria to skin surfaces. They found that within ten minutes from 90 to 95 per cent. of all the bacteria were killed. The germs of typhoid fever were among the bacteria most readily killed by human skin. These results, however, were obtained only with clean skin. On dirty or greasy skins the same bacteria survived for many hours. The finger-nail region was deficient in bacteria-killing power.

THE spot in the sea off the west coast of Mexico, which was shaken by earthquakes twice during the latter part of November, was again the scene of a heavy shock which might have done considerable damage had it occurred on land. This was indicated by reports from nine seismological stations to *Science Service*. The earthquake occurred early the morning of January 2, at 4:48.6 Eastern Standard Time. The epicenter, or point of greatest disturbance, was located by the U. S. Coast and Geodetic Survey at 17.8 degrees north latitude, and 108 degrees west longitude.