

in the configuration or pattern of the building blocks of the cell protein. With the greater knowledge of body chemistry that has accumulated in the past 32 years, scientists are in better position to test the role of enzymes in cancer.

Dr. Cleaves died in 1917, without the knowledge that over 20 years later scientists would be attacking the cancer problem from the enzyme angle on which she worked.

Science News Letter, July 29, 1939

MEDICINE—CHEMISTRY

British Fail to Confirm Cancer Cell Discovery

HARD on the heels of news that an important chemical difference between cancer cells and normal cells had been found, comes a British report that the finding could not be confirmed.

At the Imperial College and the Research Institute of the Royal Cancer Hospital (Free) in London, scientists were unable to find the difference between the cancer cells and normal cells, observed by Prof. K. Kögl and Dr. H. Erxleben, of the University of Utrecht. Reporting to *Nature* (July 8), Drs. A. C. Chibnall, M. W. Rees, G. R. Tristram, and E. F. Williams, of Imperial College, and Dr. E. Boyland, of the Royal Cancer Hospital, state:

"These preliminary results are not in agreement with those of Kögl and Erxleben, and show the need for a more extended investigation."

The Dutch discoverers, defending their findings (*Nature*, July 15), state that a difference in chemical methods accounts for the fact that Prof. Chibnall and his associates failed to confirm the Dutch work. The English scientists, they claim, used a test which, while good for detecting the natural form of the acid, is not apparently able to detect the change in this acid to the unnatural form.

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Airplane pilots are tested for physical fitness every 90 days.

Women in ancient Egypt carried basket loads on their heads.

The old game of jackstones has gone modern with plastic jacks in gay colors.

There are about 90,000 Diesel-powered vehicles in use, only about 3,000 of them registered in the United States.

A bicolored ground snake found recently at Grand Canyon is believed new to science and unknown elsewhere.

PHYSICS

Blood's Oxygen Carrier Studied With Spectroscope

First Studies of Hemoglobin Within Its Natural Environment of Red Blood Cells Reported to Meeting

THE FIRST studies ever made of hemoglobin, the red, oxygen-carrying material of the blood, within its natural environment of the red blood cells themselves, were reported to the Massachusetts Institute of Technology spectroscopy conference at Cambridge by Dr. David L. Drabkin of the University of Pennsylvania.

Previous spectroscopic researches in this knotty but highly significant field have been limited to investigations of concentrated solutions of the pigment, prepared by actual destruction of the red cells themselves. Thus much of our knowledge has been drawn from studies not of the substances in their natural environment but of their solutions obtained by extraction, a procedure possibly risking chemical change.

Dr. Drabkin dealt with a rather complicated turbid suspension of the red blood cells which gave a distorted picture requiring interpretation. His results constitute the first accurate deductions ever made on biological material. Preliminary studies indicate that the spectra of hemoglobin and its derivatives are the same within the blood cells as those obtained extracellularly.

The method has already found an additional application, in facilitating accurate determination of hydrogen ion concentration within the red blood cells. This is done by intracellularly converting the hemoglobin to methemoglobin, its oxidized form, and using the well known indicator properties of this latter compound.

Dr. Drabkin said that this unique method of using the main cellular constituent to determine reactions within the cell appears "most promising." Heretofore such methods as puncturing the cell with a micro-needle, which injures the cell, have been used.

Dr. Drabkin also reported progress in a spectroscopic study of protein denaturation which may throw considerable light on the structure of the complex protein molecule. Urea, he found, may play an important role in the denatura-

tion process, for whereas hemoglobin is denatured no more rapidly in alkali than in concentrated urea solution, the presence of both reagents speeds the process some sixty-fold.

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Study Make-Up of Virus

THE first spectroscopic analysis ever made of viruses, ultra-microscopic disease-producing entities, and their constituent proteins and nucleic acids, has been made by Dr. George I. Lavin of the Rockefeller Institute for Medical Research.

Dr. Lavin investigated three plant viruses—the classic tobacco mosaic virus, latent mosaic virus and tobacco ringspot virus, all of them crystallized in the pioneer researches in this field by Dr. Wendell M. Stanley and Dr. Hubert S. Loring of Princeton.

Crux of his technique, as explained to the spectroscopy conference, was the use of a continuous light source, in preference to the more usual source, and fractionation or splitting of the complex biological substances with which he was dealing, a procedure which may well revolutionize accepted spectroscopic methods of attacking intricate medical and biological problems.

Nucleic acid is apparently a rather prominent constituent of some viruses at least, for Dr. Lavin found it in all three of the plant viruses with a particularly high concentration in the tobacco ringspot. The presence of indoleacetic acid was also indicated.

