MEASURING THE QUALITY OF UNIVERSITIES

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Introduction. Attempts at evaluating universities (particularly graduate schools) according to various subjective and objective measures of quality certainly are not new. Beginning with the ratings assembled by Raymond Hughes in 1925 /6/ there have been repeated attempts at appraising the quality of graduate institutions. Studies by The American Council on Education in 1934 /10/, Keniston in 1958 /7/, Eels in 1960 /5/, Berelson in 1960 /2/ and Cartter in 1966 /3/ have provided a continual stream of evaluation methods and specific ratings. The Cartter study probably has become the most widely used evaluation of quality, and it has become a stimulus for further study, criticism, and refinement on matters of quality assessment. For example, recent articles by Lewis /9/, Knudsen and Vaughn /8/, and Shamblin /11/ concerning evaluation of quality in departments of sociology are indicative of the continuous interest in methods of measuring quality.

The present paper deals mainly with the following problems: dispersion in quality between the universities and the advisability of ranking universities according to quality; dispersion in quality between academic departments within schools; and the relation between quality and compensation bearing on the predictability of changes in quality. The analysis is based on data that are relevant to the problem. They are: quality indices, compensation of faculty, number of professors in Who's Who in America, and teacher-student ratios.

Quality indices were constructed from information contained in the Allan M. Cartter-American Council on Education /3/ study. Using this book's scores and quality classification of academic departments, two indexes were derived. One of them, named Average Rank Scores, makes possible, among other things, ranking of whole universities. Another, called Weighted Average Scores (not shown here), is used mainly to study the dispersion in quality among departments within a university.

The quality classification of schools can be accomplished by constructing quality indexes and by ranking. Whether it is accomplished by one or the other method, such classification is useful only when the quality of academic departments within a university is fairly uniform. If a considerable number of schools have both excellent and very poor departments, the classification of whole schools is misleading. The only guide to quality, then, would be the method adopted by Cartter, giving the classification of academic departments alone.

The present analysis suggests that there is enough uniformity among departments in a great many schools, and that, basically, classification of whole universities according to quality is justified.

However, there is a weighty problem of how to classify schools. A great many people have considerable predilection for ranking. Yet, in too many cases the difference in quality among bunches of schools is so small that ranking may be considered inappropriate.

Another important problem concerning the evaluation of schools is the method of evaluation. Cartter's grading is based on opinions of scholars. The analysis of data based on his evaluation of academic departments, strongly suggests the conclusion that such a method of evaluation exaggerates the quality of top schools and has the opposite effect on schools at the other end of the spectrum.

Finally, the relation between faculty compensation and quality on one hand and the dispersion in quality on the other has been studied. It makes possible approximate forecasting of quality and of changes in quality. It also suggests that it is almost an impossible task to build up a small number of excellent departments in an otherwise low quality school when the average compensation of this school is considerably below that of schools with predominantly excellent departments.

The Statistical Data. Let us show first how our quality indexes were derived from Cartter's study.

Cartter sent out his questionnaire to department chairmen and senior and junior scholars of universities granting doctor degrees. The questionnaire dealt not only with the quality of academic departments, but also with the quality of graduate programs. The present study is concerned with the quality of academic departments alone.

The basic question on this matter presented in the questionnaire was: "Which of the terms below best describes your judgment of the quality of graduate faculty in your field at each of the institutions listed? Consider only the scholarly competence and achievements of the present faculty. 1) Distinguished; 2) Strong; 3) Good; 4) Adequate; 5) Marginal; 6) Not sufficient to provide acceptable doctoral training; 7) Insufficient information."

The questionnaire was answered by over 4,000 scholars from about one hundred universities.

The tabulation of results in Cartter's book is somewhat different from the classification used in the questionnaire. It is restricted to "Distinguished," "Strong," "Good," and "Adequate plus" categories.

Departments in the first two categories were assigned both rank and quality coefficients. Departments in "Good" and "Adequate plus" categories have neither rank nor score. They are merely listed alphabetically. One has to assume that departments that were not listed fall into a "Less than adequate plus" class.

Let us now describe how our quality index for whole schools was obtained from this information.

