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PAPERS AT THE DETROIT MEETING OF THE AMERICAN CHEMICAL SOCIETY

DETROIT is this week the host to an army of 2,000 chemists, members of the American Chemical Society, who are meeting there from September 5 to 10. Every phase of chemistry, from the abstract problems of the teacher and research worker to the practical applications of factory and farm, will be up for discussion. In consideration of Detroit's position in the field of automobile manufacturing an important position on the program will be given to chemical problems connected with that industry. The principal session on the opening day will be devoted to a symposium of the chemical angles of the steels, fabrics, finishes, glass, fuels and lubricants that are concerned in the manufacture and use of motor vehicles. The outstanding event of Wednesday's program was an evening gathering addressed by Dr. George D. Rosengarten, president of the society, and by Dr. Charles F. Kettering, of General Motors. Sectional meetings during the week were concerned with the chemistry of food, drugs, dyes, fuels, gas, oils, paints, rubber, fertilizers and a host of other things of importance in every-day life. Other gatherings discussed chemical education, the history of chemistry, the rôle of chemistry in medicine and surgery and the chemical aspects of life itself. In all, there were eighteen divisions of the society, which heard over 300 papers read.

IN the symposium on "Chemistry's Contribution to Automotive Transportation" H. C. Mougey, of the General Motors Corporation, specified some problems in the field of automobile finishes that still remain to be solved by the chemist. Among these needed inventions are: "A substitute for black baking enamel which will retain the advantages of low cost and ease of application, but which will make the steel more resistant to corrosion under conditions of high humidity, and which will produce a film that holds its luster longer on exposure. Primers and surfacers for lacquer finishes, which will decrease the time of drying without increasing the cost of application. Some method of obtaining the smooth surface of high luster without the cost of the present system depending on hand rubbing and polishing. Professor D. B. Keyes, of the University of Illinois, said that the ideal antifreeze compound for automobile radiators has not yet been reached. The three substances now most widely and successfully employed are alcohol, glycerine and ethylene glycol.

IN the early days, when an auto got stuck in the mud of a country road, the cry was "get a horse." Now it is "get a chemist." The greatest challenge by the motorized world to the modern chemist that has not yet been answered is the challenge of the clay road, said Charles M. Upham, chairman of the highway research board of the National Research Council. Clay, like everything else, will respond to chemical treatment. The chemist must somehow get it to do three things. He must treat it so that it will drain instead of absorbing water and turning into glue. He must cure it of its present disturbing habit of shrinking and swelling according to the amount of water it has taken up. He must increase its ability to bear loads when moist, and improve its workability by road machinery. The chemist who can do this will simply revolutionize road construction. A further contribution which chemists may make to highway improvement is in the manners of asphalt, preventing it from becoming exceedingly hard in winter and soft as putty in summer.

"OLD RUBBER!" Once merely a part of the ragman's chant, these words have now become a powerful economic charm, operating in high-price years to soften the impact on the tire-buyer's pocketbook and in low-price years to save the tire-making industry from disaster. The importance which reclaimed rubber has assumed in the industry, thanks to new chemical processes which have greatly improved its quality, was discussed by William C. Geer, of New Rochelle, N. Y. In one year, Mr. Geer stated, the use of reclaimed rubber saved the consumer $55,297,000. Another recent improvement which has been made in rubber is the addition of chemicals to slow down the rate of oxidation, which does to rubber what rust does to steel. Rubber articles have had their lives thus lengthened by from two to ten years. Mr. Geer doubts both the need and the commercial possibility of artificial rubber. American-grown rubber is in sight, and this, with further improvements in reclaimed rubber, will take care of our needs for a long time to come.

THE single general-purpose emery wheel of the old-fashioned machine shop would be amazed—supposing it had a consciousness—if it could come back and see the family of abrasive machinery that has taken its place in the modern monster automobile factories. Not only have the new grinders new shapes and uses, but they are made of new materials, born of the electric furnace. Dr. Lowell H. Milligan, of Worcester, Mass., told his colleagues of the importance of abrasives in literally grinding out automobiles. It has been said that a Ford manufactured by former methods would cost as much as a Rolls Royce does now, were it not for grinding. In 1904 there was not one grinding machine in the automobile industry. To-day there are 68,000. Countless parts of an automobile are finished by grinding. The chemists and metallurgists have been continually making tougher and harder steels which can not be satisfactorily machined, but must be shaped by grinding. Abrasives are of service not alone as grinding wheels. Loose abrasives are used, suspended in grease or water, for grinding valves, for lapping piston pins and rings, crankshaft pins and bearings, and for sur-

facing plate glass. Glued on the surface of polishing wheels, abrasives serve to smooth and polish radiators, fenders, bumpers and many other metal parts. Fine abrasives cemented on paper or cloth are used for various finishing operations, conspicuous among which is the smoothing and surfacing of lacquers on automobile bodies.

