The Divisions of Industrial and Engineering Chemistry and of Cellulose Chemistry held a joint meeting with the Section of Paint and Varnish Chemistry. The chemical industries of the West was the subject of a symposium with Charles A. Newhall as chairman. The progress of nitrogen fixation in the State of Washington was discussed, an interesting paper on the decomposition of liquid hydrocyanic acid presented, and a novel method for the manufacture of hydrochloric acid from chlorine given in some detail. Motor benzene and motor alcohol were the subject of two papers giving the status of this work in the West. Among the general papers was one by Professor Alexander Silverman, of the University of Pittsburgh, on the conservation of fuel and public health, in which statistics were presented showing losses due to the practice of allowing taxicab motors to idle, especially where the cabs are not provided with self-starters. There is not only an economic loss, but a considerable hazard to public health, due to the large quantities of carbon monoxide discharged.

The meetings of the Division of Organic Chemistry held jointly with the Division of Chemistry of Medicinal Products brought out seventeen papers, an unusually short program for these divisions. The principal discussions centered about the reactivity of alcohols and the toxicity of local anesthetics.

The Division of Petroleum Chemistry met with the Division of Gas and Fuel Chemistry in a successful meeting, the papers treating the various phases of the petroleum industry and gas and other fuels. An outstanding paper was that by R. E. Wilson on the prevention of evaporation losses from gasoline storage tanks, wherein breather bags are employed to permit the contraction and expansion of the air and vapor without loss.

A paper by Berry and Brown called attention to the effect of the fuel oil situation on gas company operations and the necessity, especially on the part of Pacific Coast gas companies, of research in the effort to develop other sources of raw material for gas production.

The Division of Physical and Inorganic Chemistry held a symposium on strong electrolytes with Professor Alexander Findlay presiding. This was followed by twenty-one papers on a great variety of topics which occupied three half-day sessions.

Before the Division of Sugar Chemistry ten papers of unusual quality were presented, the outstanding one being that by J. H. Bon and A. A. Blowski on decolorizing carbons. Two papers on the preparation of levulose from artichokes brought out the fact that this year for the first time dahlias have been successfully started from seed, thereby removing the greatest objection to the dahlia as a raw material for the manufacture of levulose.

The meeting was characterized by a particularly enjoyable program of entertainment in addition to the interest shown in the scientific part of the program. Besides visiting the oil fields, several industrial plants in the vicinity, and Hollywood, those attending the meeting were entertained at an avocado luncheon, enjoyed dinner and dancing at the Miromar at Santa Monica, took part in a frolic at the hotel, and enjoyed a banquet at which President J. F. Norris gave his address. The meeting concluded with an afternoon and night on Mount Wilson, followed by an inspection of the laboratories in Pasadena and the demonstration of some of the equipment in the million volt laboratory of the California Institute of Technology. After a concluding luncheon, the party took up the post-convention program. This included a visit to the plant of the Trona Corporation at Searles Lake, an informal meeting at San Francisco where industrial plants and the great educational institutions were visited, and sightseeing about California and in the northwest, particularly at Portland and Mount Rainier.

The attendance at the meeting gave a total of 878, three being from Canada, one from India, one from the Philippine Islands, and two from Scotland.

H. E. HOWE

SERVICE OF THE AMERICAN CHEMICAL SOCIETY TO THE NATION[1]

THE happy idea of the local committee of having the president give his address at the close of the banquet has resulted in a lack of formality very agreeable to the speaker. I have been tempted to talk informally in an after-dinner style, but tradition demands the serious consideration of a subject of vital importance. In his admirable address last year, Dr. Baekeland stated that he had read the addresses of all the past presidents of the society. I had not the courage to follow his excellent example. I was afraid that I should find that all the words of wisdom had been spoken; that all the valuable ideas had been expressed. I did not want to be hampered by the thought that I was but repeating what had been better said by others. So the problem of this talk was approached in a way not in accord with the scientific method. Ignorant of the literature of presidential addresses some thoughts were written down boldly with confidence in the good luck that mysteriously looks after the cheerful in spirit.

[1] Given at a banquet in connection with the seventieth meeting of the society, Biltmore Hotel, Los Angeles, California, on August 6, 1925.

The attitude taken is consistent with looking ahead rather than behind. The cautious man governs his actions with a knowledge of the past. The statesman acts in the light of history. The reformer does not. The promulgators of revolutionary ideas have been ignorant of the facts or have disregarded them. They brought a fresh point of view to affairs. Their very ignorance of what experience had shown to be impossible made the impossible possible. I hope I have caught some of this spirit. At least I have dared to build castles in the air.

These commonplace remarks have been made not only to excuse myself of ignorance of the wise words of my predecessors, but also as a kind of preamble to an outline of some fascinating dreams that have floated before some of us who have keenly at heart the welfare of our great society. We have had a glorious past, the story of which will arouse us to enthusiasm when we hear it.

