

SCIENCE NEWS

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SOME PAPERS READ BEFORE THE ATLANTIC CITY MEETING OF THE AMERICAN CHEMICAL SOCIETY, SEPTEMBER 8 TO 12

DR. G. C. SUPPLEE, director of the biological and chemical laboratories of the Borden Company at Bainbridge, N. Y., stated that on the basis of vitamin studies in rats dietary lack of the "acid of life" vitamin, pantothenic acid, may be the cause of a new malady among British soldiers. Working with Dr. Supplee were Dr. R. C. Bander and Dr. O. J. Kahlenberg. The malady in the soldiers is characterized by fatigue, breathlessness, fainting spells and disturbance of the pulse rate. These symptoms could be due to failure of the adrenal glands to produce normal amounts of their life-essential hormone. The affliction can not positively be stated to have resulted from lack of pantothenic acid, Dr. Supplee said, but he and other investigators have found that rats deprived of pantothenic acid suffer hemorrhagic degeneration and wasting of the adrenal glands and die. Their death is usually unpredictable without previous sign of collapse, and after death destruction of adrenal gland tissue, marked kidney injury and acute hemorrhage of the heart are found. Pantothenic acid is a member of the vitamin B complex and is found in such foods as yeast, molasses, rice hulls and liver. It has been called the "acid of life" because it has been found in all animal tissues and is believed essential to all forms of life, although so far there is little or no direct evidence of human need for it.

THE electron microscope, a super-enlarging instrument that uses high-speed atomic particles instead of light waves, has many uses in industry, was reported by Dr. V. K. Zworykin and Dr. James Hillier, of the R. C. A. Manufacturing Company, Camden, N. J. Among the materials searched by its beams are steel surfaces, the structure of rubber, finely ground pigments and other things important in defense activities. Since the electron streams can penetrate only very thin slices of material, it is not possible to examine steel surfaces directly. Thin films of plastic, only a hundred-thousandth of an inch thick, are prepared, with surfaces that are replicas of the steel surfaces to be examined. These plastic "portraits" of the superficial structure of steel are then placed under the electron microscope and subjected to the atom-particle bombardments. The new instrument is also used in the study of living things too small to see with even the most powerful of light-using microscopes, such as the particles of disease viruses and bacteriophages, as well as to disclose details of structures of the tiniest bacteria, that are at the lower edge of light-wave visibility.

TIME is saved in great quantities by spectroanalysis, in which light given off by burning or glowing metals or other materials is split into its constituent colors by a prism or ruled grating, and the artificial rainbow thus produced is read for hidden chemical secrets. Dr. H. V. Churchill, of the Aluminum Company of America Aluminum Research Laboratories, described some of the advan-

tages of this quick analytical method. When a batch of aluminum alloy is being prepared for airplane construction, or a melt of steel for a battleship's armor, it is necessary to take small samples of the lot and analyze them quickly to make sure that the small but important additions of alloy metals are present in the right quantities. By the classic methods of test-tube analysis, these processes would take hours. By spectroanalytic methods, only minutes are required. New instruments have been introduced that carry on much of the work automatically, by substituting the photocell or "electric eye" for the human eye.

AMERICAN soldiers, with their high meat ration, are physically better equipped to meet certain types of war gas than are vegetarians, according to a report submitted by Dr. Jakob A. Stekol and Dr. William J. Conway, of Fordham University. Meat and some other protein foods contain two compounds known as cystine and methionine. These compounds, fed to rats, were found to detoxify benzene derivatives, used as war gases in 1914-18, and also employed in many industrial operations. The same compounds prevented ill effects from pyridine, a poison present in tobacco smoke, and from naphthalene, another industrial compound most familiar to the public in the form of mothballs.

THAT old age is a loss of elasticity, so far as arteries are concerned, was reported by Dr. J. Murray Steele, of the Welfare Island, N. Y., Hospital for Chronic Diseases. Dr. Steele measured the elastic coefficient of arteries in living animals and also measured directly the force-length and volume pressure relationships in arteries that had been cut from the body. The results have almost uniformly tended to show that arteries become less extensible with increase in age. Discovery of a chemical, elastin, which is found in tendons and which has elastic properties somewhat similar to body tissues may give an opportunity for finding the physicochemical changes that lessen elasticity in aging tissues. Dr. Henry S. Simms, of the School of Medicine of Columbia University, pointed out that the aging process which causes a progressively lowered resistance to nearly all diseases is responsible for ninety per cent. of deaths in the United States. The theory that senescence results from a random accumulation of injuries or degenerative changes is not supported by a thorough study of the problem. The urgent need of further research on the problems of old age and of funds to support the research was emphasized both by Dr. Simms and by Dr. Edward J. Stieglitz, of the U. S. National Institute of Health. In 1980, Dr. Stieglitz predicted, the total economic responsibility for the nation will fall upon less than half, 47 per cent., of the population, instead of the 55.7 per cent. that carried it in 1940. This assumes that the average man will be gainfully employed up to age fifty-five.

