

CHEMISTRY

Combine Metals and Vinyl

► **STUDIES UNDERWAY** in the field of organo-metallic compounds, some of which have become popularly known as "exotic materials," show promise of chemical developments which could have major implications in basic chemical research, plastics, silicones and perhaps even in guided missile fuels.

Two Harvard University research workers, Drs. Dietmar Seyferth and F.G.A. Stone of Harvard's Mallinckrodt Chemical Laboratory, have begun a study of vinyl derivatives of metals, starting with a substitution of tin in vinyl compounds. They hope to expand their study to cover substitutions of other metals and metalloids.

A group of new compounds which they say "may possibly display interesting physical and chemical properties" could result from this study.

Drs. Seyferth and Stone became interested in these new possibilities following their earlier studies of organo-metallic compounds and studies of the vinyl chemistry of boron and silicon.

The new studies compare roughly with work that resulted in development of silicones now widely used in materials ranging from low-temperature aircraft lubricants to eyeglass cleaners and high-temperature electrical insulation.

To the chemist, a vinyl compound is one containing a radical or group of two carbon and three hydrogen atoms per molecule, arranged in a characteristic order ($\text{CH}_2\text{:CH-}$), which can be added to or taken from molecules of other materials, greatly changing the physical and chemical behavior of the materials.

A molecule of ordinary acetylene used for welding can add a molecule of hydrogen chloride, the gas that produces hydro-

chloric acid in water, to form vinyl chloride, an entirely different substance used as an intermediate in making many plastics.

The organic vinyl group appears in a variety of industrial and household products, including the vinyl plastics Vinylite and Teflon.

Inorganic silicon, in an oxide form, is the major constituent of ordinary sand. Because of chemical similarities which are clearly demonstrated in Group IV of the periodic table of elements, silicon has been substituted for carbon in producing silicones.

A comparable substitution of the element boron has resulted in the so-called "exotic fuels" for guided missiles.

The first few of the possible new group of compounds prepared have been named vinyltin compounds. The new compounds developed so far are solids at normal room temperature, most with melting points somewhat above room temperature and boiling points considerably above the boiling point of water at normal pressures.

In addition to expanding their study to substitutions of metals other than tin, Drs. Seyferth and Stone plan to report shortly on substitutions of hydrogen compounds, metal salts, and halogens such as chlorine, iodine, etc. They also plan to study polymerization of these compounds. Polymerization of usual organic compounds occurs when organic molecules of the same kind attach themselves to each other to form long-chain molecules, many of which are used as plastics.

The work is supported by the U. S. Office of Naval Research. The research is being reported in a series beginning in the *Journal of the American Chemical Society* (Feb. 5).

Science News Letter, April 13, 1957

MINING

Oil and Coal Chemicals

► **THE FUTURE** burns bright for the coal and oil industries, the American Institute of Mining, Metallurgical and Petroleum Engineers meeting learned in New Orleans, La.

The booming population and its attendant industrial development will help the bituminous coal industry off its present deathbed, Hubert E. Risser, professor of mining engineering at the University of Kansas, said. "Coal's future," he declared, "never looked brighter."

The use of coal in the direct manufacture of chemicals holds the greatest potential for this fossil fuel, he reported. Nuclear energy, on the other hand, will not have a significant impact on the coal industry for at least a score of years.

Improved techniques and additional discoveries in old and new areas will result

in oil production that will surpass recent estimates in the United States. This was the prediction of Dr. Richard J. Gonzales, director and treasurer of Humble Oil & Refining Co., Houston, Tex.

Even the 300 billion barrels estimated by the U. S. Department of Interior to be the nation's total reserve may be "conservative" in 20 years, Dr. Gonzales said. He cautioned, however, that the amount of oil found and produced in the United States will depend on "national policies on imports and on taxation of domestic production."

Dr. Gonzales pointed out that "as more oil is discovered, the estimate of ultimate production in the United States will continue to be pushed upward and the predicted date of running out of oil will be pushed farther into the future."

Science News Letter, April 13, 1957

● RADIO

Saturday, April 20, 1957, 1:45-2:00 p.m., EST. "Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Samuel L. Emsweller, chief of the ornamental plants branch, U. S. Department of Agriculture, will discuss "Easter Lilies."

BACTERIOLOGY

Bacteria Produce Acid That Resists Viruses

► **A NEW ACID** produced by bacteria to make them resistant to virus infections has been discovered by Drs. Walther F. Goebel and Guy T. Barry of the Rockefeller Institute, New York.

Called colominic acid, the substance was produced by *Escherichia coli*, a type of bacteria found in the human intestinal tract.

This is the first time that an acid of this type has been found in bacterial cells, and its importance lies in the fact that the bacteria manufacturing it are resistant to infection by several bacterial viruses, the scientists reported.

An understanding of the biochemistry of the process may eventually throw light on what makes some cells resist virus infection while others do not.

What makes the new-found acid unusual is that it contains large quantities of a substance that resembles sialic acid.

Sialic acid has interested scientists in recent years because of its effect on viruses. When it is combined in its native state with protein and other sugars, the sialic acid-containing complex interferes with the adherence of certain viruses, such as the influenza virus, to living cells.

Before now, the only known source of this sialic acid and its close relatives has been from protein materials found in certain animal tissue.

Science News Letter, April 13, 1957

PUBLIC HEALTH

Start Nationwide Study Of Brain Strokes

► **THE FIRST NATIONWIDE** research attack against cerebral vascular disease, more commonly referred to as "stroke," was announced by Dr. Leroy E. Burney, Surgeon General of the U. S. Public Health Service.

Stroke is the nation's third-ranking killer and accounts for an estimated 175,000 deaths annually.

The program is expected to run five or six years and include 35 to 40 research institutions. It is under the auspices of the National Institute of Neurological Diseases and Blindness, National Institutes of Health, Bethesda, Md. Research results are expected to shed new light on the causes of strokes and uncover more effective treatment methods.

Science News Letter, April 13, 1957