Graduate Education: ACE Study Rates Departments Qualitatively

*An Assessment of Quality in Graduate Education,** published this week by the American Council on Education, may not settle the eternal academic question of which universities are the best universities, but it does offer a revealing in-group poll which is apropos.

The ACE study, it should be noted, is not designed to rate universities but is, rather, as the subtitle of the report says, "A Comparative Study of Graduate Departments in 29 Academic Disciplines." The judging was done by a mix of department chairmen, senior scholars, and junior scholars who were asked to rate departments in their own scholarly fields. They were asked to make separate judgments on the quality of graduate faculty and the effectiveness of graduate programs.

The report holds few surprises. The top category ("distinguished") is dominated by Cambridge, the Big Ten, and the California big three—Berkeley (particularly Berkeley), Stanford, and Caltech.

Some 200 institutions in the country are accredited to award doctor's degrees, but about 95 percent of the degrees are awarded by half these institutions. Included in the ACE survey were the 100 institutions which formed the Council of Graduate Schools in the United States in 1960, plus six others which had granted 100 or more doctorates in three or more fields over the preceding 10 years.

The ACE survey, based on data gathered in 1964, is the fourth major "subjective" study of graduate education to be made. The first came in 1924 and was conducted by Raymond Hughes, then president of Miami University in Ohio. Hughes carried out a second study in 1934. In 1957, Hayward Keniston of the University of Pennsylvania conducted a study designed to evaluate his own university's position in relation to similar universities. Hughes used small panels of distinguished scholars. Keniston relied on chairmen of departments in 25 institutions belonging to the American Association of Universities.

The new ACE study was done by Allan M. Cartter, vice president of ACE and director of the association's commission on plans and objectives, who 2 weeks ago was named chancellor of New York University.

Cartter cast his net wider than his predecessors had. Of some 4000 scholars who returned usable questionnaires, 900 were department chairmen, 1700 were senior scholars, and 1400 were junior scholars. It is doubtful that anyone will take violent issue with his sample, though it would have been interesting to have learned how graduate students felt.

Separate tabulations of the returns of the three groups of respondents indicated that "there is little to distinguish the ratings of the chairmen or of the junior scholars from those of the senior scholars. In judging the top departments the junior scholars appear a little less impressed by the traditional eminence of an institution and perhaps a little more impressed by departments that are active in the development of new specialized fields," wrote Cartter.

There were hints of human pride and pique among the respondents in Cartter's observation that "the raters currently teaching in the top departments were harder on the mediocre departments and somewhat easier on themselves than those teaching in the less distinguished departments."

In judging the quality of faculty the respondents were asked to cast themselves in the role of potential colleagues. In considering the effectiveness of graduate programs they were asked to take into account such things as the accessibility of faculty as well as their scholarly competence, and also the curriculums, the research and teaching facilities, and the quality of graduate students.

The 29 disciplines covered were separated into five fields—humanities, social sciences, biological sciences, physical sciences (including mathematics), and engineering.

The sternest graders proved to be the economists, mathematicians, physicists, and sociologists. Economics was the only field in which about half (35 of 71) of the departments rated were put into the lowest two categories. (The categories were "distinguished," "strong," "good," "adequate," "marginal," and "not sufficient to provide adequate doctoral training." The "good" and "adequate plus" departments were listed in alphabetical order, not ranked; below that level departments were not listed in the study at all.)

In these four fields and in political science, psychology, and geology, less than 45 percent of departments were rated "good" or above, while in several disciplines more than two-thirds of the departments were rated at least good. According to Cartter, it was not clear "whether there is in fact more unequal distribution of academic talent in these fields or whether the nature of the subject makes possible a clear separation of the good from the mediocre talents."

The report avoids aggregate scores, which would imply a ranking of universities. But some names appear in the top categories with conspicuous regularity. Cartter himself noted that the University of California at Berkeley "appears in the leading group in all five divisions, a finding which supports the claim that it is the best balanced distinguished university in the country."

Harvard actually tops Berkeley in four categories (see Table 1), but Harvard's relative underdevelopment in the engineering sector accounts for its absence from the fifth.

