Journal of the Minnesota Academy of Science

Volume 5
Number 8 *Volume 5 (1937)*

Article 15

1937

Problems in the Improvement of Instruction in Secondary-School Science

Palmer O. Johnson
University of Minnesota

4. The percentage of children having animals is about the same for all the grades from the third through the twelfth; thus school grade is, apparently, not a factor determining the ownership of animals.

5. The wealth of the school district seemed not to be a factor in determining the number of animals in the homes of school children.

6. A somewhat more marked difference was shown when a comparison was made between the homes in which children live and the possession of animals. Children living in houses on lots ranked higher in the percentage of animal ownership than did those living in duplexes and apartments; those living on farms ranked practically 100 per cent for animal possession at home.

7. A specialized school for physically handicapped children with a school population of 94 reporting for this study showed 65.9 per cent having animals at home and 35.2 per cent reporting having one animal. This condition showed no appreciable variation from the schools for normal children in the percentages of children enjoying animal ownership at home.

8. Small groups of children with memberships in each of three different outdoor organizations were studied in relation to ownership of animals at home. Boy Scouts reported 71.1 per cent, Girl Scouts 73.0 per cent, and Campfire Girls 73.3 per cent possession of animals. These percentages are slightly higher than that for the larger group of children of this study reporting possession of animals at home.

Other studies have shown that animals in the home have a distinct effect upon a child's life. This study demonstrates beyond question that a large proportion of Minneapolis and Minnesota school children have animals in their homes, and that animals are owned under practically every home condition. It remains for teachers to learn more about and make plans to use the great wealth of material offering opportunity for home study of animal life.

PROBLEMS IN THE IMPROVEMENT OF INSTRUCTION IN SECONDARY-SCHOOL SCIENCE

ABSTRACT

The issues underlying the improvement of instruction in secondary-school science are summarized under three headings: (1) the purposes of instruction in science, (2) the means by which the purposes are accomplished and the best estimate of the extent to which they are attained, and (3) the preparation of teachers for the tasks they perform, and how teachers may grow professionally.

PALMER O. JOHNSON
University of Minnesota

Most people would agree that some training in the methods and ideas and facts of science is an integral part of the educational process. We need to know something about nature, including our own nature, not only for its intrinsic interest, but so that we may maintain our present control over it, and improve upon our control. The educational aspects of the problem pertain to the ways of attaining the values science instruction has to offer.

There is no list of objectives of science teaching which is uniformly acceptable. The most recent authoritative formulation is that presented in the Thirty-first Yearbook, Part I, of the National Society for the Study of Education, 1932, under the title, "A Program for Teaching Science."

> The aim of science teaching should be contributory to the aim of education; viz., life enrichment. It recognizes the objectives of science teaching to be the functional understanding of the major generalizations of science and the development of associated scientific attitudes.

An analysis of the list of objectives as stated by teachers in service shows that, with relatively few exceptions, the aims are stated in terms of immediate objectives rather than in terms of ultimate goals.

A conception of objectives in terms of the behavior of students and of education as the art of assisting their growth will likely be reflected in the teaching process. There is evidence in current practice of an excessive academic element with its educational mind blindness concentrated upon subjects rather than upon students.

The problems underlying the curriculum and methodology of instruction are numerous and diverse. The problems connected with the part science should take in the elementary school are fundamental. We have no well conceived plan of giving unity to science instruction. There is too much of an attempt to fit pupils into moulds thought desirable by adults. Frequently our approach is an appeal against human nature.

The unity and continuity of instruction may be considerably enhanced by the continued interchange of references between related subjects. There is a cleavage between the physico-chemical and the biological branches of science.

The science work of the seventh, eighth, and ninth grades should be organized as an integrated sequence. The work in science at this level should be centered in those principles and generalizations of science which contribute directly to the understanding of the adaptations of living things to their physical environment. The offerings in science in the tenth, eleventh, and twelfth grades are usually general biology, physics, and chemistry. It is recommended that chemistry should follow physics and that the two courses should be planned so that they may constitute an integrated sequence.

The teacher of science ambitious to increase the effectiveness of

his instruction will resort to experimentation with new and varied teaching techniques to the end that he may more effectively adapt his methods and materials of instruction to the individual differences of his students.

The conviction that examining is not separate from, but is a part of, skillful teaching technique has been gradually growing. Problems of the measurement of the outcomes of instruction are among the most difficult, but the information accruing from reliable and valid measures is of first importance in the improvement of teaching practices. Illustrations of the effectiveness of a cooperative attack upon the problems of measurement and the uses of examination findings are given by the program in operation among science teachers in Wisconsin and by the program in operation at the University of Minnesota.

A recent investigation of teachers of science in the secondary schools of Minnesota by Dr. S. E. T. Lund indicated that the teachers had adequate college preparation in but one of the science fields, and were not adequately prepared to teach any of the generalized high school science subjects.

There is need for improved standards of preparation of science teachers as well as for improved bases of accrediting teachers for the subjects they teach. Much of the responsibility rests upon school administrators and other school authorities for the allocation of teaching duties among teachers in accordance with their special training, aptitudes, and interests.

THE VALUE OF A JUNIOR ACADEMY OF SCIENCE IN THE TEACHING OF HIGH SCHOOL SCIENCE

M. H. KUHLMAN
Stillwater High School

To appreciate the value of the Junior Academy one must first look back to the conditions existing years ago. Then he will note the changes that have been brought about and the factors that have contributed to these changes.

Perhaps looking back 15 years will give a picture sufficiently clear for illustration. Pick up a science textbook of that period and examine it carefully. Does it not remind you of a college text? Its main difference lies in the fact that there are not so many pages. Some speakers have stated that a high school science textbook is a college text with some of the pages removed.

Perhaps one can understand why these texts were so similar when he recalls the real purpose of science in the curriculum. Science was a requirement for entrance to most colleges and therefore it had to be taught as the colleges dictated. They wanted it to be