American Chemical Society Talks Automobile

At the autumn meeting of the American Chemical Society which has just closed its sessions at Detroit much attention was given, appropriately, to the subject of the relation of chemical science to the automotive industries. The following report devotes itself to the highlights of these discussions. In next week's issue other aspects of this meeting will be presented by Dr. Edwin E. Slosson.

Detroit this week was host to an army of 2,000 chemists, members of the American Chemical Society, whose sessions closed Saturday, September 10. Every phase of chemistry, from the abstract problems of the teacher and research worker to the practical applications of factory and farm, was up for discussion.

In consideration of Detroit's position in the field of automobile manufacturing, an important position on the program was given to chemical problems connected with that industry. The principal session on the opening day was 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.

Dr. Rosengarten's Address

The outstanding event of Wednesday's program was an evening gathering addressed by Dr. George D. Rosengarten, president of the Society.

Previous ages of man's history have been known as the Age of Stone, the Age of Bronze, the Age of Iron, and so on. The present time is preeminently the Age of Chemistry. This was the thesis of Dr. Rosengarten's paper.

Even in the past, chemistry played a leading part in man's progress, Dr. Rosengarten declared, though man has not always been conscious of its importance. The change from the Age of Bronze to the Age of Iron, 3,000 years ago, was largely a chemical change. The task of the present and the immediate future is the full mastering of the basic principles of chemical science.

"An important problem and one requiring our immediate and undivided attention is so-called 'pure chemistry,'" he said. "I should rather like to call it 'science of chemistry' in contradistinction to the practical application of chemistry which would be more correctly designated as the 'art of chemistry.'

"Pure science is the protoplasm of applied science. It is the brick and mortar of our sky-scraping buildings of industry and commerce. Our civilization of which we are so proud, the comforts of life we are enjoying, are wholly built on discoveries emanating from the search for scientific truths, from the pursuit of science for the sake of the science itself. As Secretary Hoover has very tersely put it: 'It is in the soil of Pure Science that are found the origins of all our modern industries and commerce.'

"The relationship between the science of chemistry and its varied and multitudinous applications is quite apparent to the chemist, but for our lay guests let me cite one or two of the thousands of examples. About one hundred and twenty years ago, Sir Humphrey Davy in his pursuit of scientific knowledge for the sake of knowledge discovered a method of separating the 'refractory' metals potassium and sodium from their combinations. Based on this fundamental discovery, Hall, an American, and Heroult, a Frenchman, prepared the metal aluminum. But for the availability of this metal, aviation would still have been a Midsummer Night's Dream.

"This metal has also added immensely to family happiness. Aluminum kitchen utensils are easy to wash and keep clean, making less work in the household, and consequently stabilizing domestic felicity.

"We are living on the scientific researches of a hundred or more years ago. We are plucking the fruit of trees of knowledge planted by our forebears. We have worked hard and fast to get all we can out of the funds of discoveries of past centuries, but we cannot much longer go on harvesting without planting. We owe to posterity what past generations have provided for us. We must not fail in our duty, we must not go back on our indebtedness."

Inventions Needed For Automobiles

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."

Prof. D. B. Keyes of the University of Illinois said that the ideal anti-freeze compound for automobile radiators has not yet been reached. The three substances now most widely and successfully employed are alcohol, glycerine and ethylene glycol.

Evolution of Coated Fabrics

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, according to 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

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backs examined was he able to tell them apart.

Value of Reclaimed Rubber

"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, the speaker declared.

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, he said.

Use of Grinding Machinery

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 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," Dr. Milligan stated. "In 1904 there was not one grinding machine in the automobile industry. Today 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 cannot 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 surfacing 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."

Toward Artificial Rubber

The production of artificial rubber is apparently brought a step nearer by researches made at the University of Notre Dame by the Rev. 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 ehtylene 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 ultra-violet 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.

Roads A Chemical Problem

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, declared Charles M. Upham, chairman of the highway research board of the National Research Council. Clay, like everything else, will respond to chemical treatment, the speaker said. 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.

Test Garage Air for CO

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. 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.