The listings in the "distinguished" category in the sciences and engineering are as follows.

Bacteriology/Microbiology: California (Berkeley), Rockefeller Institute (now Rockefeller University), Illinois, Wisconsin, Caltech, Harvard.

Biochemistry: Harvard, California (Berkeley), Stanford, Rockefeller, Wisconsin, M.I.T., Caltech.

Botany: California (Berkeley), Harvard, Michigan, Wisconsin.

Entomology: California (Berkeley).

Pharmacology: Harvard, Michigan, Pennsylvania, Yale.

Physiology: Harvard, Rockefeller.

Psychology: Harvard, Stanford, Michigan, California (Berkeley), Yale, Illinois.

Zoology: California (Berkeley), Har-

* Available from the publications division, American Council on Education, 1785 Massachusetts Ave., NW, Washington, D.C. 20036. Price, $3 paperback.

Table 1. The leading universities, by general area of study, as measured by quality of faculty, 1964. Scores for each major field obtained by averaging scores of disciplines within the field (4.01–5, "distinguished"; 3.01–4, "strong").

Humanities		Social sciences		Biological sciences		Physical sciences		Engineering	
Harvard	4.36	Harvard	4.66	Harvard	4.42	Harvard	4.60	M.I.T.	4.48
California, Berkeley	4.27	California, Berkeley	4.48	California, Berkeley	4.33	California, Berkeley	4.55	California, Berkeley	4.23
Yale	4.17	Chicago	4.39	Rockefeller	3.97	Caltech	4.46	Stanford	4.02
Princeton	3.91	Yale	4.12	Caltech	3.95	M.I.T.	4.33	Caltech	3.94
Columbia	3.79	Princeton	3.98	Stanford	3.92	Princeton	4.33	Illinois	3.91
Michigan	3.69	Wisconsin	3.91	Michigan	3.85	Stanford	4.22		
		Columbia	3.77	Wisconsin	3.76	Chicago	3.98		
		Michigan	3.75	Illinois	3.73	Illinois	3.82		
		Stanford	3.75	Yale	3.68	Columbia	3.78		

vard, Rockefeller, Stanford, Johns Hopkins.

Astronomy: Caltech, Princeton, Chicago, California (Berkeley), Harvard.

Chemistry: Harvard, Caltech, California (Berkeley), M.I.T., Stanford, Illinois.

Geology: Harvard, California (Berkeley), Caltech, Columbia.

Mathematics: Harvard, California (Berkeley), Princeton, Chicago, M.I.T., Stanford, Yale, N.Y.U., Columbia.

Physics: California (Berkeley), Caltech, Harvard, Princeton, Stanford, M.I.T., Columbia, Illinois, Cornell.

Chemical engineering: Wisconsin, M.I.T., Minnesota, Princeton, California (Berkeley), Delaware, Michigan.

Civil engineering: California (Berkeley), Illinois, M.I.T., Caltech.

Electrical engineering: M.I.T., Stanford, California (Berkeley), Illinois.

Mechanical engineering: M.I.T., Caltech, Stanford.

To cross-check the results of the study, Cartter selected four fields—English, economics, political science, and physics—for more detailed analysis. Small panels of experts, for example were asked to act as a panel of judges selected differently from the main group but addressing themselves to the same questions.

In the case of physics, the American Institute of Physics was asked to nominate "15 distinguished physicists, chosen with regard to regional and institutional balance." The results of the panel's judgment (12 of the 15 provided usable replies) are reflected in the "select-panel" column of Table 2.

At the same time, "it was thought useful to analyze the judgments of the main body of respondents in relation to such factors as institution from which they had received their highest degrees, the departments at which they were employed at the time of the survey, the scholarly publications record of the department, the level of faculty salaries, and so on."

Again few surprises. The more highly rated departments tended to be those with the best salaries, best libraries, and highest productivity in terms of publications. The results also showed that the raters had a mild bias in favor of the places where they had earned their Ph.D.'s.

