

Chemists Meet to Discuss Latest Advances

Following are reports of some of the most important papers presented at the Richmond meeting of the American Chemical Society, April 11 to 16.

Polarized Light Affects Life

A new and hitherto unsuspected influence of the quality of light upon vital processes was announced to the American Chemical Society by Dr. David I. Macht of the Johns Hopkins University. It is well known that a difference in the wave length of light, that is, the frequency of vibration, makes a marked difference in its action on plants and animals; that, for instance, rickets may be cured by light of high frequency, such as the ultra-violet rays. Now Dr. Macht has found that the direction of the vibrations also makes a difference in its effects. If the vibrations all lie in the same plane, like a wavy line on a sheet of paper, the action is different from that if vibrations occur in all directions promiscuously as in ordinary light. This peculiar form of light is called "polarized" because the vibrations have a single direction. But it cannot be distinguished by the eye from ordinary light. Ordinary light, such as sunlight, can be polarized by reflecting from a plate of glass or sheet of tin set a certain angle.

An Englishwoman, Miss Elizabeth Semmens, reported in 1923 that polarized light would promote the conversion of starch into sugar. Dr. Macht has confirmed this and gone much farther. Rays of polarized light are found by him to stimulate the growth of yeast and bacteria. Sprouting beans and sunflower seeds grow more rapidly under polarized light than under common light of the same brightness. Certain drugs, such as digitalis, cocaine and quinine, lose in their medicinal power on exposure to polarized light.

Still more interesting is the discovery that polarized light causes sick and poisoned rats to succumb more quickly. Injections of santonin or cocaine caused rats exposed to polarized light to be seized with convulsions, and usually die, sooner than those similarly dosed but living in common light. Rats, which had been reduced to poor health by feeding them on a diet deficient in vitamins, were taken with convulsions and suddenly died when exposed for several hours to ultra-violet rays.

These discoveries may aid to explain the irregular and uncertain ac-

tion of drugs and course of diseases which now perplex the doctors. Daylight is often partially polarized by reflection from sea, snow and sky. Moonlight is largely polarized by the reflection of the sunlight from the surface of our satellite. This may suggest to the reader the possibility that some day science may find some grain of truth in the old folklore theories of the influence of moonlight on plant growth and decay.

Metals Needed

Manganese, best known through its use in alloy steels, and the common element copper are needed in microscopic quantity to maintain good health in plants and animals, according to Prof. J. S. McHargue of the Kentucky agricultural experiment station, who spoke before the meeting of the American Chemical Society, Dr. McHargue said, in part:

"Carefully controlled experiments show that plants will not grow in sand cultures containing adequate amounts of purified compounds of the so-called ten essential elements after the plant food material contained in the parent seeds has been exhausted. The addition of a small amount of manganese compound causes a very marked increase in the growth of the plant and a small amount of copper in addition to manganese makes larger and more nearly normal plants.

"Small amounts of manganese and copper are normal constituents in the tissues of animals. Marine and fresh water mollusks are quite rich in manganese, copper and zinc. Birds apparently contain more manganese than some of the higher types of domestic quadrupeds. The liver, kidneys, spleen, pancreas, heart and brain contain more of these elements than the lean muscular tissues or the blood.

"The Bluegrass region of central Kentucky is underlaid with phosphatic limestones which produce a soil relatively rich in manganese, copper, zinc, nickel and cobalt, and the presence of these elements can be detected in the forage crops produced from the soils of this region. It is therefore assumed that the presence of these elements in the herbage is a contributing factor in the development of the superior

specimens of livestock for which the Bluegrass country has long since attained a world-wide fame."

Cathode Rays Speed Drying

Cathode rays, which aroused great expectations of practical applications a few month ago when Dr. W. D. Coolidge of the General Electric Company exhibited a more powerful machine for producing them, are already fulfilling their hopes. At the meeting of the chemical society their effect in speeding up the drying of paint materials was discussed by Prof. J. S. Long of the chemistry department of Lehigh University.

In collaboration with a group of his associates, Professor Long exposed a number of glass plates coated with linseed oil, perilla oil and China wood oil, all standard paint materials, to the action of rays from the Coolidge tube, and also exposed similar samples to blasts of warm air and to beams of ultra-violet rays to obtain comparisons of the speed of drying and hardening produced by these methods.

"The time required for the oil without driers to become dry to the touch or to dry hard was found to decrease in a regular manner as the time of exposure to cathode rays increased up to 10 minutes," Professor Long stated. "Perilla oil without driers rayed for 10 minutes was dry to the touch in two hours and hard in five hours. Linseed oil rayed for 10 minutes was dry to the touch in three hours and hard in six hours at 60 degrees Fahrenheit. Raw perilla and linseed oils, without driers, flowed on the same glass plates at the same time, were wet and not much changed when the progressively thicker films from rayed samples were all dry."

