Proceedings of the Iowa Academy of Science

Volume 51 | Annual Issue Article 38

1944

Physics in the Army Specialized Training Course at Grinnell College

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PHYSICS IN THE ARMY SPECIALIZED TRAINING COURSE AT GRINNELL COLLEGE

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The basic course consisted of 4 class hours and 3 hours of laboratory per week for terms of 12 weeks.

Term I—Mechanics
Term II—Heat, Sound and Light
Term III—Electricity

Only the first two terms were completed but this paper is primarily a study of the work done in Mechanics.

150 Basic Trainees started Term I in September. Of this number, 109 completed the term and took the final Form E examination.

Another group of 38 students started Term I in December and completed it in March.

An aptitude test (Penn State) was given to all trainees at the beginning of the term, and at the end Form E of the Cooperative Tests was administered in addition to an army G. I. test.

STUDY OF ARMY VS. CIVILIAN STUDENTS

The figure shows the aptitudes of the army men and about 90 men enrollde in college Physics at Grinnell during 1942-43. National norm (6695 men) was 58.

These are divided as follows:

55 Army men without H. S. Physics—73	
95 Army men with H. S. Physics—92	Total Average—85
College men with H. S. Physics—104	
College men without H. S. Physics—74	Total average—87

As a whole it appears on the basis of the test that the army men were about as good as the ordinary college students. The army group as a whole had a certain maturity that is not apparent in college underclassmen. This is not surprising since 55% had previously been to college for varying lengths of time.

THE EFFECT OF H. S. PHYSICS

This was an unusually good opportunity to study the effect of H. S. physics. Usually the two groups are separated for college instruction and not given identical treatment. Here no distinction was made but all received the same instruction, same textbook, etc.

Test	Without H. S. Physics (55)	With H. S. Physics (95)
Aptitude	73	92
Form E Mechanics		
Norm 19	17.8	19.9
Heat—Form E		
Norm 12	11.1	12.9
Sound—Form E		
Norm 7	9.9	9.5
Total—Form E		
Norm 38	38.8	42.3
Light—Form E	10.9	12.2

TEACHING METHODS

In the first term the conventional problem type course was given though the army curriculum called for only 7 hours per week of preparation of Physics. As a result, fewer problems than usual could be expected and the classroom time had to be used more efficiently. With the beginning of the second group on Mechanics it was decided to put the responsibility directly up to the students and their grade depended on a series of 8 examinations for which problem work was the preparation. The problems were collected and corrected and returned but not graded. The exams consisted of definitions, completion type, multiple choice and problems.

The two groups were nearly matched as far as aptitude and had the same instructor, same motivation, same demonstrations and laboratory. The results quite definitely indicated that the latter method yielded better results in the army program.

The results were:

	Group I (Sept.)	Group II (Dec.)
Aptitude	92.1%	92.8%
Form E Mechanics	18.5-45%	22-60%

THE APTITUDE TEST AS A PREDICTION OF SUCCESS IN PHYSICS AND ENGINEERING

Of the 14 separated from the program at the first grading period, 12 were failing physics. The average aptitude of these men was 53% compared with 81% for the group as a whole. Of these at least 10 were easily picked at the beginning of the course as not likely to succeed. The spread was 16% to 77%.

The 14 who received the highest grades in Physics averaged 95% with scores ranging from 87 to 98%.

SCOPE

This study was undertaken to determine the effectiveness of Physics teaching. We were disappointed that it was cut short by the termination of the program on March 4 after only two terms. Accordingly, our results are based on an inadequate number of cases but may have some significance to us teachers, though not statistically.

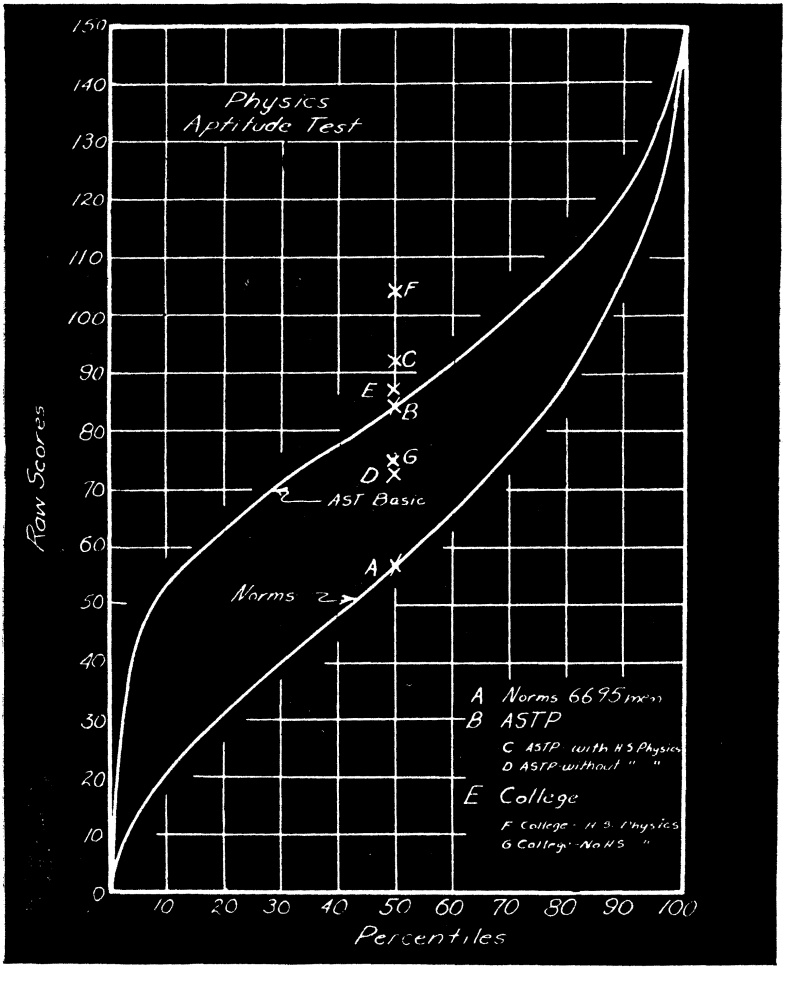

Figure 1

CONCLUSIONS

1. The army men at Grinnell were no better nor no worse than ordinary college students. They made up in maturity what they lacked in study time.

2. Previous training in High School physics was not a decided factor in success in physics.

3. The conventional problem type course is less effective as tested by form E of the Cooperative Test than periodic examinations based primarily upon the text. (However, the conventional type course probably develops the analytical powers of the student though no test has been found suitable to test this "thinking ability."

4. Probable success or failure in the army Basic Training program can be indicated by the Engineering Science aptitude test. (The test has a high correlation of .72 with college physics grades.)

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