DR. THEODORE F. BRADLEY and Dr. David Richardson, of the American Cyanamid Company, stated that a technique something like soap-making, but more severe, is now being used to convert American-grown oils, like linseed and soybean, into drying oils for the paint and varnish industry. Quick-drying oils are urgently needed in both defense and civil industries, and because of the Japanese invasion the Chinese source has been grievously pinched, while the domestic production of tung oil along the Gulf Coast at present supplies less than 5 per cent. of our peace-time needs. The oils to be treated are first boiled with alkali and water at high temperatures. This converts them into a kind of soap, from which the fatty acids are then separated by adding mineral acid. These fatty acids can then be combined with glycerol to form the quick-drying oils.

A MILL made entirely of glass, for grinding pigments, inks, industrial finishes and other substances that might be contaminated by contact with the metal parts of mills of the usual type, was described before the paint and varnish chemists by Dr. D. B. Pall, of the Interchemical Corporation, a New York research firm. Essentially, the mill consists of a conical plug of ground glass fitting into a corresponding hollow ground-glass cone open at both ends. The set-up is very much like the ground-glass stopper in the neck of a bottle or glass stopcock. The material to be ground is fed in through a tube of synthetic rubber, by slight air pressure. The mill is driven by a small motor.

OXALIC acid, familiar as a household bleaching agent, is used in large quantities by several industries, including rayon, leather, textiles and at least one plastic. Its production from one of our most abundant and troublesome industrial wastes, sawdust, was discussed in several papers presented at the meeting. With proper chemical treatment, a hundred pounds of sawdust will yield nearly \$8 worth of important chemicals, according to Dr. Donald F. Othmer, of the Polytechnic Institute of Brooklyn. In addition to oxalic acid, appreciable amounts of acetic and formic acids can be produced, as well as wood alcohol. All these are at present needed in defense industries.

POISON sprays that need only to touch Japanese beetles to disable them were described by Dr. W. H. Tisdale and Dr. A. L. Flenner, of the du Pont pest control laboratory at Wilmington, Del. Contact with the beetles promptly paralyzes their mouthparts and forelegs. There are a number of compounds having this effect. All are derived from a complex organic chemical known as dithiocarbamic acid. Some of them have been found effective against other animal pests, among them the internal parasite causing the serious poultry disease, coccidiosis. The compounds prove their versatility by being deadly also to fungi that cause plant disease.

MUSHROOM raisers have a hard time in this motorized age, for lack of the material they have always used for the feeding of their sudden crops. Substitutes have been sought, especially by treating straw with various nitrog-

enous compounds. Better results have been obtained, according to B. B. Stoller, of Coatesville, Pa., by using wastes from the brewing and various food industries, which contain nitrogen in themselves, such as spent brewers' grains, malt sprouts, extracted cocoa shells, soybean meal and cottonseed meal. Potash and phosphates are added.

EVERY time you gulp down a gelatin capsule filled with quinine or some other medicine that would leave a nasty taste in your mouth, but for this protective covering, you add your bit to the world's indebtedness to an almost forgotten French pharmacist named Mothes, who invented the capsules in 1833. A sound motion picture summarizing the history of gelatin capsules, the work of David Hayden, S. H. Fox and R. P. Scherer, of the Gelatin Products Company, Detroit, was shown. M. Mothes made his capsules laboriously by hand; to-day a machine invented by Mr. Scherer turns them out in veritable streams.

SYNTHETIC rubber—or rather, synthetic rubbers, for there are a considerable number of different kinds—at long last begin to be produced on a quantity basis, was reported by Howard I. Cramer, of Sharples Chemicals, Inc., Philadelphia. Heretofore rubber-like synthetics have found it necessary to justify themselves on the basis of superiority to natural rubber in some critical property, such as resistance to heat, abrasion or solution in oil. Now, however, with the completion of new plants planned and under construction, "sufficient of the synthetic product should become available so that attention can be given to those tonnage applications involving simple replacement of the natural product."

HEAT causes sharply marked changes in the performance of one of the new elastic plastics, a water-clear substance called polystyrene. These changes were described before the meeting in a paper by T. S. Carswell, H. K. Nason and R. F. Hayes, of the Monsanto Chemical Company. Heated not quite to boiling point, to temperatures ranging near 180 degrees Fahrenheit, polystyrene changes from a hard, glass-like solid into a soft, ductile plastic. Heated further, up to boiling point (212 degrees) or a little beyond, it again changes, gradually, from the ductile to a rubbery state. The toughness of the material seems to increase with lowered temperatures, for it continued to rise as the polystyrene was progressively chilled to a temperature nearly 100 degrees below zero Fahrenheit.

PHOSPHORUS, important in defense industries and even more so in agriculture, is something we are not likely to run out of in the immediate future at least, it appears from figures set before the meeting by Dr. George R. Mansfield, of the U. S. Geological Survey. Phosphates, the compounds in which phosphorus occurs most abundantly in nature, are found in Florida, the Tennessee Valley and the Great Basin. Latest estimates place total available U. S. phosphates at more than 13,500,000,000 tons. This represents about 55 per cent. of the known supply of this essential mineral. Outside the United States, the greatest phosphate beds are found in the USSR and North Africa.