A year from now we shall have completed the fiftieth year of a continued progress in chemistry since the foundation of the American Chemical Society. We shall then stop to hear of great achievements. But to-day we can look to the future. Some years ago I saw a striking play in which two young men were rivals for the hand of the heroine. One was continually boasting of his blue blood; his ancestors dated back to Mayflower days and beyond. The other was a nobody of force and character. He finally silenced his rival and won his lady love by saying he had made up his mind that he himself would rather be an ancestor than a descendant.

How can we apply the incident to the American Chemical Society? Fifty years of achievement are about to become a part of the ages. Let us then turn from the past and look to the future. Which path shall we take of those that lie before us? How can the society best serve the nation, chemistry and us who are giving our lives to the science? Evidently by making chemistry more vital in the development of civilization and in adding to the happiness, comfort and wealth of the people; by increasing the fundamental knowledge of our building blocks, the atoms and of the mechanism of their interaction; and finally by continuing our work of educating the people in regard to what a potent factor chemistry has been and is to-day in the march of civilization. We all recognize the fact that in the last few years the attitude of the public toward the chemist has changed. He is a man of achievement, a wonder-maker. Everybody is glad to know a chemist to-day and looks on him as almost a superman.

How can we take advantage of the great start we have made? Chemistry in America is forging ahead at a rate that startles the world. I have just returned from Europe, where I was one of those who represented America in international gatherings devoted to chemistry. On all sides our achievements are recognized. American chemistry was honored in many ways and always was given the place of distinction. We have only begun our activities and there is much to do before we can finally say we lead the world. When we calmly review the grand advances in pure and applied chemistry that have earned the wonder of the world in the last decade, we are chagrined to find that we played no important part in them. We are but followers in the study of the atom; we marvel at the application of known knowledge to the synthesis of compounds of such technical significance as ammonia, acetic acid and methanol. And we have added only a bit here and there.

Let us see to it that such triumphs are born here in America. I am an enthusiastic internationalist and science is international; but we all have a particular pride which is natural and commendable in the achievements of those close to us. Every father wants his own boy to succeed. It is not provincial to want America to take the lead in chemistry.

I again ask the question: What can we do to win the first place and how can our society help? The answer to the first part of the question is self-evident to all, but the way to bring about the result is a problem for serious thought. We must increase the productiveness of research. During the past year I have been studying with great care the relationship between chemical research and industrial development. I have visited some of our largest industries based on chemistry and have seen the part played in their development by the work done in their own research laboratories and by that produced by the investigators in universities. I was markedly impressed by the fact that the industries are prepared to utilize at once the results of research in what for a better name is called pure science. They are supplied with chemists of the best training and of the highest type, who follow eagerly the world's publications. In a paper apparently of theoretical interest is found a fact that the technical man sees he can apply. In one great laboratory I found most of the research men feverishly carrying out work that was suggested by papers published by two university professors—one in Canada and the other in Germany.

The lesson to be drawn was clear. The work that can be done in the research laboratory of a great chemical organization is of one type—that done in the university laboratory is of another. But both must be done—one springs from the other. All industrial scientific advance has its roots in the academic soil.

We are safe in this country to leave the application of chemistry to those who are at present guiding our industries. We of the academic fraternity must see to it that we furnish the acorns from which mighty oaks will grow.

These statements bring me to one of the major subjects of my talk, namely, the relationship between academic research and industrial progress in chemistry. Wherever great progress has been made the importance of this relationship has been recognized. We could well study and follow the example of Germany. It has been my good fortune to see something of the cooperation between the great masters in research and the industrial organizations that have given German chemistry such high rank. Let us copy what has proved to be of great success. I am glad to note that such cooperation is increasing in this country. The man who is devoting his life to the study of a particular field of chemistry, who is adding to the world's knowledge by research, and who knows the details of what has been done can not help but be of the greatest value to the industry based upon his specialty. I have seen and taken part in the industrial development of chemical processes and know that the men directly concerned with the development are aided by the academic investigator, who approaches the subject from a more or less detached point of view. I feel confident that our industries will advance more rapidly when they seek more freely such scientific contacts.

The industries can help themselves in another way. They can formulate problems for research of a fundamental character based on their experience. The industrial research laboratories have all they can do to solve the immediate problems as they arise from day to day. They must deliver a process that works —the dollar mark is the vital symbol in all industrial chemical equations, as our friend Walker puts it. They can not stop to investigate the very fundamental facts and relationships underlying the processes used. It may take years, and new problems are pressing for solution. Many cases could be cited. We have been cracking petroleum for years, but what do we know of it from the standpoint of real organic chemistry? What do we know of the relationship between lubrication and the chemical composition of the lubricant? Who will solve the chemical problem of vulcanization? A start has been made to get into the hands of the academic investigator many fundamental problems which must be solved before many of our industries can pass from the realm of the arts to that of applied science. But much more can be done in this direction. Many men in our universities and colleges are eager to undertake the study of these fundamental problems, but they do not know where to begin or what to study. They do not care to attempt to solve the immediate technical problems—that is the business of the industry itself and should be paid for in dollars.

Although some men of the highest rank look askance at anything of a technical nature, I am sure every one takes joy in seeing the fruits of his genius and labor become of service to mankind. The ultimate test of value must be usefulness. It may be that the particular orbit of an electron is more specifically defined, but any idea must be capable of being used, to have a value.

