THE INFLUENCE OF ORGANIC CHEMISTRY ON MODERN CIVILIZATION

Abstract of address of Frank C. Whitmore, Dean of the School of Chemistry and Physics at Pennsylvania State College, and president-elect of the American Chemical Society.

Victory in war is still determined by the bayonet rather than by high explosive, smokeless powder, gases, and other revolutionary agencies developed by the organic chemist, Dean Frank C. Whitmore of Pennsylvania State College, president-elect of the American Chemical Society, declared in an address at the exercises dedicating the new chemistry laboratory of the University of Delaware.

"In spite of all the civilizing improvements introduced into warfare by the organic chemist, the decision still probably lies in the inorganic bayonet, the civilized equivalent of the uncivilized jagged rock in the hands of an infuriated cave man," said Dean Whitmore, whose theme was "The Influence of Organic Chemistry on Modern Civilization."

War, he pointed out, is a distinctly civilized activity, brought to bear on a specific objective which a nation either has chosen or has had chosen for it. "The cave man undoubtedly became involved in fights but hardly indulged in anything which we would call war," he added. "In modern civilized war, almost every peace time activity is exerted. We have reached the point where the old term 'contraband of war' either means nothing or includes everything.

"Since the organic chemist is active in almost every field of normal life, he will be at least as active in every field in war-time. A peculiar problem in the matter of clothing may become important as time goes on. This is the treating of cloth in such a way that it will neutralize the effect of mustard gas, the most effectively dangerous
of the war gases. It is said that the Russians have developed an organic chemical which will achieve this result."

Visualizing the possibility that the next great war will be between insects and men, Dean Whitmore said that it is the task of the organic chemist to deprive insects of their unfair advantage.

"Undoubtedly primitive man knew about insects and was troubled by them when he had time to worry about such small matters. On the other hand, he and his descendants up to very recent times had their insect troubles rather limited to local pests. Since the spread of transportation it appears that there will no longer be any local insect pests. The pests from each locality will be spread eventually to every other locality. This means trouble.

"In fact, some go so far as to say that the next great war will be between men and the insects and that the insects are really better fitted to survive. It is up to the organic chemist to overcome the unfair advantage which insects have. Of course, at the present time most poisons for insects are inorganic. Unfortunately, they are also poisons for animals. The present trend, and one which is accelerating very rapidly, is to use organic insecticides which are poisonous to insects but harmless to higher animals and man.

"One way of thinking of civilization is as the conversion of life to a city basis when more or less nomadic tribes settled down in certain favorable localities and there established cities and laid the foundation of our modern civilization. This brings the thought that we may be returning to the nomadic life by means of our automobiles and especially our trailers."

Perhaps the most striking difference between the diet of modern man and that of his cave man predecessor or even his more immediate ancestors of only a few centuries back is in the amount of sugar consumed,
according to Dean Whitmore. An average American today, he said, probably consumes more sugar than a whole city of Greeks or Romans did 2,000 years ago.

"Over 99 per cent of our food is organic in nature," he continued. "The organic chemist with his colleagues, the biochemist and the agriculturist, has changed our foods profoundly. Whereas the cave man probably never had enough to eat, many of us eat too much. Various substitutes have been recommended, such as the smoking of cigarettes. There again we have a marked and almost startling distinction between our modern civilization and most of the older civilizations. If there were no other distinction between men and the lower animals, it could be stated that man is the animal addicted to smoking.

"The organic chemist is having more and more to do with the raising and production of tobacco. At the present time there is a merry little tempest in a teapot because certain brands of cigarettes claim that the chemicals which they use are superior to those used by other manufacturers. Another modern substitute for food is the highly civilized article, chewing gum. Increasing amounts of chewing gum are being made from coumarone synthetic resin. This means that it will be possible for the organic chemist to modify and control the properties of our chewing gum as never before.

"Next to food the prime requisite of the cave man was clothing; although he certainly used much less of it than we do nowadays and probably was in no sense a slave to style. Most clothing is about 99 per cent organic material.

"An important present problem in clothing is that of rendering it proof against moths. In this field many organic chemists are actively at work in the attempt to produce odorless materials which can be impregnated into the cloth to protect it against moths."

In medicine, surgery, power, radio, photography, printing, and transportation by land, sea and air, notable advances are being achieved through organic chemistry,
Dean Whitmore went on. While the skeleton of the automobile is steel and metal, it is organic material which makes it an automobile in much the same way that organic material makes an animal although its skeleton is largely inorganic, he explained.

Dean Whitmore said that organic chemistry has to do with about half a million compounds of the single element carbon, which is only one of the ninety-two elements of which all material things are made.

"Organic chemistry can do nothing without many other kinds of chemistry and many other kinds of science. Fortunately, airtight compartments between different branches of science exist nowhere except possibly in the minds of a few of us and even there these barriers are disappearing.

"The cave man probably had nothing which could be called a spiritual outlook. In the succeeding thousands of years civilized man acquired such an outlook. Unfortunately, it was cluttered up with all sorts of superstitious fears based largely on his ignorance of the true wonder of the universe in which he lived.

"Within five years organic chemistry has been able to help man's outlook on life by discovering and studying many evidences of the unity of the living matter. For instance, a single type of molecule or organic chemist blueprint has been found to exist in such widely different vital products as cholesterol of the nervous system, vitamin D, the bile acids, the male and female sex hormones, the alkaloids of opium, heart stimulants such as digitalis, the active principles of certain poisonous toads, and various compounds which produce artificial cancer. Such discoveries give us a conception of the unity of life without destroying any of the wonder of it all."

If words are a science and tool of civilization, the organic chemist need take a second place to no one. He has an ever-going vocabulary of words which must seem most awe inspiring to the layman. On the other hand,
the organic chemist's words are peculiar in that they are self-explanatory—to the initiated.

"From two different viewpoints one can understand why some people prefer the name 606 rather than the true name meta, meta prime-diamino-para, para prime-dihydroxy-arsenobenzenehydrochloride. The first name is a word like 'horse' which does not tell what it stands for unless one knows what a horse is. On the other hand, the organic chemist's word tells the initiated what the material is and a great deal about it, including several probable ways by which it can be prepared. In other words, the organic chemists have carried this matter of making a vigen word carry a maximum of ideas to a very high degree of excellence."