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required to present the results of aptitude tests administered by the University testing bureau.

Professional Curriculum

In the four years in the professional curriculum, the student takes two pre-clinical years, consisting of courses in gross and microscopic anatomy, embryology, physiological chemistry, physiology, general and pathogenic bacteriology, pathology and parasitology. During the last two or clinical years, the student spends at least three hours per day in the ambulatory clinic (which services farms within a radius of about 25 miles), the large animal medical and surgical clinics, the small animal clinic, and in the several clinical laboratories. Courses taken in the clinical years include pharmacology, obstetrics, surgery, radiology, public health, sporadic and infectious diseases of large and small animals, milk and meat hygiene, diseases of poultry, and diseases caused by poisonous plants.

The Problem Stated

It is in the domain of the secondary school teachers that students showing aptitude for a professional career may be best counselled. Young men and women of good scholastic ability who appear scientifically inclined, and who like animals would do well to consider the advantages of veterinary medicine. The degree of personal satisfaction in point of service rendered is no small part of the reward of the veterinarian. No less is that of the constant stimulus of new challenges, new disease agents and methods of diagnosis and control. The veterinarian must be one who likes living in small communities and likes being outdoors much of the time.

We should like to suggest, in conclusion, that when a student is considering veterinary medicine as a career, he be advised that it would be well worth his while to get a closer look, that he come here and see the students and staff at work. We shall be glad to meet him and his family and do our best to present the various aspects of veterinary medicine as a career.

PRINCIPLES AND EXPERIMENTS DESIRABLE FOR A COURSE IN GENERAL SCIENCE AT THE JUNIOR HIGH SCHOOL LEVEL

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The purpose of the investigation was to determine the relative values of the principles desirable in a general science course and

some of the experiments which could be included in such a course. It was to be determined, too, whether these experiments would more appropriately be done as demonstrations or as individual laboratory experiments. As the teaching of science by means of broad generalizations implies the use of the inductive method, it was necessary to include only those experiments which lend themselves to this method of teaching.

An historical study of the rise of general science in the junior high school was made with attention to the content of general science textbooks.

Since it was our thesis that science can be taught by bringing children to the realization of broad generalizations, there was gathered together the research and opinion on principles as the basis for science teaching. There is much research and expert opinion to support the thesis.

It also seemed necessary to include the findings of research in the determination of scientific method and scientific attitude as it concerns the secondary school.

Our historical research also showed a very strong case for individual laboratory work in science classes for certain specific purposes. It is interesting to read that much of the laboratory work was done by individual students until the great influx of children into the high schools in the first two decades of our century. With the immense numbers of pupils to accommodate, demonstrations and group experiments were substituted for individual work and, of course, have been retained. Demonstrations and even group experiments have their place in our teaching, but the individual method of teaching also has its place and must not be left out.

Following the work of others in the field, notably Wise and Martin, the following criteria were used in the definition of a principle.

a. To be a principle a statement must be a comprehensive generalization describing some fundamental process, constant mode of behavior, or property relating to natural phenomena.
b. It must be true without exception within limit specifically stated.
c. It must be capable of illustration.
d. It must not be a definition.

The principles from Martin and Wise, and Caldwell and Curtis, were compiled into one list which was refined and culled for duplication. From this first list were taken the principles which might, in any way, be used in a course in general science. These were then rewritten, when necessary so that they might be understood by a seventh grade child. A list of 302 principles coming from this work were submitted to four evaluators, experts in the field of science teaching, who judged each on an algebraic scale. It was found that 253 of the principles were given a positive rating indicating that,

in the opinion of the judges, each was desirable in a general science course. The desirability of each principle is indicated by a rating which may be as high as 12 or as low as one.

Of the 253 principles accepted by the judges, 109 of these were principles of physics, 21 of geology, and 11 of chemistry — a total of 141 principles of physical science — and, consequently, 112 principles of biological science.

The problem of finding experiments which migh be utilized in the teaching of these principles involved searching the workbooks and textbooks in use in the United States in the ten-year period starting with 1938. Forty-six sources were read page by page and from each the experiments were copied onto cards. This procedure yielded many hundreds of experiments but there was much duplication. After the group of experiments was culled, some five hundred remained.

When the group of experiments had been classified, each principle had assigned to it the experiments which seemed to be of use in the teaching of the principle. Then each experiment which could be used inductively was recast in question form so that a child could perform the experiment, answer the question, and in some cases, realize the principle involved. In many cases, several experiments are necessary for the realization of the principle by the child. From this work came the list of principles with experiments assigned to many, but not all of them.

This list, too, was subjected to the four evaluators and all experiments submitted to them were judged to be contributory to the principles to which they were assigned. Of 248 experiments so judged 223 were judged contributory by all four judges. As in the case of the principles, each experiment received a rating indicating its value as related to the value of the other experiments. Since each experiment was adapted to inductive teaching and had to be judged of value in this light to be accepted, it seems obvious that there are many experiments which may be used inductively in the teaching of general science.

Of the total of 248, 71 experiments were judged to be suitable for demonstration only but, on the other hand, 178 were judged, by at least one evaluator in each case, to be adapted to individual laboratory experiments. That is, 71 per cent of these experiments can be done by an individual pupil.

The findings, abbreviated, were as follows:

1. There is an abundance of principles of all fields of science suitable for the general science class.

2. Many offerings from both physical and biological science should constitute the course.

3. The large number of experiments which were judged suitable for use with the inductive method, indicates the appropriateness of this method in junior high school.

4. The experiments were judged suitable for performance with simple and inexpensive materials. Even a school with a meagre amount of equipment may teach an acceptable laboratory course in general science.

5. The importance of demonstration in a general science course is illustrated.

6. Since 71 per cent of the experiments lend themselves to the individual laboratory method of teaching, it seems that this method is not only appropriate, but is worthy of much wider use than is generally made of it.

THE INDUCTIVE COMPARED WITH THE DEDUCTIVE APPROACH TO TEACHING SECONDARY SCHOOL CHEMISTRY

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The purpose of this study was to compare through experimental evaluation the learning of students instructed in such a manner as to stress the use of the inductive approach in high school chemistry laboratory exercises and correlated discussions with the learning of students who were instructed by the use of the more commonly found deductive-descriptive exercises.

The inductive and deductive classes were chosen by random sampling from the 1948 chemistry enrollment of University High School. Seven additional control groups were chosen randomly from Minnesota schools having the same general size as University High School. Each of these control groups participated in the measurement of only one part of the total study. No attempt was made to control the type of teaching in these classes but careful evaluation indicated it was essentially of the deductive type.

All students were given an intelligence test and were pre-tested and post-tested to measure: (1) their knowledge of facts and principles; (2) their ability to apply principles in new situations; and (3) their knowledge of and ability to use the methods of science with an accompanying scientific attitude. University High School students were also given retention tests four months after the completion of the course and "end of the term" examinations for laboratory skill and resourcefulness.

Analysis of variance and covariance was the basic technique used in the analysis of data concerning only University High School groups, the central experiment. In its use pretest and intelligence quotients were held constant in the analysis of the non-laboratory data. For the laboratory skill and resourcefulness data, only intelli-