This index is basically an "average rank" index. But before an Average Rank Score for, e.g., Chicago could be computed, Cartter's ranking had to be adjusted and rank numbers had to be assigned to departments below the "Strong" category.

The adjustment of Cartter's ranking was necessary because in his study the number of schools

in various academic disciplines under "Distinguished" and "Strong" categories is not the same. Thus, in economics the number of such schools is 16; in classics, 12; in geology, 19; and so on.

The ranking was adjusted so that in the "Distinguished" category of every academic discipline the first school received No. 1 and the last No. 9 because the greatest number of schools in this category was 9.

In the "Strong" category the first department always received No. 10, and the last, No. 34. The ranks for intermediate departments in both categories were assigned by the formula for common difference of arithmetic progression $d = \frac{z_{n-1}}{n-1}$ where z_n for, e.g., "Distinguished" category is $z_n=9$ and for, e.g., anthropology the value of n is n=4, which is the number of distinguished departments in this academic discipline. As a result, these were the rank numbers assigned to the 4 schools: Chicago 1, Harvard $3^2/_3$, Berkeley $6^1/_3$, and Michigan 9.

Departments which were not individually ranked by Cartter, that is departments falling into "Good," "Adequate plus," and "Less than adequate plus" categories, received, respectively, ranks of 35, 36, and 37.

Finally, the ranks of all departments of a university were averaged. The Average Rank Scores are not shown here, but the ranking based on these scores is given in column (1) of the Appendix.

To see how this quality index compares with an index based on Cartter's scores, average scores for all departments of the top 10 schools were obtained. The results of the comparison are as follows: There is 0 rank point difference in 3 cases, 1 rank point difference in 5 cases, 2 point difference in 1 case, and 3 point difference in 1 case. This difference between the two indexes should be considered insignificant.

The influence of Cartter's scores upon the Average Rank Scores index diminishes as we descend the ranking ladder toward schools with more and more departments below "Strong" category. Thus, the University of Washington ranks 22nd according to Average Rank Scores and has 50 per cent of departments in "Strong" and no department in "Distinguished" category. Rensselaer Polytechnic Institute ranks 53rd and is the highest ranked school that has all departments below "Strong" category. This means that approximately after the 22nd school the Average Rank Scores are determined more and more by the weights 35, 36, and 37 assigned to other than the top two categories. The Average Rank Scores of schools below the rank 53 are determined exclusively by the above weights.

For this reason the Average Rank Scores were used only for correlation and ranking purposes. They were not used to compute measures of dispersion or for any other comparisons based on measures of dispersion.

In order to study the dispersion in quality, Weighted Average Scores were computed. Weights 4, 3, 2, 1, 0 were assigned respectively to "Distinguished," "Strong," "Good," "Adequate plus," and "Less than adequate plus" categories. All the departments of a school were assigned these weights and the weighted averages computed. Ranking by these scores differs somewhat from ranking based on Average Rank Scores, the median difference being 2 rank points. In spite of these unavoidable differences, Weighted Average Scores were very valuable for comparisons based on dispersion of data because their computation is based on criteria that are numerically uniform for all the schools. The Weighted Average Scores are not shown here.

Figures on the number of professors listed in Who's Who in America /12/ were obtained for the departments of chemistry, economics, mechanical engineering, English, history, mathematics, and sociology. Only full and associate professors were considered and the numbers of those listed were expressed in percentage form.

The data on average compensation (and not on average salary) come, of course, from the AAUP Bulletins.

The student-faculty ratios were extracted from two publications. One of them is American Universities and Colleges /1/ and the other, The College Blue Book /4/.

As the reader may note, data are not always perfectly comparable and figures on compensation do not reflect regional differences in standards of living.

Ranking and Dispersion Between Schools. Most every professor ranks schools with regard to quality. Schools also are very often ranked by parents, students, and employers. It is, therefore, reasonable to assume that this ranking "business" is important and cannot be avoided. If so, then criteria and methods for less haphazard classification of schools should be developed.

When dealing with this problem, one should keep two things in mind. One is the method of measuring quality, and another is the choice of a most appropriate index of quality.

