Since the two schools where the findings were not inconsistent with ours were in the same SAT range as our sample, Cleary's one empirical finding which challenges us may reflect possible nonlinearity of the relation between validity coefficients and the level of the SAT.

In conclusion, it should also be pointed out that when tests are used for employment selection, the evidence clearly indicates that differential racial validity persists as a problem (*4*). Recent court decisions stemming from the Civil Rights Act of 1964 make it mandatory to compute validity coefficients for both races. This is a practice long avoided by test publishers. Sophisticated models of statistical analysis to handle differential racial validity now appear in theoretical journals (*5*). Our study, which opened up a new phase in the discussion of test bias (*6*), is certainly outdated; nevertheless, the evidence presented in it has not been really challenged by either Stanley or Cleary. With future studies and more comprehensive data to be expected from the Open Admissions Policy at the City University and other programs which have increased the Negro ratio at integrated colleges, it is premature to insist that the SAT is as valid for blacks as for whites.

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References and Notes

1. T. A. Cleary, *Research Bulletin RB-66-31* (Educational Testing Service, 1966). Stanley did not cite this, the original paper; he referred to journal articles by Cleary which were published two years later. Most of the criticisms of the Clark-Plotkin study do not appear in the latter.
2. This situation is changing; although social policy is rarely based on a single study, the Clark-Plotkin finding that black students had a higher rate of graduation than whites despite their lower SAT scores and socioeconomic status contributed to the improvement of Negro representation at integrated colleges.
3. J. Campbell, *Research Bulletin RB-64-34* (Educational Testing Service, 1964). Campbell, in fact, in a theoretical paper with no new data, was the first to criticize the Clark-Plotkin research; Cleary merely repeated him. Neither Cleary nor Campbell ever wrote to us for clarification of the points they found obscure.
4. J. J. Kirkpatrick, R. B. Ewen, R. S. Barrett, R. A. Katzell, *Testing and Fair Employment* (New York Univ. Press, New York, 1968). The one study in an educational setting reported in this valuable work explicitly contradicted the findings reported by Cleary. Selection tests for nursing schools (similar in content to the SAT) were found to be more valid for whites than for Negroes when correlated with criterion scores on state licensing examinations.
5. H. J. Einhorn and A. R. Bass, *Psychol. Bull.* **75**, 261 (1971).
6. Accustomed as we have become for our study to be the launching pad for ETS papers, we were shocked to find that in the latest bibliography of test bias compiled by ETS (*TM Reports No. 2,* 1971) our study is not listed. Our problem now is to decide which is worse, misrepresentation or oblivion.

University Organization

Dael Wolfle convincingly writes of the need to alter, rejuvenate, and expand the universities' relict departmental system (Editorial, 9 July, p. 109). Scientific research and education must go beyond reductionism if they are to help us understand and solve complex problems. We need to form new academic structures and to modify the existing ones to better serve the current needs of scholarship and society.

Although a few new schools are being created with different organizational plans, most of us work, and will continue to work, within an existing framework of traditions, customs, and habits that tend to inhibit innovation. I would like to make some suggestions, prompted by my own experience, for moving toward a generalist approach.

1) Changes may be initiated at any level. There is no need to wait for the organizational structure to be changed before moving in new directions. A seminar may be guided into an examination of cross-disciplinary topics without the slow debate of administrative committees. At the University of Rhode Island, a course entitled "Science and Society" was offered as a "special problems" course after it had been tabled by deans who could find no mechanism for approval outside the instructor's unwilling department.

2) Faculty members should meet with colleagues outside their own departments who express an interest in interdisciplinary themes. Informal discussion groups may lead to collaborative research and teaching. Four faculty members joined to teach an experimental course on "people in cities" at our university and stimulated student and faculty interest. Persons who take part in such activities, however, must be prepared to work harder than usual and often must volunteer extra time. Departmental chairmen are unwilling to give released time for such teaching because it threatens to dissipate the human resources at their disposal.

3) The AAAS could encourage and foster adaptive change by following Wolfle's editorial with assessments of new procedures and organizational forms that are being tried. Communication of such findings could be accomplished at national meetings, by publication of examples in *Science,* and by the establishment of a reference center for university reform. While we wait for administrative superstructure to change, I urge that individuals get on with their efforts. Structural adaptations may follow thoughtful, hard work by scientists and professors who take their social responsibilities seriously. Departments may even be improved from within.

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Wolfle lists several reasons why the American university needs to be reorganized. He correctly points to the greater effectiveness in research and teaching of the American departmental structure over that of the German system, which is characterized by authority vested in the individual professor. However, in recent years many American university departments have evolved, as a result of the expansion and specialization of knowledge and dependence on external sources for research funds, into loose assemblages of individual faculty members, each of whom has carefully defined intellectual interests. In effect the result has been the recreation of the German model under the umbrella of the department.

In the Federal Republic of Germany, on the other hand, the limitations of the Humboldt tradition have become increasingly apparent. This has led to recommendations of the Science Council (*1*) and several state legislatures (*2*) for the creation of disciplinary regions (Fachbereiche) within the universities. These disciplinary regions would assume responsibility for the execution of research and teaching within large and flexible frameworks. Furthermore the implementation of the disciplinary regions structure has been encouraged through the initiation of a publicly financed interdisciplinary research program (Sonderforschungsbereiche) managed by the German Research Society.

