

**THE USE OF TEXT-BOOK AND SYLLABUS COURSES IN GENERAL SCIENCE.**

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In connection with a recent study of extensive reading of general science,<sup>1</sup> the author sent to the heads of departments of general science in two hundred six selected high schools throughout the United States, which seemed likely to represent the best equipped, most ably instructed, and most progressive secondary schools, a questionnaire for the purpose of determining the extent to which extensive reading is now employed in high schools throughout the country in connection with, or in place of, text-books and syllabi.

While the data from the replies received were analyzed and interpreted in the light of their bearings upon extensive reading, the answers to several questions reveal some very interesting facts indicating what must be representative of the best current thought and practice with respect to text-book and syllabus courses in general science.

As a part of an extensive study of "The Administration of Secondary School Units,"<sup>2</sup> Koos gives information bearing upon these same subjects, secured from questionnaire responses received from nineteen high schools, representing six states in the North Central Association. Koos found that five of the fourteen schools answering this question (35.7%) made no additions whatever to the texts used in the courses in general science, and six (42.9%) made additions to the text. The material which follows throws additional light upon this phase of Koos' study.

Below are quoted those portions of the author's questionnaire which bear upon these topics, with a summary of the information given in the replies. The first figures following the various items give the number and the second figures (in parentheses) in every case give the per cents of the total number of replies received from schools offering general science, in which those statements were checked or those answers given. Many of the questionnaire blanks were incompletely filled out.

Number of questionnaires sent out to selected high schools, 206.

Total number of replies received, 105 (51.1%).

1. Curtis, Francis D. "Some Values of Extensive Reading of General Science." Teachers College Contributions to Education, No. 163, 1924.
2. Koos, Leonard Vincent. "The Administration of Secondary School Units." University of Chicago Press, 1917 pp. 67-69.

Number of repliés received which gave no answers to the statements and questions because general science was not offered in the schools represented, 21 (20%).

Number of replies tabulated, 84 (80%) (representing at least one big high school in each of thirty-eight states).

#### QUESTIONARY.

(The teachers were asked to mark an X in front of all the statements which together expressed conditions in their respective schools).

1. Our course in general science is based upon *one* text. 59 (70.2%).  
In 26 cases (31%) the course is a one-text, unsupplemented one; 21 (25%) use magazines and some books, not texts, with one basic text, only; 12 (14.3%) of these use a syllabus based upon two or more texts.
2. Our course in general science follows a syllabus based upon required portions of several texts on *general science*. 21 (25%).
3. We have full sets of (how many?) different texts on general science which we use in our course.  
One text, 17 (20.2%); two texts, 10 (11.9%); three texts, 6 (7.1%); four texts, 3 (3.6%); five texts, 0 (0%); six texts, 3 (3.6%).
4. We have an adequate supply of general science texts for our course. 50 (59.5%).
5. We have an inadequate supply of general science texts for our course. 20 (23.8%).
- \*6. Our course in general science follows a syllabus based upon required portions of texts on general science and other special sciences (physics, chemistry, etc.). 22 (26.2%).
7. Our course in general science follows a syllabus based upon required portions of texts on science none of which are on general science. 0 (0%).
- \*8. We assign *definitely* and *require* as part of our course in general science the reading of articles upon various topics of science in magazines (as Popular Mechanics, Scientific American, Atlantic Monthly, etc.), and the reading of all or parts of various scientific books of a general nature which are not text-books in any sense (as Slosson's "Creative Chemistry," Houston's, "Wonder Book of Light"). 42 (50%).  
(There follow six questions dealing only with extensive reading.)
15. Which plan or combined plans above would you consider ideal, and, if none of these, what plan with respect to required or suggested reading in general science would you consider ideal?  
A summary of a wide variety of ideals represented in sixty-one replies to this question gives these results:  
Three (4.9%) favor the use of one text alone; twelve (19.7%) definitely say syllabus, and, if in the light of the question, the answers to which were influenced, no doubt, by the preceding six questions on extensive reading, the definition of syllabus, is expanded to include *all* plans definitely requiring extra-text readings the number who favor some sort of syllabus as ideal is 52 (85.2%).  
\*One answer qualified.

Certain significant facts are revealed by an analysis of the above replies, in which analysis a syllabus course is defined as any in which are required definite assignments in more than one text-book, or in books or magazines, or both, in addition to the basic text or texts.

