and Other Devices for Improving Pupils' English" which should be of untold assistance to the teacher in the intermediate grades.

Assuming that correct linguistic habits are acquired, not through definitions and classifications, but through practice, the compilers have presented here such language games as, "filled with life and motion, and bristling with the excitement of competition, tend to evoke the pupil's habitual oral responses." But they believe that a good language game is "never 95 per cent game and 5 per cent language."

This bulletin (1923, No. 43) has only recently been published, and is available from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents per copy.

"IF THIS BE TREASON," SAYS YALE ENGLISH PROFESSOR

I emphatically nominate for the Ignoble prize Edmund Burke's Speech on Conciliation with America. Its sentiments are fine, and did the orator credit; but what a bore it is to read! I cannot tell exactly what a bore it is to read through, for I was never able to finish it. Of all the tedious books forced on children who wish to go to college, this deserves particular execration. Think of the innumerable boys and girls who have been compelled to study this dreary essay, divide it into logical paragraphs and write of its "structure," and of its formal rhetorical qualities! No wonder so many boys run away to sea; it is more fun to con a ship than to con such stuff as this.—William Lyon Phelps, in Scribner's Magazine.

ROSTER OF ENGLISH TEACHERS

A second installment of the list of Virginia's teachers of English is to be found on pages 49 and 50 of this issue. If you find omissions or errors, will you please notify Miss Anna Johnston, Woodrow Wilson High School, Portsmouth, Virginia?

SCIENCE TEACHING IN THE HIGH SCHOOLS OF VIRGINIA

SO FAR as I know there has been published no study of the extent of science teaching in the high schools of Virginia. To get complete information the following questionnaire was sent to one hundred and fifteen high schools. Forty-eight questionnaires were returned, or 41.5%, on which this report is based.

1. Name of school
2. Location
3. What science is taught in each year?
   a. First year?
   b. Second year?
   c. Third year?
   d. Fourth year?
4. How much time is given per week in each year to lecture and to laboratory work?
   1st year 2d year 3d year 4th year
   a. Lecture
   b. Laboratory
5. How many volumes relating to science are there in the school library?
6. In the following blanks, indicate the estimated value of apparatus used in:
   1st year 2d year 3d year 4th year
   A. I I I I
   B. I I I I
   C. I I I I

Explanation:
A. As general apparatus, that is, given out by teacher as needed by student.
B. As individual apparatus, that is, assigned to each student.
C. As demonstrational apparatus, that is, used by teacher for demonstrations.
7. How many full time science teachers are there? How many part time science teachers are there? What other subjects are taught by the latter?
8. How many teachers hold:
   a. Collegiate Professional Certificates?
   b. Collegiate Certificates?
   c. Normal Professional Certificates?
   d. Special Certificates for High School Subjects?
9. Approximately, what proportion of time is given to teaching the application of science to everyday life?
10. Check below the method you customarily use:
    a. Each period divided: first part discussion, second laboratory, third summary of lessons.
    b. Lecture one period, laboratory two periods, on different days.
c. Demonstrational or individual experimental work.
d. Lecture (no laboratory work or very little).

11. What are you doing to get away from the cut-and-dried method of question and answer formerly used? (Use reverse side of sheet.)

In order to secure a representative group of schools, questionnaires were sent to each of the twenty cities and to one high school in each county. The county high schools were selected at random, some being small and some larger. All were accredited.

<table>
<thead>
<tr>
<th>Table No. I</th>
</tr>
</thead>
<tbody>
<tr>
<td>The total enrollment in each of the four years of high school:</td>
</tr>
<tr>
<td>Year</td>
</tr>
<tr>
<td>I</td>
</tr>
<tr>
<td>II</td>
</tr>
<tr>
<td>III</td>
</tr>
<tr>
<td>IV</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

This report represents a study of 5467 students taking science in accredited high schools of Virginia. Of these, 2232 are in the first year of high school and only 565 in the fourth. On the basis of these figures 74.6% of the girls and boys who enter high school drop out before the beginning of the fourth year. Only one-fourth of those who start the race stay in for the last quarter and statistics show that many of these fall out before the goal is reached. Before the beginning of the second year 31% of these drop out—17.6% at end of second year and 26% at end of fourth year.

In view of the fact that so many drop out before graduation, is not applied science needed in at least the first and second years of high school? Maurice A. Bigelow defines applied science as "science that presents the great facts and leading ideas which touch human life in its combined economic, industrial, hygienic, intellectual, and aesthetic outlooks. Mr. Bigelow also says the movement for reorganization of the general foundational work in science has been the most important one in science of the last ten years, and in most places has taken the form of a course in general science.

