Proceedings of the Iowa Academy of Science

Volume 45 | Annual Issue Article 46

1938

An Experiment in the Teaching of Industrial Physics

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AN EXPERIMENT IN THE TEACHING OF INDUSTRIAL PHYSICS

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While we as teachers of engineering physics comparing ourselves with ourselves and grading objective tests of many types and stripes are inclined to think that our teaching and student product are satisfactory, there may be criteria which our instruction is not meeting.

Impressed with this possibility I have made an analysis of my findings obtained from interviews with my own students, deans of engineering schools and engineers in the practice of their profession. The results of these studies are definite and specific

In the first place, I have found the consensus of opinion to be that the teaching of physics is too abstract and mathematical. In the second place, it was felt that the teaching of engineering or industrial physics pertains too largely to the restricted environment of the college laboratory and class room while the illustrative fields of the newer industrial applications lie untouched and unexplored.

It is true that teachers of engineering physics, trained in pure physics, object that it is not their function to teach industrial applications of the subjects which properly belong to the program of the engineering school. This attitude of the physics instructor may account for the fact that deans of engineering suggest that technical physics be taught by a member of the engineering faculty instead of by a member of the physics faculty.

Within the last few years a new emphasis has been placed on the teaching of industrial physics and the new Journal of Applied Physics is providing opportunities for coöperation between the physicist and the engineer looking forward to solving problems which require the combined acumen and equipment of both.

Through the coöperation of the Sioux City Gas and Electric Company, the Hanford Air Lines and the Northwest Bell Telephone Company with Morningside College, a supplementary industrial educational program has been evolved with interesting and inspiring applications of physics far beyond the possibilities of the college laboratory to provide. The lectures, inspection trips and staff are under the direct supervision of the head of the Depart-

ment of Physics in Morningside College. The lectures are most carefully planned and organized, copies of the same being supplied the physics department for further study and quizzes.

The lectures delivered during the current year, included a study of power plants, furnaces, fuels, boilers, Diesel engines, turbogenerators, substations, transmission lines, meters and testing techniques, lighting, gas manufacture, communications engineering and cost accounting.

Discussions followed each lecture and plant visitation served to clarify any points not made understandable in the lectures.

This coöperative instructional program between Morningside College and the industries of the city has proved so satisfactory that it will be continued as a further study in the teaching of engineering physics.

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STUDENT OPINION OF EXAMINATIONS

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Three hundred twenty-five students in Agricultural Physics were questioned regarding their preference for and the merits of the four rather general types of examinations, the completion, the multiple choice, the true-false, and the essay type.

This survey reveals a decided preference for the multiple choice type of object test. The multiple choice was also ranked highest by the students on the following points: Fairness in grading; the lack of confusing and misleading questions; the number of questions that are thought provoking and require reasoning; the degree to which the questions represent the material taken up in the course; the ability of the examination to function as a teaching instrument. The one point on which the multiple choice ranked low was on the tendency of the examination to discourage guessing at the answer. Only one examination ranked lower than the multiple choice and that was the true-false. The essay type was placed lowest on all points except two. It ranked highest on the tendency to discourage guessing and second to the multiple choice in tendency to provoke thought and require reasoning.