Ranking as an index of quality generally is used only if no other method is available or in cases where the quality index numbers increase or decrease uniformly. These principles apply very clearly to the classification of universities. If there is a sizeable number of schools of almost the same quality and another bunch in which the schools differ significantly among themselves then ranking is misleading. Ranking usually implies equal numerical or qualitative difference between the objects ranked.

To measure the amount of this kind of bunching, mean deviations of Weighted Average Scores were computed for the schools ranked 1-10, 11-20, ..., 51-60. Since these mean deviations are not comparable, coefficients of dispersion were obtained by dividing the mean deviations by their respective means. These coefficients are: .31, .095, .027, .022, .0057, .0047. They are significantly different. The dispersion of the ten top schools seems to be quite exaggerated. Is it due to differences in quality or reputation? Also, the bunching of schools with regard to quality does exist. The ranking, therefore, is not appropriate for the purpose of classifying schools, and, if possible, some kind of scores or index numbers should be used instead.

The ranking of schools, based on Average Rank Scores (and not on Weighted Average Scores) is shown in column (1) of the Appendix. The reason why ranking was used instead of Average Rank

Scores is that, due to the above mentioned weighting process, the first is superior to the second. These rank numbers should be used with caution. It is reasonable to assume that, on the average, our ranking may be in error by 1 to 5 points, and in some cases by more than that. Most of the time these are the sampling and statistical errors.

Additional information on the quality differences between schools is provided by columns (4) to (8) of the Appendix. The University of California at Berkeley has 100 per cent of its departments in two categories. West Virginia University has 93.3 per cent of departments in "Less than adequate plus" category. What a tremendous difference. Furthermore, 20 of 98 schools have 75 per cent or more of their departments that, according to Cartter's study, are not or are not quite adequate, and half the schools have 50 per cent or more departments in that category. This result does not make sense, no matter whether one compares schools or departments.

This conclusion is supported not only by common sense, but also by an analysis of the percentages of professors listed in Who's Who. The Who's Who percentages are listed in column (3) of the Appendix. As expected, there is only a moderate of correlation (r=.55) between these percentages and Average Rank Scores. It is, however, more important to note that schools with low ranks have relatively sizeable proportions of professors listed in Who's Who. For example, the 20 schools which have 75 per cent or more of departments in the "Less than adequate plus" category, have, on the average, 11.2 per cent of their professors listed in Who's Who, compared with 23.6 per cent for the top 20 schools. This difference is sizeable, but by no means is it as great as the difference between the best and worst schools based on the number of departments in various quality categories.

One may object to the present argument contending that listing in Who's Who is not always an indicator of scholarly standing. The response to this objection is that people listed by this publication did distinguish themselves in their fields of endeavor. These fields are most of the time compatible with the subjects that the listed professors teach.

The ranking of all schools, presented here, may not differ much from ranking that might be obtained from a more detailed and objective investigation. But the differences in quality (or the amount of dispersion) among schools, as indicated by the data in the Appendix, are without any doubt grossly exaggerated. Cartter's questionnaire demands a subjective evaluation of academic departments that can be achieved only from the knowledge of people who teach there. Since every participant of the survey had to evaluate about 100 departments, it is obvious that he had to consider only the nationally known scholars. However, there are many professors who are not nationally known, but who publish respectable pieces of work. They will certainly be overlooked by a participant of such a survey, although they are quite capable of training graduate students.

Ranking and Dispersion Within Schools. Ranking schools is meaningless if a sizeable portion of all the schools under consideration have departments of uniform quality and the quality of departments in other schools is widely dispersed. Some information on this problem is provided in column (9) of the Appendix. This column gives sums of percentages of two neighboring quality categories in which the number of departments is greatest. A frequency distribution has been made of these sums and it is shown in Table 1. Only the top 64 schools were enumerated since too many departments in the schools below that rank fall into "Less than adequate plus" category of column (8).

Table 1

Percent of Departments in Two Neighboring Quality Categories in which the Number of Departments is Greatest

(The distribution is made up of percentages for top 64 schools.)

Per cent	Number of schools
95-100	5
90-94.9	6
85-89.9	13
80-84.9	9
75-79.9	9
70-74.9	3
65-69.9	7
Less than 65	12
	64

Source: Column (9) of the Appendix.

