CHEMISTRY

New Plastics Coming

New plastics will not be limited to carbon compounds and silicones but will be made from everything from phosphorus to arsenic.

➤ THE PLASTICS which make so many new materials are by no means limited to the usual carbon compounds and the new silicones in the chemists' bag of tricks.

Possibility of whole new series of them, built of everything from phosphorus to arsenic, appeared in a paper given in Chicago before the American Chemical Society by Dr. Anton B. Burg of the University of Southern California at Los Angeles. Dr. Burg reported work carried on in association with Drs. J. C. Taylor, D. K. Robinson, C. L. Randolph Jr., R. I. Wagner and F. G. A. Stone of the same institution.

Possibility of making compounds between phosphorus and nitrogen, phosphorus and arsenic, arsenic and boron, and phosphorus and boron are being studied by the group, and the resulting plastic-type materials tested for stability and chemical inertness.

Dr. Malcolm E. Kenney described similar attempts made with Dr. A. W. Laubengayer at Cornell University to produce plastic materials by combining carbon compounds with the little-known metal gallium. Such compounds might be expected to be similar to those made with boron.

Elements Predicted

Experience with the newest man-made elements leads their discoverer, Dr. Glenn T. Seaborg of the University of California, to predict with greater certainty the chemical properties of eight elements which do not exist today and may never have existed on earth. If they are made at any time in the future, either in the giant cyclotrons of the University of California under Dr. Seaborg's direction, or elsewhere, they will conform to the pattern displayed by the sequence of 98 elements already known, according to Dr. Seaborg's prediction.

Element No. 104 will accordingly be similar in properties to zirconium and hafnium, now in demand as materials for building atomic reactors. Elements 99 to 103 will complete the list of actinide elements, which correspond to the lanthanide, or "rare earth" elements which appear among the fission products of uranium. Uncertainty about this correspondence was expressed by some chemists when the man-made elements first appeared on earth, as a result of neutron bombardment of uranium in atomic piles. Dr. Seaborg now believes that apparent irregularities in the properties of thorium, uranium and the first of the "artificial" elements are understood and that the places of the new elements are well established.

Complex Sugars Made First

Green leaves seize upon the carbon in the carbon dioxide they absorb from the air and build it into a complex acid composed of phosphorus and glycerine, which is then torn down to make sugar.

This round-about way of building plant nutrients was explained by Drs. James A. Bassham and M. Calvin of the University of California.

Working with radioactive carbon 14, these scientists have made a time chart showing the successive combinations formed as the radioactive material travels through the life processes of the plant. Ordinary sugars which are commonly obtained from plants and fruits are shown by these studies to be late steps in the plant's photosynthesis, while unusual sugars of greater complexity are formed first.

This is the opposite of the way chemists had imagined the build-up of sugar in plants. They had supposed that nature would start with some simple compound and build toward the more complex ones.

Molds Make Alcohol

New kinds of fermentation have been discovered in which pentose, a simpler kind of sugar than the one met on the dinner table, is changed to alcohol by molds instead of yeasts. Studies of fermentation by various kinds of molds and bacteria were reported by Dr. Martin Gibbs of the department of biology at Brookhaven National Laboratory. Radioactive carbon was used to determine the formation of fermentation products.

Science News Letter, September 19, 1953

PHYSIOLOGY

Primitive Animals Have Red-Blood Material

➤ RED BLOOD material has been discovered in very primitive animals, protozoa.

Hemoglobin may be much more widely distributed in this large phyla division of the animal kingdom, Drs. D. Keilin and J. F. Ryley of Cambridge University's Molteno Institute suggest in a report to the British scientific journal, *Nature* (Sept. 5).

They proved spectroscopically that this iron-containing constituent so important in human blood exists in small quantities in Tetrahymena pyriformis. In 1937 two Japanese scientists, T. Sato and H. Tamiya found it in Paramecium caudatum.

Science News Letter, September 19, 1953

ARCHAEOLOGY

Soup Was on a Thousand Years Ago in New Mexico

➤ SOUP WAS on some thousands of years ago in what is now New Mexico. The stone bowl and remains of the fire on which it came to a boil have now been found by

SOUP WAS ON—Some thousands of years ago, prehistoric Indians cooked dinner in this pot. Here are shown archaeologists carefully digging out the pot and remains of the fire on which it came to a boil so long ago.

archaeologists from the Chicago Natural History Museum under the leadership of Dr. Paul S. Martin.