It was clear, also, that good departments tend to grow in "clusters" within a university. No university with a distinguished economics department, for example, had a political science department rated lower than "strong." Chemistry, physics, and mathematics also tended to prosper, or not prosper, jointly.

The rule seemed to apply least in the humanities, and there were plenty of exceptions in other fields. Mathematics at N.Y.U., German at the University of Texas, chemical engineering at Delaware, philosophy at Pittsburgh, and anthropology at Arizona earned "distinguished" or "strong" ratings which represented peaks in otherwise generally flatter academic landscapes.

Regional contrasts were pronounced and predictable. Some 80 percent of the "distinguished" departments are located in 13 states, in the East and Midwest and on the West Coast. The Southeast and Mountain states did not place a single department in the highest rating group in any of the 29 disciplines rated. On the other hand, several Southern universities—Duke, Texas, North Carolina, Rice, Tulane, and Vanderbilt—seem to be solidly installed in the "second 20" group and are showing signs of moving up.

What another report of this sort would show in 5 years or, particularly, in 10 years is one of the speculations this report stimulates. It is hard to believe that sheer growth in graduate education won't change things. The number of graduate students is expected to rise from the 315,000 enrolled in 1960 to an estimated million in 1975. The 15 leading universities in Keniston's survey awarded 75 percent of all doctorates in 1925 and 49 percent in 1950. They award less than 40 percent now. One estimate puts their share at 20 percent by 1980.

While a comparison of the 1925 results with results of the new survey show that strength in universities seems to breed strength, the old leaders have lost their absolute dominance in terms of numbers of Ph.D.'s produced. On the matter of quality, signs seem to conflict.

The strongest of the private institu-

Table 2. Comparison of ratings of effectiveness of the doctoral program of high-ranking physics departments, by rating group.

Institution	Rank				
	All respondents	Chairmen	Senior scholars	Junior scholars	Select panel
Princeton	1	2*	4	1	3
Caltech	2	1	1	3*	1*
Stanford	3	2*	3	2	4
Harvard	4	4	2	3*	1*
California, Berkeley	5	5	5	5	5*
M.I.T.	6	8	6	6	5*
Cornell	7	6	7	7	5*
Illinois	8	7	8	8	9
Wisconsin	9	9	9	11	13
Chicago	10*	11	10	10	8
Yale	10*	12	12	9	10*
Columbia	12	10	11	12	10*
Rochester	13	16	13	13	16
Michigan	14	14*	14	14	10*
Washington (Seattle)	15	14*	16	18	14
Pennsylvania	16	13	18	16*	19
Maryland	17	22	15	15	21*
Minnesota	18	17	17	21*	17*
Johns Hopkins	19	18*	19	25	17*

* Rank shared with another department.

tions have maintained their preeminence, while a few which are not so strong have slipped a bit. The leading private universities have managed this in large part by being beneficiaries, along with the stronger state universities, of federal research funds. What happens if federal policies change in the direction of redistributing these funds to the benefit of universities which are now less illustrious is a pertinent question. And what happens to the paramount state institutions in the sharpening competition for state funds for higher education also remains to be seen.

Meanwhile the Cartter study will give university presidents a text to point to with either pride or alarm in their dealings with trustees, foundations, state legislators, alumni, and wealthy friends. And for faculty and graduate students it will serve as a new Consumer's Guide to the academic marketplace.—JOHN WALSH

Announcements

A study of the role of **computer systems** in the administration of colleges and universities will be undertaken by the System Development Corporation under sponsorship of the American Council on Education and the College Entrance Examination Board. The study is designed to review the present uses and the potential values of computer technology to administrators. The project will be managed by John F. O'Toole, Jr., and the principal investigator will be John G. Caffrey, both in the advanced systems division of Computer Development Corporation.

The Thomas Alva Edison Foundation recently presented its annual **Edison awards** for children's books, films, and radio and television programs and stations considered to best serve youth. Awards involving the sciences were made in the following categories:

Best science television program for youth: "Grand Canyon: A Journey with Joseph Wood Krutch," NBC.

Best science radio program for youth: "World of Science," NBC.