The frequency distribution shows that 52 of 64, or 81 per cent of the schools under consideration have between 65 and 100 per cent of their departments in two neighboring quality categories. This result, together with a more detailed examination of the frequency distribution, leads us to an important conclusion: there is a great degree of uniformity between departments in the universities offering graduate degrees. One result of this analysis is that the interdepartmental dispersion in quality does not diminish the usefulness of classifying whole universities as to quality.

In addition to ranking, the information on interdepartmental dispersion of quality throws some light on the problem of change in quality. One has to suspect that most often change in quality does not occur in all departments simultaneously. Rather, a small number of departments lead the change. It means that schools in which a significant change in quality is taking place will have greater dispersion in quality between departments.

This point will be taken up in the following section. However, one already can make another interesting observation. Further analysis of columns (4) to (8) shows that only one school (University of Delaware) has one department two quality categories above the bulk of departments. Another school (M.I.T.) has four departments two categories below other departments. It is, therefore, most unlikely to find a very poor department in a high quality school and an excellent department in a low ranking university. It appears that an effort to upgrade a university,

starting with one or two departments either was not present, or if it was, did not meet with success.

Forecasting Changes in Quality. The relationships between Average Rank Scores, average compensation, Who's Who percentages, and student-faculty ratios were analyzed with the help of regression analysis and some other statistical techniques.

The student-faculty ratios shown in column (2) of the Appendix are of interest to those teachers and students who like small classes. Since small classes are expensive, they are found predominantly in rich private schools. There is no correlation between quality of schools in general and the student-faculty ratios. The figures in column (2) are given merely to satisfy the reader's curiosity.

The regression analysis of the other three variables has been done with the help of parabolas. In regression analysis the quality of estimates was measured not by absolute, but by relative values of standard error of estimate. To make these comparisons, the standard errors were divided by the means of dependent variables. The coefficients of correlation and coefficients of dispersion of dependent variables around the regression curves are shown in Table 2.

Table 2
Coefficients of Correlation and Coefficients of Deviation from the Regression Line

The variables: 1 Average Rank Scores
2 Average Compensation Data
3 Per cent of Associate and Full Professors Listed in Who's Who in America

	1	2	3	
1	----	.777 .156	.529 .184	r $\sigma_{yx}/\bar{Y}$
2	.769 .100	----	.634 .190	r $\sigma_{yx}/\bar{Y}$
3	.556 .514	.610 .475	----	r $\sigma_{yx}/\bar{Y}$

Further information on the relationship between the three variables is provided by Figures 1 and 2. These are the polygons drawn from standardized ($z_i=x_i/\sigma_x$) figures representing Average Rank Scores, average compensations, and Who's Who percentages.

We note in Figure 1 that both polygons are quite similar and skewed to the right. Thus, not only more than 50 per cent of the schools are below the mean in quality and compensation, but the differences between the schools below the mean are much less than above the mean. The dispersion in quality below the mean is less than the dispersion in compensation, but not by much. As has been noted, this difference is due partly to weights used in the computation of Average Rank Scores. Similar results are obtained from Figure 2.

