

product that the powerful radiation will be useful in the treatment of cancer and possibly put to other medical uses. They expect that the radiations will give new knowledge of the earth's magnetism and how it is caused. This latter possibility was the starting point of the whole investigation and the reason for its support by the Department of Terrestrial Magnetism of the Carnegie Institution directed by John A. Fleming. Incidentally, there will also come a better understanding of radio because physicists feel sure that the radio reflecting Kennelly-Heaviside layer above

the earth is affected by natural radiations that come from the sun and outer space.

Dr. John C. Merriam, president of the Carnegie Institution, expressed delight at the award of the American Association prize to the three members of his institution and explained: "Their work represents a long continued intensive study of this problem and it is a great pleasure to know of the recognition of the work at this stage of the investigations."

*Science News Letter, January 10, 1931*

#### BIOPHYSICS

## "Artificial Cells" Point Way To Greater Knowledge

### Famous Physiologist Thinks Creations of Cleveland Surgeon Will Aid Understanding of Living Matter

By **DR. D. T. MacDOUGAL**

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EDITOR'S NOTE: At the Cleveland meeting of the American Association for the Advancement of Science, Dr. George W. Crile, famous surgeon of Cleveland, announced the making of "autosynthetic cells" out of non-living extracts and mineral salts, and showed specimens under the microscope. This critique of Dr. Crile's work is written especially for the SCIENCE NEWS LETTER by one of the world's foremost students of plant physiology.

**T**O 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 some-

thing 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 taking 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.

#### What the Cells Do

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, stability 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 anyone 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.

*Science News Letter, January 10, 1931*

#### CHEMISTRY

### Substitute for Sulfur Vulcanizes Rubber

**A** FIRST cousin to the TNT of wartime, a chemical called trinitrobenzene, will make possible rubber that can be used next to shiny silver and other metals without fear of causing tarnishing, discoloring and corrosion of the metals.