

SOME PROBLEMS OF THE CHEMISTRY TEACHER

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We live in a world of chemical changes, at a time when the chemist's is the guiding mind of human contact with the material world. This century is the Chemical Age of the World's History. That man will be happiest who best understands the chemistry of himself and of the world about him. It therefore behooves us to spread a knowledge of chemistry.

The problems of the chemistry teacher may be classed into two groups: 1st, what to teach, and 2nd, how to teach. It is the choice of the writer of this paper to consider only the problem of what to teach. The subject of chemistry is now so large that no one person may hope to know it all. Topics must be chosen from this vast array depending upon what the student wishes to do in life. Our teachers of chemistry may be grouped into High School, College, Technical School, and University teachers. Each group has its own problem of what to teach. Let us begin with the High School teacher. He has pupils who will end their school days when they leave the High School. A second group will take the examination for teaching, and become teachers of physiology, geography, nature study, and elementary agriculture. A third group, the smallest, will go to college.

Chemistry is a useful subject and therefore every topic studied must by its usefulness justify the time spent upon it. What topics are best suited to these three classes of high school students? Let us consider the class that leave school to enter the ordinary walks of life. These students need as many of the facts of every day chemical experience as possible. Chemical theories have little value to such students. They need the facts so grouped as to be easily remembered. They need to know the effects of air, water, salt, and the common alkalies on the various metals in common use, the chemistry of food, of digestion, of respiration, of soap, and of some of the more common carbon compounds.

The second group of high school students, those that are to enter the teaching profession, of whom there are between 4000 and 5000 in Illinois each year, need all that the first group need and also the chemical foundation for the teaching of geography, physiology, and elementary agriculture. They need a vast knowledge of the chemistry of air, water, carbon dioxide, acids and minerals. They do not need much chemical theory or chemical arithmetic.

The needs of the third or college preparatory group are at the present time unknown; at least the colleges of the North Central Association have not solved the problem and most of them teach chemistry to the freshman class as if freshmen had never heard of chemistry.

Let us consider if there are not some of the topics usually taught to high school students that could be omitted without loss to the student's after-life activities, and the time saved used to better advantage. May not the chapter on Physical and Chemical Changes be left out? Do even you always know whether a given change is chemical or physical? And what difference does it make which you call it? Why devote time in the high school to the study of Boyle's and Charles' laws? Even if they were true the student may never have need to use them unless he goes to college, and he will have forgotten them long before that time comes and must relearn them. Where in the experiences of a wife and mother will a woman be helped by a knowledge of the periodic law, or of atomic numbers, or of the electron theory of the structure of the atom? Will a farmer raise better cows, pigs, oats, apples, or garden truck after he has spent hours in the study of the radio activity of uranium and thorium and the degeneration of one of them into radium and both into isotopes of lead? Had he not better spend his time learning the properties of common lead and the effects of lead arsenite on insects, animals, and plants? How useful to him is the knowledge of the structure of a factory for the manufacture of sulfuric acid by the chamber process compared to the knowledge of the effects of an excess of sulfuric acid in a super phosphate on his soil?

If some of those topics that belong to the advanced courses were left out, could not the time be used for the study of fuels and of the more important carbon compounds? The Technical Schools and Teachers Colleges have solved their problem of what to teach much better than have the High Schools, tho there is much yet to be done. The technical schools have labored with an eye on the completed product and I take off my hat to them.

What the Colleges shall teach to freshmen has about as many answers as there are teachers, and it looks to an outsider as if the answer is not yet in sight. Nearly all our teachers of chemistry in our high schools are college graduates, and 90% of them either take some high school text and follow it blindly or try to teach the high school children what they themselves were taught in their freshman year. The colleges have not yet solved the problem of what to teach prospective teachers of chemistry in the high schools.

If we agree that there is room for improvement in the choice of subject matter for High School Chemistry, what are we going to do about it?