SCIENCE BULLETIN

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EDITORIAL

Scientific standardization, both of materials and labor, is one of the most outstanding developments of the last decade in the industrial world. Apparently the last group of people to apply this method to their own problems are the very ones who originated the principle. We refer to the scientists and especially to the teachers of science. Our study of the science course offered in secondary schools and our experience with college students in science emphasize the entire lack of uniformity among high school science courses.

The year 1929 promises to mark a great advance for Iowa's high school science. There is hope that the shoemaker's children are soon to be shod. The state department, at the instigation of Superintendent of Public Instruction Agnes Samuelson, has enlisted the services of a large number of teachers and supervisors of science. These groups are preparing outlines of a course of study embracing all of the high school sciences, such outlines to include the lists of topics, suggestions for presentations and desirable outcomes. The same plan is being carried out for all high school subjects. Science Bulletin hopes to list all of its readers among the users of this syllabus when it appears from the press next fall.

IMPROVED METHODS IN SCIENCE TEACHING

Teacher Training

Pasteur has said that "in our century science is the soul of the prosperity of nations and the living source of all progress." Teachers of this important branch of knowledge, then, should carefully consider the methods of instruction in the science departments of our secondary schools. As these methods vary considerably, no general criticism of them will be attempted here. However there are certain fundamentals that merit attention, and in this paper we will examine three of them.

High school science teachers commonly are criticized for requiring their pupils to memorize a large mass of unrelated facts. This criticism is pertinent only when the word **unrelated** is applied with entire justice. Too often it is rightly applied, especially when the teacher is inexperienced or inadequately trained. But under no teacher or system of learning can the well instructed child escape the acquisition of a large number of facts if he is to be properly grounded in any science. However the work should be so directed that as the child learns facts he is led to an understanding of the principles that underlie them. To make this more effective, each small unit of facts or group of units should be organized around some scientific principle intimately related to the life of the pupil. The memory requirements may be limited to the laws or principles until the pupil becomes familiar with their application.

This leads us to another point of criticism: that the pupils are not taught to make practical use of the scientific laws and principles which they learn. Downing states: "We do not transfer our training readily. The knowledge acquired in school is kept for school use - -. A student in biology may learn Mendel's laws, but unless the teacher takes pains to show how these laws apply to the human situation, not in a single instance, but repeatedly, the law remains a bit of interesting school science but has no effect on life's problematic situations." (Page 102 of Teaching Science in the Schools, by Elliot R. Downing, University of Chicago Press.) The need then is that the teachers of high school science shall teach the pupils to apply the principles of science to the things they are doing and thinking outside the class room. The teachers need a broadness of interest, an alertness of mind, and a proficiency in the fundamental principles in order to accomplish this. The success of this transfer of knowledge depends almost entirely upon the teachers, nor can they rely solely on the textbook or on a file of old lectures to make their teaching practical and effective.

In the third place, methods used in laboratory work have been a tar-