<table>
<thead>
<tr>
<th>Table No. II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Showing sciences taught, what years, and hours each week given to lecture and laboratory.</td>
</tr>
<tr>
<td>Science</td>
</tr>
<tr>
<td>General Science</td>
</tr>
<tr>
<td>II</td>
</tr>
<tr>
<td>Biology</td>
</tr>
<tr>
<td>III</td>
</tr>
<tr>
<td>Chemistry</td>
</tr>
<tr>
<td>IV</td>
</tr>
<tr>
<td>Physics</td>
</tr>
<tr>
<td>III</td>
</tr>
<tr>
<td>Geography</td>
</tr>
<tr>
<td>II</td>
</tr>
</tbody>
</table>

In Virginia chemistry seems to be the science most usually taught in the high school. Of the 48 schools reporting, 40
offer chemistry; 27 of these offer it in the third year, and 13 in the fourth. While chemistry holds first place, general science ranks next with 36 of the 48 schools offering it. Biology is usually offered as the second year science. Geography is offered by six schools. The large number of students enrolled in the subject is due to the fact that in one of these schools there are 350 students taking geography. One large high school is providing for geography to be introduced next year.

"...edge is my ultimate end." If we are only seeking a knowledge of scientific facts, all efforts are in vain, for they are absolutely useless to anyone if not put into practice. The range of the value of apparatus is very great and the lowest are far below the average. The average value of physics apparatus is $329.99 and one school has apparatus valued at only $40. This is one of the largest problems we have to meet in science teaching, the practical application of the principles learned.

**TABLE NO. III**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Value of Apparatus</th>
<th>Average per School</th>
<th>Average Per Pupil</th>
<th>Range Per School</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>$9,184.50</td>
<td>$191.34</td>
<td>$1.68</td>
<td>$20-2,500</td>
</tr>
<tr>
<td>II</td>
<td>6,480.00</td>
<td>135.00</td>
<td>1.00</td>
<td>25-2,800</td>
</tr>
<tr>
<td>III</td>
<td>14,996.00</td>
<td>312.41</td>
<td>2.74</td>
<td>50-4,650</td>
</tr>
<tr>
<td>IV</td>
<td>15,835.00</td>
<td>329.99</td>
<td>2.89</td>
<td>40-2,500</td>
</tr>
<tr>
<td>Total</td>
<td>$46,495.50</td>
<td>$968.65</td>
<td>$8.21</td>
<td></td>
</tr>
</tbody>
</table>

Many of the smaller high schools meet the problem of small classes by alternating the sciences. For example, one school gives general science to first and second year pupils one year and agriculture the next. To third and fourth year pupils it offers biology one year and chemistry the next. In this way each student gets four years of science but only two sciences are taught each year. The classes are larger and better teachers can be obtained. Another common alternation is chemistry and physics in the third and fourth years.

Only one high school reported no apparatus in the science department. Several schools have apparatus valued at $125 and $150. This plan of teaching science without the aid of the laboratory reminds one writer of a character in a 17th century comedy who declared, "I content myself with the speculative part of swimming. I care not for the practice. I seldom bring anything to use; 'tis not my way. Knowledge is my ultimate end." If we are only seeking a knowledge of scientific facts, all efforts are in vain, for they are absolutely useless to anyone if not put into practice.

Table No. II shows the average amount of time given to lecture and laboratory. One school gives almost twice as much time to lecture as laboratory; this same school devotes only one period or forty-five minutes each week to the teaching of the application to everyday life the facts learned. Another school gives four hours and forty minutes a week to lecture and eighty minutes to laboratory in physics. From all the reports I found that an average of 48% of the time was spent in teaching the application of science to everyday life. There was the widest range of difference in the answers to this question. Replies varied from "none" to "100%." One school which answered "none," has no science library and employs two part-time teachers to teach 38 pupils. Many answered this question, "every possible opportunity." One said, "as suggested in text and pamphlets."

The number of books relating to science in the school library varied from none in some cases and as few as 5 in others to 200, with an average of 35 books for a
school, or about one book for every three science pupils.

One of the most interesting phases of this study has concerned the certificates held by teachers. There are 109 teachers represented in the questionnaire returns. Of these 50 are full time and 59 part time teachers. Mathematics leads as a subject taught by part-time science teachers; 22 teachers, or 37% who teach other subjects, teach mathematics. English is taught by 27%, as the other subject; 18% teach history, 6 teach foreign languages, 1 physical education, and 3 teach in the grades.

