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PERFECTING THE IDEAL OF
GENERAL SCIENCE

While the committees on admission and classification of students in our universities are in the habit of accepting high school units of work in the sciences, no small number of instructors in charge of the university departments of science will be frank enough to tell an applicant they wish he had not had any preliminary training, if it deserves the name, in their special sciences; that it is too frequently a greater handicap to the instructor than an aid; that it would have been more satisfactory, in the long run, both from the standpoint of the university and of the student, if the latter had devoted himself to the study of mathematics and the languages, especially English and Latin. While there is a tendency on the part of those in charge of the secondary school course of study to attribute this attitude to the irritability of special instructors because their peculiarities are not immediately accepted as the highest authority, yet the question may be raised as to whether or not the seeming deficiencies of the freshman science student may not be more largely due to differentiation and specialization without any science foundation than to any other cause.

Whatever the conclusion that one may reach as to the merits of this viewpoint, it seems quite apparent that the science of the secondary school, differentiated as it usually is after the first year, is undergoing important changes in content, as well as treatment. It is not too sweeping to assert that the science of the high school is destined to become in no distant future much more "general" than even the general science advocates are urging, if the same progress towards rationalizing science teaching is made within the next dozen years as has been made in the past decade. In other words, if we can overcome the handicap of textbooks *ad nauseam* and limited science preparation on the part of instructors, we will soon be teaching *science* rather than *sciences* in the high schools, and leave the differentiation, where we leave it in other subjects, to the colleges and universities.

There is apparent a growing sentiment that differentiation of the sciences should come

only after a general foundation of scientific training and information makes this an undertaking of intelligent selection. Then the choice will not be a fanciful one, determined by some momentary whim; and the insight gained from science, by proper training and habits, will make the possibility of achievement in any of the special sciences more certain. If the claims advanced for a year's work in "general science" in the first year of the high school can be substantiated, it is obvious that most of these claims apply equally well to an extension of the time to all four years of the high school course.

The difficulty that now retards progress towards this ideal is, of course, a satisfactory nucleus, or nuclei, necessary to carry the subject on from year to year in a progressive way, without repetition or oblique presentation. Even limited, as it is, to one year, the tendency in general science teaching is towards expansion and emphasis where the special preparation and interest of the instructor lie. The desire, moreover, of the average instructor to make himself a specialist along some one line of science makes not only for unwillingness to spread himself, as he feels it, over so wide a territory, but creates the feeling of unpreparedness except along his special line of thought and work.

As, however, there is a scientific method of thinking, the scientific attitude towards life, scientific habits, as well as scientific information, these can well become the objectives, rather than so much biological, chemical, or physical data. The fact that our science teaching does not produce love for truth, well directed curiosity, logical habits of mind, and such other results as could be expected, suggests that we are too much occupied with the external facts of science to inquire into their meaning and to give this study an opportunity to react as it should. We talk vaguely, it is true, of the power of observation and inference that a course in science should develop in us, but how rarely is it realized! The essential thing is most certainly not quantity of data, but correctness of data and developed powers and right habits. These are the results that would be welcomed in the college freshman, as a substitute for the know-it-all air, when he takes up his maturely selected science or group of sciences.

A systemized course in what is now com-

monly called "general science," or what we shall possibly learn some day to call "science", the aims of which shall conform substantially to those stated or implied in Huxley's *Physiography*, meeting the needs of a special group of boys and girls, not being a complete exposition of the principles nor the presentation of all the facts of any one science necessarily, but rather the facts and principles of science gathered around some nucleus forming the keynote of the life and needs of the group, would meet more nearly the results aimed at in science than the formalized presentation of a particular viewpoint in chemistry or physics or agriculture. Suppose the situation is that of a rural high school. Shall we adhere to the regular program of a half year in physical geography, a half year in agriculture, the option of a year in formal biology, and the requirement of either chemistry or physics? Rather let us suppose that the facts to be known, as well as the habits and abilities desired, are those that are intended or supposed to fit the student for a helpful, happy, constructive life on the farm. Is there not a suitable measure of the student's needs in this case? Would not agriculture, with its modern finish, constitute a reasonable basis of the scientific work in this situation? The cultivation of the soil for the benefit of man, an honorable and essential industry, is the motivating principle of this science work. Let the starting point vary as it may, as elaborate a course as one could wish may be gathered around the projects and problems that could be brought up for intelligent consideration; and whatever of chemical, physical, biological, geological, or geographical data may be necessary to give a real understanding and appreciation of the vital aspects of the problems can be introduced. An elementary training of this kind, though not in conformity with any particular text, would doubtless produce better results than are obtained in the majority of cases through the use of a special text.

The general science idea is developing rapidly; behind it there is an ideal, not yet realized. It is better organized and more scientific than the old Natural Philosopher's hodgepodge of scientific facts. It is not made up of scraps of the sciences, but is a unified, logically developed oneness, capable of duplicating Nature's presentation of principles,

and with its indifference to differentiation. Is it towards this that secondary school science is tending?

JAMES C. JOHNSTON

VI

ITEMS OF GENERAL EDUCATIONAL INTEREST

"FORD EDUCATIONAL LIBRARY" LAUNCHED

According to a statement from the non-theatrical department of Fitzpatrick & McElroy, Chicago, sole representatives of the Ford motion picture laboratory, the laboratory is engaged in the production of an educational film library, to be known as the "Ford Educational Library," that will provide for the schools and colleges of the world films distinctly for classroom use, in a way that will make them of greatest value and easiest to obtain.

"By placing at the service of every educational institution product based on the principles of sound pedagogics and edited by leading professors of the universities of the United States and competent authorities in screen instruction in the schools, Henry Ford not only will supply school needs but will fulfil the ambitions of the pioneer professors and instructors, until now seriously handicapped in their efforts to secure films designed by teachers for teachers' use in classroom work," the statement reads. "On September 1 the first issue of this library will be available to every school in the United States. The subjects will be specially prepared for use in any classroom by members of the scholastic profession who are experts in their particular line and the units as arranged will be distributed under a plan that will fully meet all conditions in each school, whether the schools be large or small. The library will further offer to every university and college in the United States facilities for the production by their own professors of films for world-wide school use in any quantities that may be necessary to meet the constantly increasing demand.

"Dr. S. S. Marquis, former dean of St. Paul's Cathedral, Detroit, who has repre-