PRESIDENT'S ADDRESS.

MORE SCIENTIFIC EDUCATION; LESS EDUCATIONAL MEASUREMENT.

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Mr. Chairman, and members and guests of the Indiana Academy of Science: My title seems to imply that there is coming to be some sort of conflict between the ever-increasing wave of educational measurements and the teaching of science. It is because I suspect that to be the case that I have chosen the kind of title that I did. It seems to me that this fever for testing is but a symptom of a deep-seated disease in American educational method. In the recent report of the Carnegie Foundation for the advancement of teaching, on "The Quality of the Educational Process in the United States and in Europe," I find what I think is an account of the disease itself. In discussing the faults of our secondary schools the report cites as the third of four defects the following: "The curriculum is a rope of sand, without texture or organization. Effective organization through related ideas is thereby sacrificed *to the mere registering of information*." The italics are mine. Again we find, "For fear of evaporation the process is checked up at once—daily recitation, written review, monthly test, and term examination. These concluded, responsibility ceases, and 'credit' is recorded, of which no future misstep, even though it discloses total ignorance, can ever deprive the pupil." In contrast with this state of things, the Carnegie report tells us that in Europe "The pupil who knows from experience that a new fact or a principle will reappear year after year in modified forms or with enlarged applications confronts it in an attitude unlike his who believes it will be shelved forever after the next term examinations. It is to his obvious interest to understand it. *There are no tests or examinations in the American sense from one end of the curriculum to the other*." Again the italics are mine.

I should say at once that I hope and expect to find in you a sympathetic audience and one that has little need of what may seem like a warning message. It is because it seems to me that there is need in various quarters for consideration of this topic that I wish to have it go on record in the Proceedings of the Academy at this time. Surely we members of this State Academy of Science should be concerned about the best methods of inculcating the scientific spirit in the students who are one day to take our places, whether in scientific education, research or applied science.

May I make it clear at this point that my remarks are intended to apply solely to conditions in secondary education. Every teacher should stay within the field with which he is familiar.

"Proc. Ind. Acad. Sci., vol. 37, 1927 (1928)."

Like a preacher, I have taken a text for my discourse. Unlike the preacher, however, I did not find my text in the Holy Scriptures. It came rather from an Omega Oil advertisement of some 25 years ago. Some of you will recall the Omega Oil Philosophy posters, each with its long line of geese winding down the way toward the reader and each poster carrying a pithy saying. The one I quote read: "Don't inquire into a hungry man's history! Give him something to eat!" You all see the point. I submit the question, "Have we educators not been a bit too inquisitive recently as to the measure of the progress of our pupils and perhaps somewhat negligent of our duty in connection with inspiring them to dig in and thus make real progress?

I would not like to be regarded as unprogressive in these matters, but I have no objection to being considered as conservative. My thought is this: Is it not time we were putting the new so-called "science" of educational measurements in its proper place? Should we not attempt to view it in its proper perspective? We should give it due credit for the real progress that it has made. A number of most ingenious psychological tests of intelligence have resulted from the labors of workers in that field. May I suggest, however, that experienced teachers can usually estimate rather closely the "I. Q.'s" of pupils with whom they have been working for a time. It is with the newcomer that the intelligence test is most useful. Even here the results must be "taken with a grain of salt." I recall a case in point. A certain pupil was graded very low after one of the conventional intelligence tests. Later, on being tested in another and very much larger school, the pupil ranked first among several thousand pupils. Investigation showed that on the occasion of the previous test the pupil had needed to go to the toilet, but, on raising the hand, had been told by the teacher that no questions could be answered until the test was over. The "I. Q." number that resulted can be imagined. On that occasion it was the teacher's "I. Q." that needed investigation.

We must consider too that the character factor counts in educational results as well as the intelligence quotient. Often our "failures" are of high intelligence but of low moral purpose. Weak wills may be yoked to high intelligence. Is it not true that much of our energy as teachers should be expended in trying to stimulate our pupils to greater effort? Does not *inspiration* often go farther than *examination*? Our friends of the educational yardsticks have avoided these intangibles. They have stuck very largely to the *informational* side of *knowing*. For *feeling* and *willing* they have no gauges. Yet most of the influences of the great teacher are probably exerted through his pupils' feelings stirring their wills to action.

Shall we not then recognize the relatively secondary character of the subject-matter which we teach; and apply ourselves to *educating* boys and girls, young men and young women? And if we are to do well at this we cannot afford to spend too much time using artificial and admittedly not altogether dependable methods of measuring achievement in the memorizing of facts. In the light of the foregoing premises how unwise it is to conclude, as did one enthusiast in educational measure-

ments, that since certain pupils who had had no chemistry did better on a test than certain others who had taken one semester of chemistry, therefore those pupils who had had no formal instruction should be put at once into the second semester's work. Shades of all educators of all past ages! Did not the most valuable part of the semester's work lie in the experiences of laboratory and of classroom and in the intercourse between pupil and pupil and between pupil and teacher? Were not all of those pupils going on into life and fewer than five per cent into chemistry?

You who know me so well will not be misled into thinking that I am not an admirer of scholarship. Fine scholarship is an admirable, an excellent thing. It may be had, however, only by those who, having high native intelligence, are taught to make good and efficient use of it in acquiring, classifying, storing and learning how to apply knowledge. The teacher who can stimulate and guide the learner to do these things —especially the latter—has his hands full without making very large use of objective tests. His examinations will have to be largely in the nature of teaching-exercises calculated to lead his pupils to attempt to apply in new situations the essential facts that they should have previously learned. It is only by repeatedly encouraging her fledglings to try their wings that the mother bird teaches her young to fly.

In fairness to some of the more recent tests, some success has been had in bringing in questions that give the pupil a chance to use his ability to apply his knowledge. It is, however, admittedly a more difficult type of question to prepare than the questions that deal with mere information, and few "thought questions" appear in most tests.

By way of constructive criticism may I suggest that instead of spending an undue amount of time, as I expect some teachers are doing, upon what is considered by its devotees scientific testing, we should devote much time and energy to an attempt to discover how we may more effectively arouse the interest of our students in the subjects we are teaching. To do this we must study the present interests of our boys and girls and make contacts with them. We should also study the tactics of all great teachers in all times and in other countries and learn of them. The well-considered opinions of present-day educators should be respected, studied, weighed, and suitable use should be made of them. Although our modern school of scientific testers scoffs at "mere opinion," let us remember that great businesses are successfully run by boards of directors—men of experience, who may make due use of statistical evidence in arriving at their conclusions, but who rely finally on their own judgment in making their decisions. So too should we teachers make due use of the various methods of testing results now available to us, but let us not fail to be governed by our common sense.

As the irate mother, whose boy had been beaten by the teacher, wrote, "Don't lick him! Larn him!" So I say, "Don't test him! Teach him!"