Some Chemistry Projects at Booker T. Washington School of Cushing, Oklahoma

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In an attempt to get away from the hum-drum routine usually experienced in the teaching of chemistry, we have tried the project method of approach to the subject. The project method of teaching is one by which an extended problem or series of related problems growing out of the students own interests and endeavors at problem solving may be followed. It is the purpose of this paper to describe briefly the project as we have tried it at Booker T. Washington.

The course began with two weeks of regular textbook reading and discussion. Our procedure then shifted to the project method. Some of the reasons for using the project method were listed as follows:

1. The expressed desire of the student to know the relation of chemistry to the industrial products of everyday use.
2. Student interest in science fairs and science talent searches.
3. A desire on the part of the teacher to try this much discussed method of teaching, and to experiment with a new approach which would seem to make the teaching of chemistry a little more dynamic.
4. It was thought that the traditional chapter by chapter approach could be eliminated as easily as the teaching of the alphabet prior to reading in the child's training.
5. It is also believed that the student's learning in chemistry comes within the frame-work of his imagination, which is enhanced by his experiences with everyday things.
6. The method utilizes the vital factor of student interest.

The order of procedure used in this method began with the listing of the products which the students wanted to make during the school year. These products were selected for simplicity of formation and for the effect of their familiarity within the students' experiences. The list included such articles as soap, vinegar, glue, perfume, dentrifices, nail polish, hair pomades, cold creams, and lotions. The products and their methods of formation were next considered for their value in teaching the processes and skills covered in the text.[1]

In the preparation of these products the students get an introduction to and an understanding of the following processes:

1. The name and uses of chemical apparatus and reagents.
2. The characteristics of mixtures and compounds.
3. Calculations of molecular weights of compounds.
4. The writing and balancing of chemical equations.
5. The interconversion of weights and volumes by the use of specific gavities and densities.
6. The meaning of moles and molecular relationships.

[1] Rawlins, G. M. and Strubble, A. H., 1948, *Chemistry in Action*, Boston, D. C. Heath and Company.

Chart I

Unit	Topics Discussed	Preparation or Project	Principle Illustrated	Skills Involved
Theory of Solutions	Formation of Solutions	Tincture of Iodine	Distribution of a solid in a liquid	Using the balance; measuring liquids; Calculation of component percentages
		Antifrceze	Parts of solution	Solution
		Vinegar	Distribution of liquid in liquid	Solution
		Purification of table salt	Saturated solutions and Crystallization	Crystallization; Solution; Filtration
	Colloidal Dispersions	Floating soap	Gas dispersed in solids	Dispersion
		Liquid Glue	Partial digestion of cellulose	Dispersion; Digestion
	Emulsions	Hand Lotions; Oil Polishes; Wax-emulsion Polishes	Emulsification and Dispersion	Dispersion
	Acids, Bases, & Salts	Table Salt	Neutralization of an acid by a base; Double Decomposition	Titration; Calculation of Normalities

7. Developing common laboratory skills of distilling, titration, etc. As an example illustrating the above statement, a typical unit and the preparations adapted to it are listed in Chart I.

All students of the current chemistry class are subjected to these general projects. One superior student however, has been given an additional assignment. He is entering the Science Talent Search, conducted by Science Clubs of America. In partial preparation for this, the student has been assigned a project involving the "Isolation of Some Amino Acids from Their Natural Sources". Some of the separations undertaken are:

1. Arginine from gelatin—in the form of arginine monohydrochloride.
2. Glutamic acid from flour.
3. Cystine from Human hair.
4. Glycine from hippuric acid, prepared from urine.

From the results thus far obtained in our school the project method of teaching chemistry is a fairly successful one. It must be understood that the procedure followed in this plan was with a small class and would probably present certain problems if tried with a very large class. Further experimentation will be necessary before final conclusions are reached.