Letters

International Studies and the Academicians

In his criticism of the "discipline orientation" of the universities ("But is the teacher also a citizen?", 6 Aug., p. 601), A. M. Weinberg illustrates his argument with the recommendations made by a panel of the National Academy of Sciences for the treatment of the population problem. This example recalls a visit I made a few years ago to the *favelas* of Rio de Janeiro, those teeming hillside slums. The reaction of an ordinary person was to say, "Something must be done about this." The response of my academic companions was, "We need to study the problem more." Men of action are now cleaning up the *favelas,* and the academicians have been left with their Byzantine concern for more studies.

Indeed, the so-called disciplines have undermined international studies and area studies. In a university of distinction, to use the current public-relations jargon, researchers must be engaged in "pushing back the frontiers of knowledge," in making "scientific breakthroughs"; and the mirage of victory is apparently sufficient to produce the research funds that are the jam on our academic bread and butter. But it takes breadth of interest and experience to master and consolidate all the materials required for an area study. I do not now find in the American academic community many scholars with a broad grasp of Latin American affairs, a knowledge of the languages, an acquaintance with the people and the leaders, long and repeated experience throughout the area. Instead we are turning out relatively uninformed scholars who are testing their anthropological or sociological hypotheses on some group of South American Indians or some tribe in Southeast Asia; usually they study Asia when there is money for Asia and Latin America when there is money for Latin America. Those who devote their lives to the organization of information about an area and research based on this consolidation are dismissed as "area-bound" and pragmatic, and research funds go to the more "scientific" disciplinary studies. The resultant tragedy in our universities has not been sufficiently publicized.

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Achievement

Wolfle notes ("The freshman class," 24 Sept., p. 1453) that "college grades and the measures that best predict them are relatively poor predictors of other kinds of achievement and of later success in most professional fields." I believe that one reason is that our classroom experiences are not close enough to the real world. The classroom treats the ideal case. Problems in the texts always have solutions. We establish and enforce a high code of ethics in the classroom and then send our graduates out to compete in a world that is quite different.

I agree that more research should be done on "how to select those who will be real achievers in a variety of fields." But first we must agree on what is a real criterion of success or achievement in life after school and how to measure *it.*

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. . . First we must develop a majority opinion on "proof of achievement." I think most AAAS members will agree that yearly income, lifetime accumulation of worldly goods, or even a record of having caused the least trouble for other people during one's lifetime is not the type of achievement Wolfle means, although each of these achievements is praised by many. Much praise has been heaped on dedicated teachers, yet we still lack any standard test and yearly graded awards for our teachers; evidently we do not want to reward them since it would not be difficult to find proper ways of doing so. Have they, then, "achieved"?

Shall we measure success by the number of words, articles, books published, public lectures given, patents received, days spent on professional trips? How many forgotten pages equal one valuable paper or idea in it? Shall we measure success by the number of years spent in administrative service, graded according to degrees of responsibility or authority?

I believe that many of our smartest people have upset the "test predictions" by taking seriously the view . . . that none of these is a measure of true achievement, success, happiness, or satisfaction. Instead, they have believed what our best minds keep saying: that true achievement is measured by how much better off the world is for our having lived in it. It is measured by the time and thought we devote to our families, to other peoples, to setting an honest and good example to the best of our ability. These can be quite time- and energy-consuming. . . .

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. . . Great efforts are being made to produce better curricula, better instruction, but no similar effort is devoted to the problem of choosing careers. Nearly all the high school and early college students of my acquaintance have only the foggiest notions, if any at all, of what they want to become or are capable of becoming. Almost no data are placed before them about the kinds of life led by professional people. (Most *do* know the kind of work available to nongraduates—a threat held over the heads of the laggards.)

Is it not necessary—and possible—to display and discuss for these young people the "world beyond" in terms they can understand, and then offer them some means of correlating their own likes, hopes, and talents with the

available opportunities? Is there no way to channel some funds and expertise along these lines?

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. . . A quite common factor in achievement in all fields is energy level—not motivation or drive or push but the physical energy a person has available to follow his motivation. We are all familiar with the man of ordinary, even inferior, native ability who has risen high simply because he is always alert, alive, and brings to every act an uncommon amount of energy. We are equally familiar with the man who is always tired without apparent cause and who fails to rise to the level indicated by his native ability. Yet I have never heard of any testing program—academic or in placement centers—to measure the physical energy the person can bring to bear. . . . The man who found some way of truly increasing this energy would be making at least as great a contribution as those who have found ways of increasing longevity.

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Harder by the Dozen

S. T. Fisher ("More on metrics," Letters, 24 Sept., p. 1450) says, "We count by tens because we have ten fingers. But twelve is a much better base. . . ." But is it? The argument usually given in favor of base 12 is that 12 has five divisors: 2, 3, 4, 6, and 12, while 10 has only three divisors: 2, 5, and 10. So let us see what happens, in practice, when we divide a number A by a number B.

1) To start with a truism, A divided by B will give a whole number, with no remainder, if and only if A is a multiple of B. This is quite obvious, but what is apparently less obvious to some people is that it is quite independent of the base m in which A and B are written. In base 10, the number 195 is not divisible by 6; if you rewrite the two numbers in base 12, you find that 143 is still not divisible by 6. The only advantage of B's being a factor of the base m is that you can see at a glance, by looking at the last digit of A, whether A is divisible by B or not. But in the case considered (10 vs. 12) even this advantage is illusory, because it happens that it is fairly easy to find out if a number A written in base 10 is divisible by 3, 4, 6, or 12, and much harder to see if a number A written in base 12 is divisible by 5 or 10.

2) When A is not divisible by B, if we accept the use of common fractions to write the result there is obviously no difficulty, whatever the base used.

3) When A is not divisible by B and we wish to write the result as a decimal fraction (in base 10), we find that, because $10 = 2 \times 5$, the result will be a terminating fraction if B is of the form $2^a \times 5^b$; in all other cases we have an unending (in fact periodic) fraction. In base 12, as $12 = 2 \times 2 \times 3$, we have a terminating fraction if B is of the form $2^a \times 3^b$. Is this an advantage? Only if numbers of the form $2^a \times 3^b$ are more frequently used than those of the form $2^a \times 5^b$, which seems doubtful. In fact the smallest base to give us an advantage in this respect would be $2 \times 3 \times 5 = 30$ (with seven divisors). All those in favor of adopting 30 as a base for our future computations please hold up their hands!

4) So much for the mathematical operation of division. It is easy to see that it is directly applicable to the field of weights and measures. But it may be worth while to consider briefly the special case of a sum of money S which has to be divided equally among B persons. Whatever the currency used, there is always one coin which is smaller than all the others (the cent in the United States). Let us call A the number of such coins to which the sum S is equal. We are brought back to the numerical problem of dividing A by B discussed above, with the additional conclusion that, if A is not a multiple of B, it is impossible to perform the operation exactly. The fact that the currency is based on a scale of 10, or 12, or any other multiple has no influence at all. If anyone is not convinced of this, let him try to divide £5 11s. 7d. into six equal parts. . . .

If the "French and Russian revolutionaries" had indeed adopted the duodecimal system of counting, as Fisher wishes they had, it would have meant a long period of utter confusion. And even when this period was over, schoolchildren learning their addition and multiplication tables would have had to memorize, for each of them, 121 results instead of 81. . . .

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