the eye. The signal subsequently is amplified to drive a pen recorder. In our technique we do not measure directly the total light reflected from the eye but derive a measure of total light from an optical image of a part of the eye. We do this by casting an image of a small part of the eye on a surface which contains a small slit oriented parallel to the horizontal meridian of the eye (for measuring horizontal eye movements). As the eye moves horizontally and the light-dark field of this image formed by the iris and sclera plays across the slit, the total amount of light passing through the slit varies and is detected by the photomultiplier tube located immediately behind the slit. Thus, the optical arrangements of the two systems are, in a sense, the inverse of each other.

That there are gross and important differences between the two systems is evident from the fact that the device used by Torok and his associates cannot be used for tracking large-scale movements of the eye which are correlated with stimulus movement. In our experiments it is essential that the device used for measuring eye movements should not impair normal visual observation by the subject during the course of measurement. The device described in (*1*) and (*2*) is placed directly in front of the subject's eye and seriously limits, if it does not prevent, visual observation by the subject during measurement. In fact, the device employed by Torok and his associates is designed to preclude the possibility of normal vision during measurement, since such vision would interfere with the phenomenon being measured ["The subject must not be presented with a light spot or any image upon which he can fixate, since fixation and undue light tend to minimize or suppress nystagmus" (*1*)]. In our technique the subject has an unobstructed lateral view of at least 90 degrees of the visual field. One could use our system for measuring nystagmus of all types, of course, but it was not designed with this purpose in mind. Finally, it would appear that the principles of design in our system make possible much greater sensitivity and precision of measurement, a difference of considerable importance.

We appreciate Torok's bringing to our attention the work being done by him and his associates in the clinical study of nystagmus.

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Teaching and Research

The editorial entitled "Small colleges and small minds" [*Science* **131**, 71 (8 Jan. 1960)] emphasized clearly and concisely a serious weakness among a majority of our fine small colleges which demands correction in the immediate future. The issue is of such great significance that it needs to be called to the attention of every president of a small college and to that of the heads of his science departments.

That the larger colleges and universities do not have a monopoly on students with ability, curiosity, and desire is often overlooked. Nor can these larger institutions be relied upon to supply all the academicians to meet our expanding needs. Our small colleges must do more than they have to meet this challenge. If they so far fail to provide inspiration, challenges, and opportunities that their students do not know the thrill and satisfaction to be gained from original in-

vestigative efforts, the nation will lose many potential scientists to careers which offer greater material gain but less benefit to society.

I am not suggesting that all science instructors in small colleges who have never done any significant research should immediately seek to become investigators. I do urge, however, that new appointments to science faculties be based upon a candidate's enthusiasm and ability for both teaching and research. Again, promotions should be based on contributions of the candidate in both areas of endeavor.

The nation can ill afford to have its college students, especially those interested in the sciences, exposed to the teachings of a department that is sterile in research. To cite one example of a critical situation, the basic medical science departments of most of the nation's 85 medical schools are desperately seeking qualified and dedicated candidates for their excellent doctoral programs. Many more such candidates would be available now if the seeds of research interest had been effectively sown by the science faculties in our small colleges.

The inertia and resistance to research seen in some small colleges seems to emanate from those who fear the competition for promotion and prestige which might arise if active research programs were encouraged. Might not this type of healthy competition, if it should arise, prove stimulating to faculty activity in general?

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The editorial of 8 January stirred me to write this note.

I believe *Science* could do a greater service if it took up its cudgel on behalf of those who find it well-nigh impossible to do good research and good teaching at the same time. I give a reference here: St. Matthew 6: 24.

As an AAAS fellow, I like to believe I have some research ability. I have never been able to be fair to both teaching and research at the same time. I will go farther and say I can count on my fingers those who have been, to my knowledge. I have seen teaching slighted for research *ad nauseam*.

Teaching should be more than a "meal ticket for researchers." Let us give up pollyanna hogwash and be honest.

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Meteorology as a Field of Study

To the excellent points already made by John Day in his case for meteorology as a study with broad cultural benefits for college students [*Science* **130**, 1600 (1959)] we might add the factor of continuous international cooperation.

Because of the need for international exchange of weather observations and other information on an hour-to-hour basis in the years since the first international meteorological meeting, held in 1853 at Brussels under Maury's leadership, meteorologists have developed a high level of international cooperation. This has borne fruit in the establishment of ties of understanding and mutual respect among these workers in atmospheric science. Students who must study the atmosphere by analyzing observational reports from many distant places gain broadened horizons and an interest in affairs far beyond the college campus.

Thus, an additional factor commends atmospheric science not only as a field of major study but also as a field of minor study for all students, including liberal arts majors.

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