Discovered with the bowl were some crude figures of bears, a tobacco pipe and about half of a sandstone disk painted in bright colors. Archaeologists are excited about the find because of what the objects reveal of the lives of prehistoric Americans many hundreds of years before the coming of the white man.

Science News Letter, September 19, 1953

MEDICINE

Specific Virus Antidotes

Prediction made that within five years diseases now incurable will have chemical specifics. Many classes of compounds considered hopeful.

➤ PREDICTION THAT virus diseases will find their specific antidotes within five years was made in Chicago by members of the world's first symposium on chemical specifics against the disease group for which there is now no cure.

Taking part in the symposium were Dr. Alexander M. Moore, Mellon Institute, Pittsburgh, who presided; Dr. I. W. McLean, Jr., Parke, Davis & Co., Detroit, Mich.; Dr. Laurella McClelland, Merck Institute for Therapeutic Research, Rahway, N. J.; Dr. W. Wilbur Ackermann, School of Public Health, University of Michigan, Ann Arbor, Mich.; and Dr. John Spizizen, department of virology, Sharp & Dohme Division, Merck & Co., West Point, Pa.

Less than 20 classes of compounds are now looked upon as hopeful as the source of such possible specifics against virus diseases, these research people say. But they point out that each class of compounds may offer the chance of finding the most promising drug among many related chemical substances. Five years ago no work was being done on this problem. Today the results so far obtained give hope that study for an equal time in the future may produce practical results.

Pooling their information on how to study virus attack on the living cell, this group, calling themselves "virologists," came to the American Chemical Society's meeting to interest chemists in helping them.

Their hope is to expand the number and kind of chemicals that seem hopeful in their attack on the cause of polio, influenza, and other virus-caused diseases. These diseases still resist the sulfas, the antibiotics and the other so-called miracle drugs which have proved specific against other illnesses. It is the hope of the virologists that some medicines with equal power against virus diseases may be found, either among new antibiotic preparations or as known types of chemical compounds formulated on purpose for trial.

A 50-50 chance exists, in the opinion of this group, that the specifics they hope to find will come from the antibiotic or the strictly chemical classes of remedies. Some signs have already appeared in their researches of compounds that prolong the life of cells under virus attack. There is even an occasional "cure," although the results are by no means yet predictable enough so that they can be tried in clinical tests on patients.

What happens when a virus breaks through the membrane surrounding a living cell, and how the break-through can be prevented or the virus destroyed before it multiplies and spreads to other cells, make up one line of attack on the virus disease problem. There is plenty of literature, according to the scientists, on things that do not work. They now begin to see hope of finding some that do.

Science News Letter, September 19, 1953

BIOLOGY

Study Germ Genetics For Best Treatment

➤ BETTER DISEASE fighting will be done when doctors know more about the genetics of disease germs and how this affects the germs' reaction to antibiotics, or so-called mold remedies.

Some of this kind of knowledge was reported by Dr. W. Szybalski of the Biological Laboratory, Cold Spring Harbor, L. I., N. Y., at the meeting of the Sixth International Congress for Microbiology in Rome.

Development of resistant strains of germs is responsible for many failures with penicillin and other antibiotics, as is well known. Such resistance develops because the drug kills off the non-resistant germs, allowing mutants that were born with resistance to develop.

When two antibiotic drugs are given at one time, as is being done more and more, the situation is more complicated. If the drugs are unrelated, the chances are much smaller that a particular single disease germ will be resistant to both. This is the case for the TB fighting drugs, isoniazid and PAS, or para-aminosalicylic acid.

But when the drugs are related, the situation is different. For example, mutants resistant to aureomycin are also resistant to terramycin and the reverse. Such cross resistance is not always reciprocal, however. Mutants may develop which are resistant to erythromycin and also to aureomycin if that is given later, but if aureomycin is given first, aureomycin-resistant mutants may not be resistant to erythromycin.

Antagonism between drugs also appears when they are given together. This develops when a strongly germ-killing drug is given with a relatively ineffective concentration of a drug that checks germ growth but does not kill the germs.

From his studies, Dr. Szybalski concludes that there is probably a genetic explanation for both positive and negative interaction between anti-germ drugs.

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