That the amino acids which go to make up a protein may at times be hitched together in a very peculiar way was indicated by Dr. Lavin's study of papain, a protein-splitting enzyme, in which he was unable to find the amino acid, tyrosine, until after the enzyme had been hydrolyzed by Dr. J. S. Fruton.

He has also used the spectrograph to analyze urine, photographic fractions prepared by Drs. K. Dobriner and C. P. Rhoads so precisely that he was able to identify a number of physiologically im-

portant materials. Two years ago Dr. Lavin made the first spectroscopic analysis ever done of an enzyme, pepsin.

In all, Dr. Lavin has investigated proteins both containing and deficient in aromatic amino acids and with varying concentrations of nucleic acid, problems which are virtually hopeless chemically. He has also examined the protein fraction of pneumococci, the causative agents of pneumonia.

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Predicts Sun Discoveries

IDENTIFICATION of three previously undetected molecules of matter, which can probably soon be found in the sun, was announced by Dr. H. G. Howell of University College, Southampton, England.

They are the oxides of iron, nickel and

cobalt, none of whose spectra has ever been reported heretofore.

If found in the sun, as Dr. Howell predicts, these will bring to 30 the number of molecules known to exist there and in all probability in all stars of a similar type. Several other molecular combinations thought most likely to be present have not yet been found, partly due to lack of laboratory data concerning them and partly because the properties of these molecules make detection exceptionally difficult.

The research was conducted with the spectrograph which analyzes the light given off by the molecules under examination. In investigating atoms, the strength of the spectral lines indicates their relative abundance but this phenomenon is not sufficiently trustworthy in the case of molecules, due to their peculiar properties.

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DENTISTRY

New Way of Using Toothbrush Introduced To Dentists

Scientist Says Back-and-Forth Brushing and Rotary Method Are Equally Harmful; Should Imitate Chewing

ANEW way of brushing teeth was introduced by Dr. T. Sidney Smith, of San Francisco, to the American Dental Association meeting in Milwaukee. Dr. Smith also stressed the importance of toothbrushing and of cooperation between dentist and patient in caring for the teeth.

"There is nothing more helpful in the daily care of the teeth and their investing tissues than the toothbrush when properly used," Dr. Smith declared. "At the same time, nothing has been so destructive of tooth structure by abrasion and has caused as much recession of investing tissues as stiff, ill-shaped brushes."

The child's way of brushing teeth horizontally back and forth and the rotary method are both harmful, according to Dr. Smith, because they cut grooves into the teeth in time. Slightly better, but not good enough, is the newer method of brushing away from the gums. This does no harm but neither does it do any good in Dr. Smith's opinion. He advises a method that follows the direction of the food in chewing.

"The main strokes of the bristles are guided upward over the upper teeth and

gums and downward over the lower; this is nature's way of cleansing and stimulating the tissues," Dr. Smith explained.

The brush he recommends is the plain old-fashioned one, of medium size, with small tufts of fine bristles arranged in four parallel rows and trimmed to an even length. Gentleness and time should be used, rather than force and speed, he indicated. He suggested that teeth, like dishes, should be cleaned after every use, but since this may not be practical, the bedtime cleansing is especially important because, he says, bacteria increase more rapidly in the mouth during sleep.

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Forecasting Life of Teeth

AMEASURING stick by which the longevity and future health of one's teeth can be forecast was proposed by Dr. Arthur L. Jensen, of the University of California.

Dr. Jensen's plan would allow dentists of the future, he believes, to answer the following questions: "What are your chances of outliving your teeth? Can your teeth last through life? Must you

go through life with tooth troubles? How long will your teeth last? What can be done to help you maintain a healthy mouth?"

The plan is based on individual measurement of the capacity of each tooth in the mouth and the tooth damage each person has sustained. From this is computed a "dental health capacity index" for the mouth as a whole. Dentists would pool information on many thousands of patients of the same age group who had the same kind of tooth troubles. In the course of years, a definite pattern of tooth history could be secured from which a person could know years in advance just what to expect.

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PHYSICS

New Device Traps Current in Lightning Bolts

ATOP the 42-story tower of the University of Pittsburgh's Cathedral of Learning is a spinning wheel that traps bolts of lightning, studies their electrical characteristics and then discharges them harmlessly through lightning arrestors.

The device spins at 3,400 revolutions a minute. In continuous operation since June 3, it turned over its 210,000,000th revolution July 15. In a normal lightning season of 200 days it will come close to a billion revolutions.

The device that willingly and purposely awaits the direct hits of lightning is called the fulchronograph. Designed



LIGHTNING TRAP

This device on the top of the 42-story tower of the University of Pittsburgh traps bolts of lightning and records their electrical characteristics.