uled sessions. Not all who came to their meetings were sympathetic, and the radicals themselves were split by violent disagreements over tactics and sometimes philosphy. At one radical meeting Rosenthal—the student who had been "needled" by Mrs. Hardin—was pounced upon by four young radical women who tried to drag him from the room. Rosenthal was subsequently berated in a heated planning session by a number of radicals who felt that he undermined their efforts with his wild tactics.

The more thoughtful radicals were trying to deliver a call for revolution and for the liberation of science from capitalist control, but the message tended to get lost in the high jinks and disruption. As Zimmerman, one of the Chicago-area radicals, expressed it: "We didn't come here to close down the meeting or to advise people to withdraw from science. We came to argue that science has to be transformed." The radicals acknowledged that they have not fully worked out just what a true "science for the people" might be. But they suggested that it might include such elements as performing research on the power structure for the people, rather than vice versa; designing kits to detect environmental poisoning; and developing "people's weapons," such as the Molotov cocktail.

Whatever the goals of the radicals may have been, their disruptive tactics frequently "turned off" as many people as they "turned on." The tone of newspaper comment was generally negative. The *New York Times* deplored the "rowdy tactics" of the dissenters and suggested that they were "emotional fanatics." The *Washington Post,* whose editorial page is among the most liberal in American journalism, likened the radical scientists to "Nazi storm-troopers" and noted that, while Mrs. Hardin should not, of course, have jabbed that heckler, it was hard to feel too sorry about it. "It should not be beyond the power of scientists to restore reason to its normal throne at their conventions," the *Post* said.

—PHILIP M. BOFFEY

ACE: Rating of Graduate Programs Shows Little Change in Status Quo

The American Council on Education (ACE) has published an updated version of its mid-1960's comparative study of university graduate departments, which won for itself a place as the Baedeker of American graduate education. The new study* reflects a big increase in the number of graduate programs, but shows that the institutions which dominated the ratings 5 years ago—notably Harvard and Berkeley—are still in dominant positions. According to the survey's authors, the "most dramatic development has been an improvement in the rated quality of the faculty in a large number of graduate programs."

The original study, conducted by Allan M. Cartter, then an ACE vice president and now chancellor at New York University, was based on data collected in 1964 and was published in 1966. More than 26,000 copies have been distributed. Titled *An Assessment of Quality in Graduate Education* [see *Science* **152**, 1226 (1966)], it caused a strong reaction, particularly among academics whose oxen had been gored.

The authors of the new study are Kenneth D. Roose, who was an ACE vice president until recently, and Charles J. Andersen, a member of the ACE staff. Methodologically, Roose and Andersen have followed closely in Cartter's footsteps, although the new study offers ratings in 36 disciplines (seven more than the earlier study) and is based on responses from 6000 scholars, compared with the 4000 who turned in usable questionnaires in 1964. It would be fair to say, however, that the Cartter report was a more personal and a somewhat more controversial document since Cartter not only included a broader discussion of the justification of a subjective survey but also made more explicit comparisons of institutions.

The authors of the new report play their data cards closer to the vest, as the revised title, *A Rating of Graduate Programs*, implies. Several times in the course of the report Roose and Andersen make the point that they "have tried to deemphasize the pecking order relationships inherent in most scoring systems, for it is not our purpose to bolster or deflate egos."

The fundamental objection of critics to the original ACE report was that it was subjective and empirically uncheckable. The response to that criticism has been that nothing else was intended. The rating by peers is intended to indicate the reputation of graduate programs, not to measure quality on some absolute scale. Objectors can say with justification that the raters may have inadequate knowledge of some departments they judge or may be swayed by out-of-date impressions, old school ties, or plain and fancy snobbery. At a press conference held to discuss the report, ACE president Logan Wilson repeated the enjoinders of Cartter and his successors to regard the report only as a compilation of judgments of scientists and scholars, but noted that "the reputation of an institution is nothing more than what its judges think it is."

Roose and Andersen used Cartter's rating system but rather drastically altered the way in which the results were presented in the published report. The principal changes were in not publishing numerical ratings and in merging categories to provide larger groupings of institutions.

The questionnaires asked the scholars to evaluate graduate departments in three respects. Two of the sections, on quality of faculty and effectiveness of the doctoral program, were repeated from the Cartter study, and the third section was added to elicit opinion on changes in the last 5 years.

In the section on faculty quality, the respondents were asked to indicate the "term that corresponds most closely to your judgment of the quality of the graduate faculty in your field at each institution listed. Consider only the scholarly competence and achievements of the present faculty. Limit the number of 'Distinguished' ratings to no more than 5." The other possible ratings were: strong, good, adequate, marginal, not sufficient for doctoral

* *A Rating of Graduate Programs*, by Kenneth D. Roose and Charles J. Andersen, is available for $4 from the ACE, Publication Division, 1 Dupont Circle, Washington, D.C. 20036.

training, and insufficient information. In the published report, the names of schools whose departments were rated marginal or lower were omitted. Schools in the distinguished and strong categories were lumped together. Although institutions in this category were listed according to ranking, no numerical ratings were printed, and therefore standings tended to be fuzzier than in the earlier study. In the Cartter report, for example, there were eight physics graduate departments in the "distinguished" category, but in the new report 30 institutions were given the top rating for the quality of its physics faculty.

