

**THE VITALIZING OF HIGH SCHOOL CHEMISTRY.**

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What I am going to say on this subject is based on two convictions as to what high school chemistry should do for the student. In the first place a study of chemical principles and the practical application of these principles should give the student a better living acquaintance with his everyday surroundings, and in the second place the student should develop the experimental method of attacking problems and securing results.

It will probably be admitted that high school chemistry as presented in most of our secondary school texts is one of the most difficult subjects in the curriculum. A student's previous work may have been excellent in many ways and he may have done laboratory work successfully in some other subject, yet when he begins the study of chemistry he encounters many difficulties. He has to adapt himself to a new subject in new surroundings. He has to learn the names and formulas of many substances of which he has never heard. He has to learn a number of hypotheses, theories and laws to account for chemical facts. He has to learn to observe and interpret at the time of carrying out his experiments. These are a few of the things we expect of the average immature overworked high school pupil.

What then can we do to vitalize the teaching of chemistry? Let us first look to the recitation. The recitation should become a clearing house for the troubles encountered in the experimental side of the work. The various facts and principles should be brought out so that they can be grouped into a few large units for otherwise the student will retain but very little of the subject matter presented to him. Dr. Ira Remsen has said, "It is an easy thing to teach chemists chemistry, but it is very hard to teach beginners something that is worth while about chemistry in one year." Later on in the same article, Dr. Remsen laments the fact that we make too many fleeting impressions with no reminders, that we attempt to cover too much ground and that we do not introduce enough drill work such as is characteristic of the languages and mathematics. These facts lead me to believe that the first step in the vitalizing of high school chemistry should be in developing a good live recitation. In the theoretical discussion of the text I frequently find it necessary to reword and reinterpret what the author says. I sometimes outline the more difficult

lessons or ask a few questions which will lead to the most important thoughts.

Another good way to vitalize the subject is to call attention whenever possible to the application of chemical processes in the commercial world. The main difficulty here is that the high school student's knowledge of the commercial world is limited. Our more recent textbooks are doing a great deal for us in this direction so that it is becoming increasingly easier to relate the chemistry of the classroom to the chemistry of the outside world. And then, too, a great many industrial plants are glad to present samples showing the various stages in the manufacture of their products. Collections of this kind should be made and shown to the class at the proper time. The Corn Products Refining Company of New York have an interesting educational exhibit on corn and its products; likewise the American Cotton Oil Co. on cotton and its products; Belding Bros. & Co. on the manufacture of silk; The Dixon Pencil Co. on the manufacture of a lead pencil, etc. There are a large number of others that could be mentioned.

Another very helpful means of securing interest in places where industrial plants exist is to visit such places as will show chemical and other scientific processes in operation. Florence is a small town but we are fortunately situated in this respect, for we have several interesting places to visit. Among them may be mentioned the iron furnace, oil mill, cotton mill, ice plant, gas plant, steam laundry, wagon factory and stove foundry. Before making the trip, the class is given an outline of chemical and whatever other important scientific processes are involved. They are then taken through the plant where they make their own notes and afterwards write up an account of the trip in their notebooks so that it will become a part of their permanent laboratory record. With us these trips are made after school hours. The students are urged though not required to go. Out of a class of seventy pupils in no case so far have less than sixty pupils attended, and in one case, the visit to the ice plant, every member of the class was present. This shows that they are interested in this phase of the work.

Another most important way to vitalize the work is in the laboratory. In my own case during the first half of the year I give a series of experiments covering the fundamental principles, experiments such as will be found in almost any good secondary manual. During the second half of the year experiments of a

practical nature are introduced such as the making of safety matches, gunpowder, soap and a large number of the simple food tests. In every case I try to avoid introducing an experiment which employs a test which the student can not be expected to understand.

These are a few of the ways in which I attempt to vitalize the work and while I have by no means reached the goal for which I am striving, I can not help but feel that with each succeeding year a course is being developed that is more worth while from the standpoint of the high school pupil.

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### FADS.

One hears nowadays so much about the subject of fads that he is sometimes disgusted and at other times puzzled to understand just what is meant by the term. In the opinion of the writer there is no such thing as a fad, yet for the benefit of those who would like to see a definition of the word, here is one from the writer's point of view. A fad is that for which the person so calling it has no use, either theoretical or practical, but for which the person studying it has use, in order to earn his daily bread.

Many people have the impression that this is not a cosmopolitan age, and that in our large centers of population people do not have many varied ideas or conceptions of education. This is a mistaken idea, because in large congested centers of population there are very many ideas as to what education comprises. There are numbers of people who desire to become proficient in this or that subject, which to others appears to be absolutely worthless and of no educational or economic value. In the high schools of every city of at least 100,000 inhabitants, provision should be made in the curriculum for giving instruction in every subject for which there is a considerable demand. The writer means by a considerable demand, say a desire on the part of at least fifteen individuals, and he would advocate instruction, where there is this demand, in subjects which our conservative friends would designate as fads.

Our schools are not supported primarily for instruction in Greek and French, mathematics and science, but for the purpose of training our boys and girls to become useful citizens of such a type that they will do something to add to the economic, social and intellectual worth of our country. If one is interested in mechanical drawing and has no ability in languages, arrange his course so that his major study is mechanical drawing. If a person demands instruction in practical electricity, arrange matters so that the bulk of his time will be spent on the subject in which he is vitally interested. If he wants mathematics and has an aptitude for that, give him mathematics. The contention of the writer is that the best and most efficient results are secured in the long run by developing the individual in those directions in which he has a special aptitude.