Curiosity the Prime Factor in Learning Elementary Science

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Many scientists and educators of today find fault with the layman's definition of *science* as an organized body of knowledge about a subject. Rather, they feel that *science* is a way of thought and investigation that tends to discover new knowledge and to help organize it. Characteristic of the method is that new phenomena are examined critically in the light of what is already known. Few who have observed the development of an individual from babyhood can doubt that the very young are quite adept at this type of discovery. Long before language is acquired by an infant, one can almost feel the mute question, "What does it taste like?" as he examines bits of food, toys, or scraps of paper. Probably the first concepts of distance are discovered in an attempt to taste the light hanging from the ceiling or the moon shining in the window. Within the time of a few short months an incredible number of observations must be made, data processed without benefit of mathematics, conclusions formed and knowledge put to work in explaining new phenomena as the individual is motivated by his curiosity to explore and explain his environment. By the time he starts to school, he has spanned much of the knowledge gained through thousands of years of history and can use language, simple tools, and simple machines.

Is it not, then, natural that this driving curiosity is so useful a tool in continuing his education? Particularly does this seem useful in science, since the feeling of discovery and accomplishment can be made so frequently the reward of effort. Compared to this exploratory method of presentation, the offering of mere facts for memorization is much like the spoiling of the enjoyment of a good movie by an unthinking person who continually relates in advance what will occur in the next scene. Actually, when one considers the great store of known facts today, the attempted learning of all of even a small area by rote or drill seems quite futile anyway. Almost as futile is the attempt to select out just the necessary ones for a person to use in a world that has not as yet been invented and may by the time the child reaches adulthood be entirely different from the one in which we live. Many, therefore, feel that elementary students gain more by using facts and concepts as tools for the learning of critical thinking.

A new in-service training program for elementary teachers in this state has provided opportunity to observe students under various methods of instruction and at all grade levels of the elementary schools. This program had its origin coincident with a change in elementary science text books throughout the state. It was designed to help in the change from teaching or reading about science to the teaching of science itself. As the program progressed, intensified short "lessons" were given in some two hundred classrooms over the state in an effort to determine the relative efficiency of the various methods of learning concepts. Although testing and the resultant data are not sufficiently complete for publication at this time, it is the opinion of the investigators that the various methods rate as follows in efficiency:

1. Methods in which the child's own personal experiences and observations are utilized. Here the full interest and curiosity of the child is demanded, since he, himself, is involved. This is the basis, of course, for the use of the laboratory in secondary and higher education.

2. Observation of the experiences of others. Many things do not lend themselves readily to classroom experimentation but may be demonstrated easily by the teacher or one of the class.

3. Observation of the experiences of others through the medium of audio-visual aids.

4. Reading or hearing about the experience of others, through which method the bulk of what is learned must be acquired, apparently is effective only after curiosity is stimulated by one of the other methods.

The importance of leaving many questions unanswered should not be left unmentioned in motivating children to explore for themselves. Such demonstrations as lead them to "discover" concepts through their own devices are apparently very effective. Nearly all of the teachers involved report that children may in this way be stimulated to read more, form hypotheses of their own, and devise tests for their hypotheses. Many can be guided into chains of concepts by finding new problems when they test their hypotheses, and many frequently "invent" practical uses for the knowledge gained.

It is felt by an almost unanimous majority of the teachers contacted that this type of teaching may result in a more lasting self-motivation throughout the child's career in school, reducing the "I dare you to teach me" attitude so apparent in many in the upper grades. No way of validating this theory is seen at the present, since the newer methods must be used for six years before graduates from elementary schools will have had full benefit of them. If this does occur, and further studies should be made in the area, the impact upon the junior high school and high school curricula could doubtless be very great.