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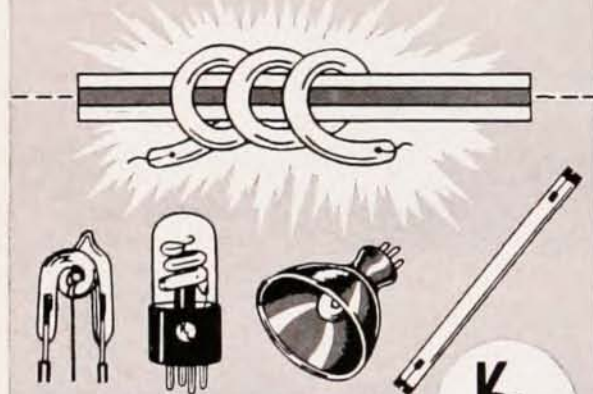
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cially designed to turn these defensive weapons into boomerangs. He has not only ignored the essential points in my criticism, in *Testing*, of ETS' official defense, in *Explanation*, but has answered my challenge mainly by rote, and I am loath to think that his article constitutes ETS' "best answer".

Banesh Hoffmann
Queens College, N. Y.

References

1. Frank J. Fornoff, *Physics Today*, April 1962, p. 36.
2. See Banesh Hoffmann, *Harper's Magazine*, March 1961, p. 37; "Explanation of Multiple-Choice Tests," (April 1961) obtainable on request, and without charge, from Educational Testing Service, Princeton, N. J.; and Banesh Hoffmann, *Physics Today*, October 1961, p. 38. For convenience, these are referred to, respectively, as *Harper's*, *Explanation*, and *Testing*.
3. See Robert Hart, *Physics Today*, February 1962, p. 62.
4. In this connection, see footnote 1 in *Testing*.
5. Robert B. Gray, *Physics Today*, February 1962, p. 62.

And Again . . .

As a former educator (field of physics) but now a member of industry's technical management fraternity, I was taken with the splendid and illuminating articles dealing with "Objective Tests" which Dr. Hoffmann (*Physics Today*, October 1961, pp. 38-42), and Dr. Fornoff (*Physics Today*, April 1962, pp. 36-44) have written.

Yet, perhaps I am somewhat "old-fashioned" in my concepts of education, and as such have leaned in the direction of those who prefer to think of comprehensive final tests, College Board tests, Regents' Examinations (New York State), and other similar types of tests as a means of estimating what a student has learned. I recognize and have carefully excluded those types of tests used for diagnosis which may have as one of their prime objectives an estimate of what a student doesn't know. These tests, too, are valuable for their purpose.

It seems to me, sitting on the sidelines, that both of your presentations only allude to the aforementioned issue, and tend to dissect the validity of particular scientific questions and subsequently their reliability as a forecasting tool. From my own point of view, I am inclined to think that the major issue has been somewhat overshadowed. I am left with a number of questions, the answers to which are not definitive in the articles. What is the prime purpose of the tests? Are written tests (whether essay or objective type) the best means of achieving the purpose? How accurately do the means of evaluating (written tests or other techniques) serve the purpose? How closely do the means typify or simulate "real life" situations or evaluations?

Frankly, I do not purport to know all of the answers to such questions. Nonetheless, it has become evident to those of us in industry that one of the better methods of evaluating happens to be a "guided" discussion with an applicant. By subtle direction, conversations

with applicants can divulge a great deal of information concerning the applicant's storehouse of scientific facts, his methodology, and general approach to a problem. If this is any criterion, then one might conclude that the nearest approach is an oral examination for students. Of course, the time and cost involved would be prohibitive, and as such, might not be the most appropriate testing technique. However, the written essay type of test is able to provide more insights in those areas beyond pure scientific factual data. Again, this is a time-consuming technique and answers are open to individual interpretation by examiners. Hence, one seems to resort to the objective-type tests, which essentially provide estimates of a student's knowledge of specific and isolated scientific facts to be recalled in a limited amount of time. It would seem that many facets of a student's knowledge and ability are somewhat disregarded, albeit they are extremely important under actual working conditions after university life.

Dr. Fornoff invites attention to an interesting point involving correlation of College Board Test scores and teacher-given grades, indicating that a good correlation exists. My impression is that this fact was mentioned in an endeavor to lend support to the value of the College Board objective-type tests. However, if indeed there is a close correlation, why bother with the tests? Much time and expense can be saved by merely using the teacher-given grades (even if they too are not perfect predictors).

It is unfortunate that our fast-moving world of automation forces the education process to be equally automated and just as hurried where students become mere numbers (to preserve anonymity, of course), where a "false" sense of precision is applied to the "estimation" of student acquisition of certain aspects of knowledge, and where the end product may someday be a race of automations for which we may feel very proud—or will we?

Gilbert Kelton
Silver Spring, Md.

Moe and Broader Issues

"A Lawyer's History Lesson" (April 1962, p. 30) is one of the most worthwhile articles I have seen in *Physics Today*. The depth and perspective and abiding patience that characterized Mr. Moe's viewpoint is the most refreshing contrast to the frantic shouting for immediate panaceas that we hear from so many quarters today. In his awareness of the essential gradualism involved in social progress, Mr. Moe shows himself an intellectual blood-brother of the scientists, who have learned the same lesson through other channels. Technical discussions are a dime a dozen. I hope that we may see more intelligent and pertinent discussions of such broader issues in *Physics Today*.

Joseph H. Rush
Boulder, Colo.

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