In a second paper Professor Long discussed the properties of a synthetic compound resembling linseed oil in its quick-drying effects. It bears the descriptive chemical name "Linolenic monoglyceride" and was artificially made with acids derived from linseed oil and perilla oil as a basis. It is the hope of Professor Long and his co-workers eventually to obtain a series of such synthetic oils that will free the paint and allied industries of their present de-

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pendence on vegetable oils that can never be produced in sufficient quantity to satisfy the demand, and hence are always expensive.

Leopard Changes Spots

The leopard can have his spots changed, at least after he is dead, and any other fur-bearing animal can be similarly metamorphosed by the magic of the dye chemist, to meet the demands of fashion. At the meeting of the American Chemical Society, William E. Austin, of New York, spoke on the importance of his industry to the modern fur trade.

"In spite of the great variety of furs, and the difficulties involved in the dyeing operations, it is now possible to produce on furs effects such as could be made formerly on textile fabrics only, such as printing, etching, stencil work, multicolored effects, and so on," said Mr. Austin. "Bleaching has been successfully developed and applied. Naturally dark furs can now be dyed in light colors similar to those hitherto obtaining only on white furs. In the very near future black furs will be made white on a commercial scale."

Lime Used in Butter

Lime, familiar in building operations, is also of use to the dairyman. O. R. Overman, assistant professor of dairy chemistry at the University of Illinois, told members of the society in a symposium on lime and its chemical aspects. This use of lime, he said, has come with the development of dairying as an industry with a scientific basis. It has been found that when lime is added to cream used in butter making, it neutralizes the acids formed, resulting in a greater yield of butter and increased keeping properties.

Other members of the society told of the use of lime in the beet sugar, tanning and paper industries. The chief need of the industry is to make suitable lime at a profit, Prof. J. R. Withrow, of the Ohio State University, told the symposium. The lime manufacturers, he said, give the best of their product to the building trades, and what is left to the chemists. As the building use of lime varies with the seasons, the result is a variable quality of lime reaching the chemist, and damages the manufacturer in the eyes of the chemist.

Marble-Fed Hens

Feeding hens calcium carbonate, which is the chemical name for marble, in addition to their regular diet of wheat, yellow corn and skim milk, aids egg laying, members of the society were told by G. Davis Buckner, of the Agricultural Experiment Station of the University of Kentucky.

Mr. Buckner has been conducting a series of experiments on the efficacy of various substances added to hens' diet to aid in the formation of egg shells. Besides the calcium carbonate, a number of other chemical compounds containing calcium were tried, but the carbonate proved the most effective. It produces heavier eggs and more of them.

Rubber and Aluminum Paints

The advantages of rubber and aluminum as paint materials were outlined in two addresses before the American Chemical Society.

Harold Gray, research chemist of Akron, Ohio, told of the development of a protective paint from rubber. Its chief advantages, he stated, are resistance to corrosive chemical action, low permeability to liquids, especially salt solutions and sprays, toughness and flexibility even at sub-

zero temperatures, and absence of flaking when cut.

Junius D. Edwards and Robert I. Wray, of New Kensington, Pa., set forth the advantages of aluminum powder in paint as a moisture-proofing agent. The best protection, they stated, is given when all the coats of paint contain aluminum, but excellent effects may be obtained by its use in the priming coat alone.

Food Affects Meat Quality

"Tell me what you eat and I'll tell you what you are" has been made good, for animals, at least, by N. R. Ellis, research chemist of the Maryland agricultural station, who spoke before the meeting. The protein, or muscle-forming foods, he stated, do not make much difference; the red meat parts of the animals are very much the same, no matter what the material out of which they were built. But the fats of an animal show marked difference according to the kind of fat-forming foods which were given it to eat. "Soft pork is produced by the feeding of such basal feeds as peanuts, soybeans, rice polish and rice bran, all of which contain large amounts of unsaturated oils," he said. "The oil in cottonseed meal is abnormal in producing lards and butters with high melting points. Certain off-flavors and odors in milk are transmitted from the feed."

Science News-Letter, April 16, 1927

There are supposed to be approximately 150,000 organic chemicals, each one possessing a different taste.

A strip of adhesive plaster over the top of a bottle is useful to keep the cork firmly in place, in traveling.

Eye specialists of Germany predict that it is only a matter of time until all spectacles will have only one lens.

Swift, cold winds from Greenland's ice cap are responsible for many of the heavy storms on the North Atlantic.

Burns are dangerous because the tissue cells which are destroyed form poisons which enter the general circulation.

Civet, which is used in making perfumery, comes from the civet cat, an animal resembling a cross between a cat and a hyena.

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