**TABLE IV**

<table>
<thead>
<tr>
<th>Certificates Held by Science Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of science teachers: 109</td>
</tr>
<tr>
<td>Per cent holding collegiate professional: 37.6</td>
</tr>
<tr>
<td>Per cent holding collegiate certificate: 31.2</td>
</tr>
<tr>
<td>Per cent holding normal professional: 15.6</td>
</tr>
<tr>
<td>Per cent holding special certificate for high school subjects: 15.6</td>
</tr>
</tbody>
</table>

A Collegiate Professional Certificate is granted to a four year graduate of a teacher training institution; a Collegiate Certificate to a four year graduate of an A-1 academic college; a Normal Professional Certificate to a graduate of a two year course of a teacher training institution; and a Special Certificate for High School Subjects upon the completion of certain special work required.

A large per cent of the teachers holding collegiate certificates are in the larger high schools. This is explained by the fact that many of these teachers held their positions before the teachers colleges of Virginia were equipping many graduates each year. These larger high schools are gradually increasing the number of teachers holding Collegiate Professional Certificates and requiring those who now hold Collegiate certificates to attend summer school and have their certificates converted into Collegiate Professional Certificates. Each year the two year graduate finds it more difficult to go into an accredited high school to teach.

I obtained the following information from certain sections of the freshman class of The State Teachers College, Harrisonburg, Virginia. To get these data each student answered the following questions:

1. The number of students in the high school from which you were graduated.
2. Did the science teacher teach other subjects?
3. What was your grade the first and second quarter at The State Teachers College?

These students represented 62 high schools with an enrollment of 13,698 pupils. The average grade for those who came from a high school in which the science teacher did teach other subjects was "C," while those from a high school in which the science teacher did not teach other subjects was "B." These students have been under the same instructors and the same conditions during this time.

**TABLE V**

<table>
<thead>
<tr>
<th>Number Checking Question 10 and the Method or Methods Checked</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

Of the 48 schools answering, 25 checked only—lecture one period, laboratory two periods, on different days. Only 2 schools checked lecture (no laboratory work or very little), while 4 schools combine the discussion, laboratory and summary into one lesson. As shown in the table, many schools combine the various methods and use the one most applicable to the lesson to be taught. One teacher answered this question: "I never use any method to any but a limited extent." Some answered it: "As suggested by text."

Many helpful suggestions were given as answers to the last question of the ques-

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3 According to the grading system at State Teachers College, "A" is excellent; "B," good; "C," fair; "D," passing; "E," conditioned; and "F," failure.
tionnaire. Some of these individual methods used to depart from the formal presentation of subject matter are as follows:

1. Supervised study.
2. Competition between sections of class for speed and accuracy in reports and experiments.
3. Questions on day’s lesson which require research on part of pupil.
4. Reports from current literature.
5. Individual assignments and reports.
6. American Chemical Society contests.
7. Demonstrations.
8. Topical outline made by instructor and definitely assigned to students.
10. Visits to local industries.
11. Visual education by use of Bray Motion Pictures, University of Alabama.
12. Socialized recitation—half of class ask questions which are answered by other half.
13. One school makes use of class debate.

CONCLUSION

After making this study I endeavored to find what other states are doing along the same line for purpose of comparison.

In California 50% of the schools offer a course in general science, in Massachusetts 87 of the schools teach general science, over 100 schools in Iowa and Pennsylvania offer it as a part of the high school course. On the basis of the returns from my questionnaire, 75% of the high schools in Virginia offer general science and 64% of these give it the first year. One school requires it first and second year. Of 459 reports from California, Iowa, and Massachusetts as to whether general science was more effective and economical in time as an introductory course than specialized science, 414 reported in favor of the affirmative and 45 for the negative.

From a report of an Iowa Committee on Elimination of Subject Matter in 1916, it was found that of all persons in the United States engaged in gainful pursuits, 33.2% were engaged in agriculture and 27.9% in mechanical, industrial, and manufacturing work. Among women 31.2% were engaged in domestic arts and 22.4% in agriculture. For these occupations representing 61.1% of the people a practical knowledge of science is needed. According to Mr. Bigelow’s definition of applied science, given above, we find in science just what the majority of the people need.

REFERENCES

Hessler, John C.—“Junior Science.”

CLARINDA HOLCOMB

Awards of fifty $500 scholarships have been made by the American Child Health Association of New York City to teachers of a competing group of 1,639, who submitted examples of classroom work in health education directed by them during the school year. The contest was made possible by an appropriation of $25,000 from a life insurance company.

To determine a student’s fitness for entering an institution of higher learning, Chicago, Princeton, Minnesota, and Northwestern Universities and Dartmouth College are cooperating under the direction of the American Council on Education in preparing psychological tests. These tests will be given to freshmen of more than 100 colleges and universities.