How great is the danger of carbon monoxide poisoning to which garage employes are exposed? We read frequent accounts in the daily news about automobile owners who have committed involuntary suicide in their small private garages by running the engines when the doors are shut. Yet mechanicians work all day behind closed doors in large garages. How much of an industrial hazard are they exposed to? Dr. S. H. Katz, of the U. S. Bureau of Mines, and Dr. H. W. Frevert, of the U. S. Department of Agriculture, have been endeavoring to find an answer to these questions, and they reported on their work. The two investigators collected samples of the air from a large government garage in Washington and from a large commercial garage in Pittsburgh, and subjected them to chemical analysis. They found that the working conditions in the government garage, so far as the poisonous gas was concerned, were better than those in the commercial establishment. During the regular working day the concentration in the government garage never exceeded one part of carbon monoxide in ten thousand parts of air, while in the Pittsburgh shop the maximum was two thirds again as much, or 1.64 parts in 10,000. In neither establishment did the concentration reach the danger point, though during one hour the carbon monoxide in the Pittsburgh garage attained a "bad eminence" of 4.33 parts per 10,000 of air. This, it was stated, is enough to cause headache in some men. The report adds, however, that the investigations were conducted under only average working conditions. In very cold winter weather, when the garage doors are likely to be kept more tightly closed, conditions may become more serious.

The production of artificial rubber is apparently brought a step nearer by researches made at the University of Notre Dame reported to the American Chemical Society by the Reverend J. A. Nieuwland. Working in association with Daly and Sister M. Florentine he has found that a ninety per cent. yield of ethylene chloride can be obtained by passing ethylene and chlorine gases into antimony pentachloride. The product can be readily converted into vinyl chloride by alcoholic potash. This chemical reaction will seem unintelligible and unimportant to the general reader, but yet it may have a bearing on one of the most exciting commercial controversies of the day. For Plotnikoff proved in 1922 that vinyl chloride could be converted into rubber by the action of ultraviolet rays from an electric light. The electricity may come from water-power, which may also make calcium carbide of coal and lime. Adding water to the carbide generates acetylene gas, which is easily made into ethylene. So the chain is complete from the waterfall to the rubber tire. But it is very questionable if rubber can be made in a factory as cheaply as it can be grown in a tree.

Cloth coated with various wear- and weather-resistant materials masqueraded as leather in the early days of the automobile. Now, however, the various coated fabrics have reached a stage of excellence where they can make their own way on their own merit, and "imitation leather" as a term of semi-reproach is no more. Thus reported Dr. Hamilton Bradshaw, of the du Pont laboratories at Wilmington. Coated fabrics are of three principal types. They are coated with preparations of linseed oil, with rubber and with pyroxylin, which is one of the new "plastics" made by dissolving cotton or wood-pulp cellulose in an acid. The linseed oil fabrics belong to the oilcloth class, which are little used in motor cars. The rubber preparations are used mainly in top fabrics, for both open and closed cars. In the latter class they have wholly replaced the old solid, rattly tops of wood or metal. Pyroxylin fabrics are almost universally used as upholstery in open cars now, the speaker declared. Over ninety per cent. of such cars turned out last year were upholstered in this type of leather replacement. The strange part of it is, that now the coated fabric does not need to imitate leather it has reached the point where it can fool even an expert. Dr. Bradshaw told of examining a car that was finished partly in real leather and partly in grained coated fabric. Only when the leather and fabric were loosened and their backs examined was he able to tell them apart.

Ethylene, one of the ingredients of common illuminating gas, is working a revolution in the fruit and vegetable industries. Poisonous to plants when present in high concentrations, in small quantities it acts as a stimulant, and advantage is being taken of this recently discovered fact. Dr. F. E. Denny, of the Boyce Thompson Institute, Yonkers, N. Y., discussed fruit ripening by gas attack. It had long been known that when the rooms where citrus fruits were stored were heated with kerosene stoves the usual time required for changing the green rind to the desired golden hue was reduced to about one fourth. Dr. Denny's experiments in 1922–1923 indicated that the active agent in the combustion gases was ethylene. Now this gas is used instead of the old oil stove in the treatment of hundreds of carloads of oranges and lemons, thus avoiding fire risk and smoky odor. Surprisingly low concentrations of ethylene added to the air surrounding the fruit are able to bring about hastened coloration. If precautions are taken to prevent the loss of ethylene by diffusion, the process is successful with one part ethylene to 10,000 parts of air, one part in 100,000 or even one part in 1,000,000. In practical operation a somewhat higher original concentration is used in order to take care of losses of gas, but it has not been necessary to use a greater concentration than about one cubic foot of ethylene to about 5,000 cubic feet of air.