In the ratings on faculty quality the University of California, Berkeley, placed 32 departments in the top category. Harvard was next with 27 and following in order were Stanford, 16; Chicago, 14; Yale, 13; M.I.T., 12; Michigan, 12; Princeton, 12; Caltech, 11; Wisconsin, 9; Illinois, 6; Columbia, 5; and Rockefeller, 5.

"Effectiveness" Ratings

In the section rating "effectiveness of doctoral programs," the raters were asked to choose the "term that corresponds most closely to the way you would rate the institutions listed if you were selecting a graduate school to work for a doctorate today. Take into account the accessibility of the faculty and its scholarly competence, the curricula, the instructional and research facilities, the quality of graduate students, and other factors that contribute to the effectiveness of the doctoral program." The possible rankings were: extremely attractive, attractive, acceptable, not attractive, and not sufficient information.

Institutions rated in the "extremely attractive" category, in a representative selection of disciplines in the "effectiveness" section, are as follows.

Economics: M.I.T., Harvard, Yale, Chicago, Princeton, California (Berkeley), Michigan, Minnesota, Stanford.

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

Biochemistry: Harvard, Stanford, California (Berkeley), Caltech, Rockefeller, Wisconsin, M.I.T., Brandeis, Johns Hopkins, California (Los Angeles), California (San Diego), Cornell, Duke, Princeton.

Microbiology: M.I.T., Rockefeller, Caltech, Harvard, Illinois, California (Berkeley), Stanford, Wisconsin, Purdue, Washington (Seattle).

Molecular Biology: Caltech, Harvard, California (Berkeley), M.I.T., Rockefeller, Stanford, Wisconsin, California (San Diego), Johns Hopkins, Yale, Brandeis, Princeton, Washington (Seattle).

Chemistry: Caltech, Harvard, California (Berkeley), Stanford, M.I.T., California (Los Angeles), Cornell, Illinois, Wisconsin, Chicago, Yale, Columbia, Princeton.

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

Physics: Caltech, Princeton, Stanford, Harvard, California (Berkeley), Cornell, M.I.T., Illinois, California (San Diego), Chicago, Wisconsin, Yale.

Electrical Engineering: M.I.T., Stanford, California (Berkeley), Illinois, Caltech, Michigan, Princeton.

In the new section which is included to indicate changes in reputation in the past 5 years, there was by and large no dramatic shuffle in the ratings. The prevailing impression is that the strong are getting stronger, or at least remaining strong. To be included in the study an institution must have awarded at least 100 doctorates in two or more disciplines in a recent 10-year period; no graduate department of an institution included in the survey was rated unless it had awarded at least one doctorate in the 10 years. Each discipline had at least 100 raters. Because of the criterion of doctoral production, no clear idea of the progress of the so-called emerging institutions is provided in the report. No predominantly black institution shows up in the ratings. It should be noted that graduate programs in professional schools, including programs in education, were not rated in the report.

Most readers of the report will look for evidence that campus unrest has affected the reputations of graduate departments at institutions such as Berkeley and Columbia. In the case of Berkeley, the university remains at or very near the top in many categories and still competes with Harvard—as it did 5 years ago—for a No. 1 ranking in any absolute unofficial assessment of aggregate rankings. Wilson noted that Harvard appears in the No. 1 position in 14 disciplines and Berkeley in 8, but Berkeley shows up in more categories due principally to strength in engineering disciplines.

Columbia, on the other hand, has slipped markedly in several disciplines, although the ranking of the quality of the faculty in physical sciences has held up comparatively well. Observers tend to ascribe the slippage at Columbia more to financial and leadership troubles than to student depredations. It should be noted that Harvard and Berkeley, as well as Columbia, are in several instances ranked lower in effectiveness than in faculty quality. For Berkeley and Columbia differences in more than a few cases are significant.

The authors' generalization that the quality of faculty is regarded as being higher than it was 5 years ago is supported by figures showing that, of faculty in 1600 programs included in both studies, slightly less than 70 percent were rated adequate plus or better in 1964, and 80 percent were so rated in 1969. Graduate faculties in the South enjoyed something of a surge in the ratings. In 1964, about 59 percent of faculty in 256 programs rated in Southern institutions merited adequate plus or better marks, and in 1969 it was 73 percent. In the new study 130 institutions were rated, compared with 105 in the earlier study.

Names Tactfully Omitted

Institutions whose graduate departments received low ratings and whose names were tactfully omitted from the report will, like all other institutions rated, get confidential reports from ACE that may help them make decisions on use of resources. One policy implication that the authors of the report press is in the form of a caution that institutions not neglect undergraduate education in an attempt to catch up with the Joneses in graduate education.

ACE officials appear to feel that the ratings are fulfilling their intended functions of assisting scholars and administrators to order institutional priorities, of helping prospective graduate students to assess the market, and of providing a guide to educational policy makers in foundations and government. But 5 years hence, the universities may not be getting a revised version of the ratings from the ACE. The Council in 1966 committed itself to a follow-up study in 5 years, but this time there is no such undertaking. And there are signs that ACE officials would be relieved if another organization, perhaps the Council of Graduate Schools, took over the task, and the resulting praise and blame, of periodically and publicly giving the graduate schools the good news and the bad.—JOHN WALSH