Special citation for a scientific television series: "Animals and Man," Canadian Broadcasting Corporation.

Special citation for an educational film: "Careers in Engineering," General Electric Company.

Best children's science book: *Biography of an Atom*, by J. Bronowski and Millicent E. Selsam; Harper and Row.

Best science book for youth: *Explorations in Chemistry*, by Charles A. Gray; Dutton.

Required 6 months' notice is given on the possible use of plenary powers by the International Commission on Zoological Nomenclature in connection with the following names, listed by case number [see *Bull. Zool. Nomencl.* **23**, pt. 1 (30 April 1966)]:

1733 Validation of TRYPETESINAE Lacordaire, 1833, as the family-group name for *Trypetes* Schoenherr, 1836 (Insecta, Diptera).

1735 Validation of *Podalonia* Fernald, 1927, with designation of type species (Insecta, Hymenoptera).

1737 Suppression of *Gobius lenkoranicus* Kessler, 1877 (Pisces).

1738 Grant of Priority from 1876 to *Collignoniceras* Breistroffer, 1947 (Ammonoidea).

1740 Suppression of *Clupea isingleena, Clupea nymphaea, Clupea caeruleovittata* Richardson, 1846, and *Anguilla clathrata* Richardson, 1844 (Pisces).

Comments should be sent in duplicate, citing case number, to the Secretary, International Commission on Zoological Nomenclature, British Museum (Natural History), Cromwell Road, London, S.W.7., England. Those received early enough will be published in the *Bulletin of Zoological Nomenclature.*

Meeting Notes

Papers are invited for presentation at the Northeast **electronics research and engineering** meeting (NEREM), 2–4 November in Boston. Topics to be covered include semiconductor devices and techniques, communications systems and techniques, space electronics, electronic circuits, and biomedical electronics. Sponsor: Institute of Electrical and Electronics Engineers. Abstracts: 35 to 40 words; condensed paper: 600 to 1000 words. Deadline: *1 July*. (T. A. Longo, 31 Channing Street, Newton, Massachusetts 02158)

A symposium on **computer and information sciences** is scheduled for 22–24 August in Columbus, Ohio. Papers will discuss various aspects of learning, adaptation, and control in information systems. Attendance is open to all interested technical personnel; delegates will be housed in dormitories on the Ohio State University campus. Sponsors: Columbus Laboratories of Battelle Memorial Institute, Office of Naval Research, Ohio State University. (Julius T. Tou, Communication Science Research Center, Columbus Laboratories, Battelle Memorial Institute, 505 King Avenue, Columbus, Ohio 43201)

A conference on principles of **radiation protection** is scheduled to be held 24–26 August at Oak Ridge, Tennessee. The topics will include recent research and opportunities for teaching, research, and applied programs in radiation protection and health physics. Participants will be faculty of university and liberal arts colleges, technical institutes, and engineering schools. A few will be eligible for travel expenses and per diem allowance for the conference. Sponsors: Oak Ridge Associated Universities, Oak Ridge National Laboratory, AEC Division of Nuclear Education and Training. (Special Projects Office, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge, Tennessee 37830)

A conference on the **characterization of materials** will be held at Pennsylvania State University 16–18 November. The meeting will consist of invited lectures and a limited number of contributed papers designed "to focus the attention of the international scientific community on this field, to interchange information on objectives, standards, and techniques, and to survey recent progress." Topics to be covered include elemental composition and homogeneity of materials; site distribution and valence state of ions in crystals; determination of periodic and aperiodic structures; characterization of point, line, and surface defects; problems of clustering; and phase separation phenomena. (Rustum Roy, Materials Research Laboratory, Pennsylvania State University, University Park 16802)

Papers are being solicited for the 1966 Pittsburgh **diffraction** conference, to be held 9–11 November. Papers on any aspect of diffraction, microscopy, crystallography, crystal physics, or related instrumentation will be considered. Abstracts: 400 words; deadline: *12 September*. (P. R. Swann, U.S. Steel Corporation, Fundamental Research Laboratory, Monroeville, Pennsylvania 15146)