The search to find the perfect disinfectant was described by Dr. Herbert C. Hamilton, research chemist for a large pharmaceutical firm. The weakness inherent in most chemical germicides lies in the fact that the ones that kill germs effectively also injure the surrounding

body tissue. Exceptions to this general rule are the class of chemicals known as colloids, of which argyrol is an example, and certain of the aniline dyes which seem to have a selective action. This condition does not necessarily imply that the germicide is selective in the sense of attacking the microorganisms in preference to the tissue of the body but more probably to specific differences in the resistance of the organisms.

THE product of the cow has one advantage over the food traditionally supposed to be best for babies. Cow's milk is more effective as a rickets preventive than human milk, according to Dr. Icie G. Macy, director of nutrition research at the Merrill-Palmer School. Thirty cubic centimeters of cow's milk daily for a week produced a marked healing of the bone lesions in young rats with rickets, while the administration of 40 cubic centimeters of human milk daily had no effect on the condition of the rickets.

TWO active principles of great potency in their effect upon the human body have been extracted from the pituitary body by Oliver Kamm and associate investigators of Detroit. The pituitary body is a gland about the size of a pea situated at the base of the brain. It has long been known that the gland secreted certain substances into the blood which had a powerful influence on the rate of bodily growth and the activity of various organs, but since these compounds could not be separated from one another and obtained in pure form their use in medicine was uncertain and restricted. Now, however, two of the compounds from the back lobe of the gland have been isolated and can be analyzed in the chemical laboratory. One of them injected into the blood greatly increases the blood pressure and the other causes strong contractions of the uterus.

THE word chemistry and the names of such chemical materials as toilet articles, perfumes, dyes, textile fibers, precious stones and metals have been traced back to an Aryan source by Dr. W. R. Kokatnur, consulting chemist of New York City. He cited hieroglyphic records as well as archeological and ethnological evidence to support his conclusions concerning the origin of chemical terms. The isolation of metallic mercury dates back further than many historians have believed, according to Dr. Earle R. Caley. Apparently the only compound of mercury known to the ancients was the sulphide. This was used as a pigment and early Roman writers have left accounts of a chemical test to detect its adulteration.

RALPH WALDO EMERSON, the great essayist, kept in close touch with the development of chemistry from the time he was a boy of seventeen until his old age, Dr. Charles Albert Browne reported. Emerson's journals and essays are filled with chemical references, said Dr. Browne, while he drew freely upon his knowledge of this science for many of his most striking analogies and comparisons.

ITEMS

POSITIVE proof that beauty is only skin deep was recently shown by Roger B. Corbett, of Rhode Island State College, who took four varieties of apples, peeled them, and cut them into cubes which he placed before eleven different men, ranging from bankers and professional men to farmers and mechanics. The apple that was rated first when seen whole, shining in its brilliant red skin, ranked last in taste. In the taste test the McIntosh won first place, the Baldwin second, the Rhode Island Greening third and the Rome Beauty last. The Rome Beauty, a dessert apple that is a favorite in stores and on fruit stands, when peeled was found least tasty. In another test to determine the distribution and consumption of apples, 4,000 questionnaires were mailed to Providence families. It was found that 46.7 per cent. are eaten raw, 48.5 per cent. cooked, either in pies, sauce or general baking, while apples used in salad constituted 4.8 per cent.

TWELVE million dollars for state parks is the ambitious program projected for California by a number of civic organizations of that state. Bills now before the legislature provide for a bond issue of $6,000,000 to be matched by an equal amount from private gifts and other outside sources. A considerable part of the areas expected to be set aside under the new program will be in the famous California redwoods country. These trees, closely related to the famous "big-trees," constitute a remnant of a once world-wide distribution of tree giants that flourished before the last great ice age. Individual trees now standing have been in existence since long before the beginning of the Christian era. For historic and scientific interest as well as for the sake of their scenic beauty a strong and fairly successful effort has been going on for some years, to save a part of the redwood forests from cutting.

PLANS for a large reflecting telescope, with a concave mirror twelve feet or more in diameter, and to be the largest in the world, have been abandoned, according to an announcement in *Popular Astronomy*. The telescope was to be made in France, and financed by a wealthy Hindu by the name of Dina. Professor G. W. Ritchey, American astronomer, who designed the great 100-inch telescope of the Mt. Wilson Observatory, now the world's largest, has been experimenting with a new method of making large mirrors at the Paris Observatory, in France. The new method consists in making the great glass mirror with a cellular construction, out of smaller pieces of glass, instead of a solid piece. One of the chief things which has prevented the making of large telescope mirrors has been the difficulty of making the great glass discs at the start. Professor Ritchey has already made mirrors of 36 inches' and 60 inches' diameter. When recently visited in Paris, he said that one of 30 feet was not impossible. However, Dina's plans have been abandoned, but the Paris Observatory has authorized Professor Ritchey to make two mirrors of 20-inch diameter, one by the old method, and one by the new, so that their relative merits may be tested.