If this attempt to make the German university more effective and responsive is a success, Germany will once again have provided a model for American graduate education.

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References

1. "Empfehlungen des Wissenschaftsrates zur Struktur und Verwaltungsorganisation der Universitaeten" (Wissenschaftsrat, Cologne, 1968); "Empfehlungen des Wissenschaftsrates zur Struktur und zum Ausbau des Bildungswesens im Hochschulbereich nach 1970" (Wissenschaftsrat, Cologne, 1970).
2. J. Habermas, *Protestbewegung und Hochschulreform* (Suhrkamp Verlag, Frankfurt am Main, 1969).

It is perhaps inevitable that those outside a university department have a different view from those within. Wolfle's comments about the educational constraints of a university's departmental organization are those often heard from certain university administrators and others who have been too far removed from active participation in teaching and research to appreciate the values that are the target of their criticism. A department is the focal point of academic expertise in a given field. Besides being a convenient administrative device, it establishes the necessary environment for scholarly pursuits. A viable academic department continuously adjusts its goals, frontiers, and internal composition to the changing requirements of the fields that it serves. The rigid and inflexible department, surrounded by unscalable walls that shield it from external influences, cannot survive and fortunately exists more in the minds of external critics than in reality. Perhaps the most telling proof of the validity of this assertion is provided by my colleague Dael Wolfle himself when he reminds us that one-fifth of American doctorates have moved out of their degree field 5 years after their doctorate and 30 percent after 15 years. Such interdisciplinary moves contribute to the vitality of science fields. Their high incidence is evidence of the flexibility of departmental boundaries.

I doubt that Wolfle's desire for the ceremonial burial of university departments will be realized. A university cannot function without administrative units; divisions tend to subdivide and old "walls" are replaced by new ones. Interdisciplinary collaboration already exists to a high degree, despite departments, if not because of them. Most importantly, collaboration is a highly individualized undertaking that can be enhanced by sensitive and understanding university leaders, but cannot be enforced by administrative measures.

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About 2 years ago, I proposed that the Johns Hopkins Medical School substitute for its present department structure a new organization, with small groups of faculty joined together by common interest. This suggestion did not arise from lack of respect for the outstanding quality of our departments. My reasons were similar to Wolfle's, but extended beyond them because of the special and additional problems in medical schools. To a large extent these problems have to do with the ambiguity of clinical departments, which are, on the one hand, traditional university departments dedicated to teaching and research, and, on the other hand, hospital departments obligated (and dedicated) to providing clinical service. Under certain circumstances these two kinds of functions are complementary. The stimulus of taking care of patients can focus attention on important problems, basic or applied, that require and invite investigation; experience in research and teaching can clarify and expand ideas useful in patient care. But under many circumstances, particularly with respect to administration, faculty priorities, and division of effort, these two kinds of functions can be in conflict, to the detriment of both. A by-product of the patient-care function of clinical departments was that, as patient care became more specialized, the size of the full-time clinical faculty grew, until now many such a department is as large as some medical schools used to be.

More importantly, the natural association of those who are interested in special areas is not with other members of their own department in outside areas, but with members of other departments with related special interests. Several voluntary associations in our institution were formed for the purpose of teaching medical students; these groups hold joint research seminars, train postdoctoral fellows, and even consolidate laboratory studies, to the advantage of all. These natural associations of faculty have been more productive and far less wasteful of faculty time than artificial "integrated teaching" efforts that, in my experience, are invented by individuals with no understanding of the reality of the direction of faculty interests. Medical schools need one kind of organization, hospitals another. We have gotten into trouble by trying to force one structure to serve both needs.

The proposed plan could improve the research atmosphere and thus stimulate research, raise the level of postdoctoral teaching, produce natural integration, particularly vertically in the curriculum, of medical student teaching, and could improve patient care by providing opportunities for earlier and more direct involvement of the basic science faculty with those engaged in patient care.

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Radiation Protection

Despite the Atomic Energy Commission's reported denials (News and Comment, 18 June, p. 1215) that its hand had been forced by critic-generated pressures, its recent proposals to sharply reduce the limit on the amount of radiation exposure that the public may receive from light-water-cooled nuclear power reactors have little other apparent justification. By publicly airing sensational claims that the standards-setting bodies have grossly underestimated the risk level of current public radiation standards, such critics as Gofman and Tamplin (see News and Comment, 28 Aug. 1970, p. 838) helped to bring about a climate of public and legislative opinion in which the AEC had little choice.

If adopted, the AEC's proposals would occasion an unfortunate distortion of priorities in both radiation and environmental protection policies. The current rate at which the U.S. public is exposed to medical x-rays is in the order of 2×10^7 rems per year, which is in addition to a comparable natural background rate. From a recent report by Gamertsfelder (*1*), it appears that in 1969 the average exposure per power reactor (designed to meet current standards) was about 40 rems. The extra design cost per reactor to meet the proposed more restrictive limits appears to be more than $1 million. J. G. Terrill, former director of the National Center of Radiological Health, has recently estimated (*2*) that if this money were applied to the reduction of x-ray exposure, the annual population dose could be reduced by 35 millirems per capita (a total of 7×10^6 rems).

The Committee on Pollution of the National Research Council has calculated (*3*) that the total annual cost attributable to air pollutants from fossil plants is $13 million. Starr has calculated (*4*) that they result in about