I may be pardoned, I hope, if I say that the division of chemistry and chemical technology of the National Research Council has for the past few years seen the opportunity of developing our industries in the way I have just outlined. The work is now in excellent order and will be pushed during the coming year. Our great industries have responded cordially, and some of the more important fundamental research problems have been formulated. The next step is to win the cooperation of the university men. Measures are being taken now actively to bring about the kind of cooperation which must prove fruitful in time.

A second path is before our university men who wish to devote their energies to the development of our industries. Let them work in those fields of the science which are being applied. We are producers of vast quantities of petroleum products. We have the opportunity to develop great chemical industries based on an abundant raw material. We use this possible source of untold wealth only to move from place to place. Compare what coal tar and petroleum have done to add to our joy in living. Coal tar was studied by the greatest investigators and the results obtained aroused the admiration of the world. I believe petroleum offers the same possibilities. Let American chemists center their attention on the many fascinating problems awaiting solution in this field.

By cracking the crude oil we can make hundreds of compounds valuable as sources for myriads of products that will make over our life as coal tar did. I am not suggesting that any one try to make a fortune from petroleum, but that the many scientific problems pushing forward for study be approached in the same spirit that finally led to the triumphs attained in aromatic chemistry.

There are many other fields in which America should lead in pure science. The study of carbohydrate chemistry has just begun. We are making noteworthy progress in the chemistry of the organometallic compounds and are taking a commanding position in the study of the application of chemistry in medicine.

Again I want to emphasize the fact that I do not mean that our university men should become industrialists. Let some of them work in these fields that are being applied so successfully. Everything they do will be recognized and used. The most striking thing in applied science to-day is the quickness with which the results of academic research are utilized. Twenty-five years passed before any one made use of Faraday's epoch-making discovery of benzene. It would not be so to-day.

I have had nothing to say of the kind of research that changes the trend of the investigation into the unknown. This is logical because I have been speaking of the type of research that is more or less directed. No one would want the whole world to follow on the paths I have indicated. There are always geniuses who go their own way; unfortunately these are but few. We do not attempt to point the road. They should be provided with every material aid, and that is a part of the plan.

I have outlined in a somewhat discursory way how it appears to me chemistry can be made in the future a more vital factor in America. It all goes back to research. The industries should seek more fully than in the past the cooperation of individual academic investigators in solving their industrial problems. The industries should point out to the chemical world the fundamental unsolved problems underlying their procedures.

Many of our investigators should turn their attention to developing the pure chemistry of the fields upon which our industries are based. The investigator of genius should be encouraged to push his way into the great unknown and should be provided with ample resources for his work.

How can our society help to bring all these things about and how can it in perhaps more efficient ways encourage and support research? I said some of us had been dreaming dreams—daytime dreams. We see the fully developed rose in the tiny bud. The bud is the endowment fund, and it lies next to our hearts. I dream of the day when the society will be supplied with adequate resources to take such a place in aiding research that we shall be the envy of the scientific world. We have just made a start. We must have the cooperation of every one of our members. Each one must feel a personal interest in the success of the effort being made. Each one must see it from an altruistic point of view and at the same time recognize the fact that the development of American chemistry reflects itself on him individually. The dignity of the profession has markedly advanced in the opinion of the man in the street and the employer.

The results up to the present have been encouraging, but much remains to be done. Has each man done what his own conscience dictates? Have you been as generous to your science as to your religion? Think it over.

The large sum of money required to foster research as it should be can not be raised from our own membership. We are not rich, but can afford to do a great deal. But after we have done our best another path lies before us. We must go to the public, especially the men who have amassed wealth as a result of the work of the chemist and tell them the story of their fortunes. We want to say that our society to the last member has done its best. We want to tell the banker, the merchant that his life and happiness have been largely enriched by the chemist.

We can tell the story of chemistry in a way that many will understand, and I am confident of a favorable outcome. We must and we shall win.

As you go to your homes, spend a few minutes in the way I have spent hours. Think what you would do if you had a great sum to devote to the development of chemistry. Draw up a plan, so much for this, so much for that. I guarantee that if you are an optimist, and God help you if you are not, you will be full of enthusiasm and go home determined to wake up your associates to the beauty of the idea underlying our endowment fund.

Don't leave all the delights of achievement to others. Those of us who are steering the ship have an eye fixed on the star. Join the crew and be ready to cheer when we sail into port.

JAMES F. NORRIS

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THE TWILIGHT ZONE OF MATTER[1]

WHEN we crush and grind the ordinary coarse matter which we can see and handle, we can break it up into smaller and smaller particles. At first these particles can still be seen by the unaided eye, but as the process of grinding is continued, they become so small that they can be distinguished only with the help of a lens or of a microscope. One can carry the process of subdivision of matter still further, so that the particles become too small to be seen even with the aid of the most powerful microscope, and finally

[1] Address delivered before the seventieth meeting of the American Chemical Society, Los Angeles, August 3, 1925.