In thirty-one per cent of these eighty-four highly selected, "best" American high schools represented by this study, and in thirty-five and seven-tenths per cent of the schools represented by Koos' study, the course in general science is a *one-text* book course, unsupplemented with required work in any other texts or in scientific magazines or scientific books not texts; when asked to state what plan they considered ideal, however, only four and nine-tenths per cent of the department heads answering this question in the author's questionnaire favored the single-text plan. Twenty-five per cent stated that their courses in general science followed syllabi based upon required portions of several texts on *general science* (forty-two and nine-tenths per cent in Koos' study made additions to the text), and twenty-six and two-tenths per cent, that their courses followed syllabi based upon required portions of texts on general science and other special sciences. But, as there is an overlapping of answers here, since eleven of the department heads replying did not apparently consider questions 2 and 6 mutually exclusive, and marked both, the actual number using syllabi based upon text-books in general science or other sciences was only thirty-eight and one-tenth per cent; and if in addition those are taken who were not included under questions 2 and 6, but who used a text with magazine and book references, —in other words, if the very broad definition of syllabus stated above is applied to the data, the total number using some sort of syllabus is fifty-nine and five-tenths per cent. Yet eighty-five and two-tenths per cent preferred a syllabus of some sort.

Of the schools replying to the author's questionnaire, therefore, more than half as many used one text-book unsupplemented in any way, as used some sort of syllabus, though nearly *eighteen times* as many of these department heads preferred as the ideal plan some sort of syllabus to the unsupplemented text-book. Considering, then, the highly selected class of schools represented in this study, the number using the one-text course in general science, unsupplemented by *any* reference work of any sort, is surprisingly large. Or, stated conversely, considering the very broad definition of syllabus course stated above, the number of schools using a syllabus in general science is astonishingly small,—and not less so, because so large a percentage of the department heads who stated their ideal of a course, favored a syllabus.

Another surprising fact revealed by the questionnaire is that

only fifty-nine and five-tenths per cent of these department heads stated that their supply of general science texts was adequate, and twenty-three and eight-tenths per cent stated positively that their supply was inadequate. If this is the case in these "best" high schools, what must be the conditions in some of the smaller, less favored districts?

It is interesting to speculate upon the reasons why the syllabus course in general science, apparently so greatly preferred as superior to the one-text course, does not more generally replace the latter in our high schools. Probably the following are among the more potent reasons:

1. The lack of funds in the district or the school to provide the necessary extra texts, books, and magazines. The replies to questions 3, 4, and 5 would seem to indicate this fact clearly.

2. Conservatism and inertia,—the willingness to continue with the text-book course because it is the easiest to teach and because it is the course most generally taught.

3. The heavy teaching load (particularly does this apply to the smaller high schools) coupled with the failure of the teachers to realize that deviations from the regular text-book course are under the existing conditions possible.

4. The more or less general distrust of the syllabus course *per se*, because of the difficulties involved in determining whether it may be of sufficiently high standard to entitle it to be considered the equivalent of a regular, text-book course.

5. The administrative difficulties always arising whenever there is necessitated a transferring of pupils from one school or one system to another, in which a different sort of course in general science is offered. This difficulty would be met with most frequently in large cities.

6. The difficulties in the way of making a good, teachable syllabus: the very great amount of time required in constructing the syllabus; the requirements with respect to breadth of training and grasp of subject matter demanded of the teacher or the committee making an original syllabus; the problems arising from attempts to secure proper sequence and continuity of subject matter selected from several texts,—for example, that of finding suitable material which does not need, for its understanding, facts or explanations previously presented in the particular text-book from which the reference is taken, but not in the syllabus elsewhere.

In what practical ways, then, may some of the advantages of the syllabus course be secured by all high schools, especially those in which it is undesirable to discard the basic text-book entirely?

First, the work in, and outline of, the adopted text-book may be supplemented by suitable references to texts upon various phases of science available about the building or in the town library; or obtainable through an appeal to the patrons of the school for such fairly recent text-books on science as may be in their homes. One such book, provided the references are assigned two or three days in advance of the recitations upon them, and provided the pupils make use of the book during their free periods and over-night, will serve a surprisingly large number of pupils.

Secondly, the pupils may be encouraged to donate to the department of science, magazines in which they find scientific articles. Most of this material will be unsuitable for supplementing the text-book, but in the better-class of literary magazines, as well as in the scientific ones, will occasionally be found articles of great cultural and pedagogical merit, the addition of which to the regular course will add not a little of pleasure and fresh interest to the work.

Thirdly, the pupils in general science may each be induced to contribute a small sum each term for the specific purpose of adding to their science library. Once the pupils and their parents have been made to see the advantages to be derived from such a plan, there will be little or no opposition. In one medium-sized western high school, where this plan has been in operation for several years, the pupils take great pride in their science library numbering more than five hundred volumes.

In no school are the actual and potential resources for syllabus building in general science so meagre and unpromising as to make impracticable *some* sort of syllabus.

#### NATURAL SCIENCE INTERESTS OF RURAL CHILDREN.

Rural-school children in New York State ask more questions about invertebrate animals than about any other natural science group. Birds come second and trees third. This statement is based upon a record of the questions asked for three consecutive years in connection with correspondence with rural schools concerning rural-school leaflets published by the department of rural education of the New York State College of Agriculture at Cornell University. For three years more questions have been asked about the habits of living things than about their classification, distribution, structure, or other points of interest.