

BIOCHEMISTRY

New RNA Species Found

➤ A NEW SPECIES of a chemical that is essential to life has been discovered by University of California scientists in Berkeley. The work may have far-ranging effects on thinking about fundamental aspects of protein synthesis, virology and cancer.

The chemical is a new species of ribonucleic acid (RNA), a vital component of all living cells.

Scientists have believed RNA had only one essential structure. Each RNA molecule was believed to have just four nitrogenous units—guanine, adenine, cytosine and uracil—although it was known the arrangement of these units might vary.

Berkeley scientists, Drs. Frank W. Allen and Frank F. Davis, have now identified a kind of RNA with five nitrogenous components.

Discovery of the new species of RNA may clear up some present ambiguities about the role of these chemicals in the life of cells in both health and disease. At the present time there is no agreement on the role of RNA, and one of the reasons scientists obtain different results may be the presence of this previously unidentified species.

Dr. Allen, who has been studying RNA for many years, has been working for some time to improve methods of isolating RNA.

The chemical has been known since 1870, but it was recognized that only about five percent to ten percent of the RNA could be separated from a given batch of cellular material.

Drs. Allen and Davis developed paper electrophoresis and ion exchange chromatographic techniques that allow them to achieve yields as high as 80%. They found that in the older techniques, the new RNA species is lost along with waste material, accounting in part for the fact that scientists had not found it earlier.

Drs. Allen and Davis said the new species comprises about five percent to ten percent of the RNA in tissue. It has the same four nitrogenous components plus a fifth related to cytosine and uracil, all three being classed as pyrimidines. A detailed chemical characterization of the fifth component has not yet been worked out.

The "five-legged" RNA has been found in pancreas tissue, yeast and reticulocytes, a species of red blood cell, suggesting that it is a universal RNA fraction.

The research by Drs. Allen and Davis of the School of Medicine, Berkeley-San Francisco, is scheduled for publication in the *Journal of Biological Chemistry*.

Science News Letter, April 20, 1957

ASTRONOMY

Observatory in Venezuela

➤ ASTRONOMERS in this part of the hemisphere will soon have an ultramodern observatory in which to conduct their scientific star-gazing.

The first buildings of Venezuela's new Observatory Cagigal, which will be the first observatory of this size in the world's equatorial belt, are already built and functioning.

The "Observatorio Astronomico, Seismologico y Geomagnetico Cagigal" will be completed in 1960. The seismological station alone will have more than 14 recording instruments of the most modern types, which will make it possible for Venezuelan scientists to record seismic movements anywhere in the world.

The Observatory site is located on a mountain-top on the border of Caracas. It is headed by Dr. Eduardo Rohl, director of Venezuela's Astronomical, Seismological and Geomagnetic Observatory.

The major share of precision instruments, which are to be housed in the Observatory-complex, are being made in Germany. These include, among others, a photo-zenith-telescope for the exact determination of time and latitude, an instrument which is found in only seven other observatories of the world.

In addition to this instrument, the Observatory Cagigal will have a great refractor,

a parabolic reflector, a Schmidt-camera, a meridian-telescope and a smaller refractor.

A geomagnetic station is to be built farther away from Caracas and will be equipped according to the most modern achievements, as becomes an up-to-date observatory.

Science News Letter, April 20, 1957

PHYSICS

Tiny Memory Device Is Switch Changed by Light

➤ A NEW KIND of switching device, so small that a hundred million of them occupy a square inch, operates on chemical principles and will be used in the memory circuits of large computers.

As described to the International Symposium on the Theory of Switching in Cambridge, Mass., by B. K. Green of the National Cash Register Company of Dayton, Ohio, the light-sensitive fluid can be used to store information and give it up again in fractions of a second.

By switch, the scientists mean a system that can exist in at least two stable states and can be changed back and fourth. Older switches are relays that operate mechanically and vacuum tubes or transistors that work electronically. The new kind of switch pro-

vides the stable states by chemical changes.

The material used, when exposed to lights of different colors, itself will change color. This process can be reversed. This "photochromism" provides the two stable states required for switching action. When these photochromic materials are used in solution, they may be enclosed in the form of tiny droplets by capsules or cellular structures.

An automatic process has been developed to produce many thousands of billions of these cells in a single batch operation. Each of these cells is a switching unit, about two and one-half microns in diameter. They can be made in single layers containing about 100,000,000 per square inch, although the practical limits may be somewhat lower.

These switches may be changed from one state to another in about one-thousandth of a second. Three different colors of light may be used to read, write and erase the information in these synthetic memory cells, so that the reading process does not destroy the information in the cells by changing their color.

"Many analogies have been drawn between the human brain and man-made machines," Mr. Green said. "Generally, these analogies tend to ignore the chemical aspects of the brain and lay chief emphasis on the physical or circuitry-network aspects. We are working with new components. Basically, these are extremely different from conventional components, and much more closely allied to neuron and brain structures than are transistors, diodes, and magnetic cores, although it is not our intention to duplicate a neuron or a brain."

Science News Letter, April 20, 1957

MEDICINE

Rubber Tube Breathing Prevents Lung Collapse

➤ A SIMPLE WAY to prevent lung collapse, after surgery and in pneumonia patients, is described by Drs. Seymour I. Schwartz, W. Andrew Dale and Hermann Rahn, University of Rochester School of Medicine and Dentistry, Rochester, N. Y., in the *Journal of the American Medical Association* (April 6).

The new method uses a rubber tube about four feet long into which the patient breathes for five minutes once every two hours.

The tube, called a "dead-space rebreathing tube," actually serves as an extension of the lungs. Since not all the air can be drawn from the other end, a dead space occurs in the middle of the tube and the patient "rebreathes" his own carbon dioxide.

This raises the carbon dioxide level in his blood and causes him to breathe faster, thus helping to unclog the lungs.

The tube has been satisfactorily used by more than 1,000 patients and has completely replaced the previously used paper bags and carbon dioxide tanks at the Strong Memorial and Rochester Municipal hospitals, Rochester, N. Y.

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