FIGURE 1

STANDARDIZED AVERAGE RANK SCORES AND AVERAGE COMPENSATION FIGURES

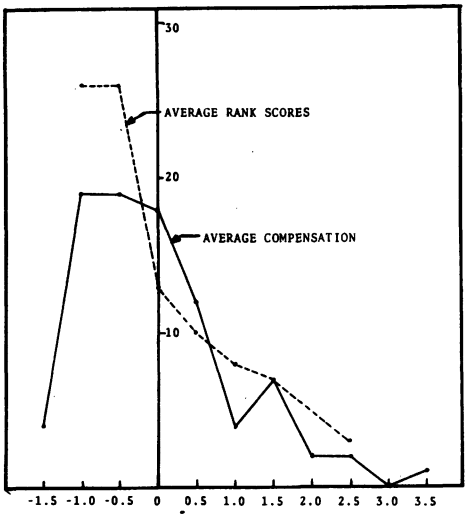
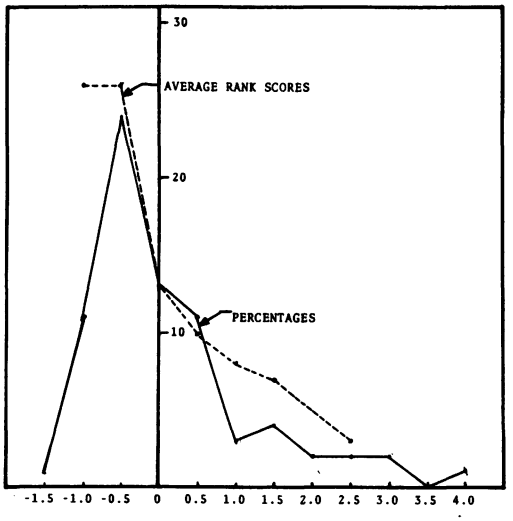


FIGURE 2

STANDARDIZED AVERAGE RANK SCORES AND PERCENTAGES OF ASSOCIATE AND FULL PROFESSORS LISTED IN WHO'S WHO IN AMERICA



To the extent that average compensation and Who's Who percentages are predictors of quality of schools, the two graphs tend to confirm our assumption that the classification of schools based on Average Rank Scores is not too bad. They also confirm our conclusion that the ranking of schools is not justified. If it were, the polygons would resemble a rectangular distribution.

Due to results of Table 2 average compensation can be used as a predictor of the quality of schools. This is important because average compensation figures are available every year, while any index of quality probably will be computed at considerable time intervals. This time interval is now and may continue so far into the future that it may be of interest to estimate significant changes in the quality of schools before the next quality index is computed. Further comparisons of quality and average compensation may provide additional clues in this respect.

Column (13) of the Appendix shows differences between quality and compensation ranks. The frequency distribution of these differences (without regard to signs) is shown in Table 3. The median difference is 10.7 rank points and the greatest difference is 55 points.

Table 3
Differences between Rank Numbers Expressing Classification as to Quality and Average Compensation of 89 Universities

Number of rank points	Number of universities
0-3	20
4-7	17
8-11	11
12-15	11
16-19	6
20-23	14
24-27	3
28-31	2
32-35	3
Less than 35	2
	89

Source: Column (13) of the Appendix.

The reasons for these differences are, of course, the same as the reasons for a relatively high value of $\sigma_{yx}/\overline{Y}$=15.6 per cent for regression of Average Rank Scores on compensation in Table 2. One reason is considerable change in compensation at the time of comparison so that there was no time for readjustment between quality and compensation rank. Other reasons are differences in the dispersion of salaries within a school (permitting employment of high and low quality instructors), differences in the administrative efficiency, statistical errors, and others.

The comparison of compensation and quality rank numbers for the purpose of estimation is, to a certain extent, justified because the shapes of distributions of standardized Average Rank Scores and average compensation figures are similar. On the other hand, one has to bear in mind that, due to the shapes of these two polygons, a ten point difference for the 20 top schools is more significant than, say, for the 40 middle quality schools. The following percentile ratios, computed from 1963/64 compensation figures, are indicative of the problem: P_0/P_{20}=1.380, P_{20}/P_{40}=1.128, P_{40}/P_{60}=1.080, P_{60}/P_{80}=1.081, P_{80}/P_{100}=1.179, and P_0/P_{100}=2.148. The differences between these percentiles in dollars are respectively: 4,572, 1,358, 790, 738, and 1,388. The difference between P_0 and P_{100} is $8,842. However, the estimates made with the help of regression analysis would suffer from the same weaknesses.

It is also interesting to note that the correlation between quality and compensation for schools at the top and bottom is greater than for the schools in the middle. This statement is supported by medians of rank differences of column (13) for schools ranked 1-22, 23-44, 45-66, and 67-89. The medians are: 6.0, 15.0, 18.0, and 7.0, to be compared with the already quoted median of 10.7 points for all schools.

Once again, the magnitude of differences in column (13) may be due to the amount of dispersion in salaries within a school, or to administrative efficiency, or to both so that only a significant difference in this column indicates a change in quality due to the change in average compensation. How substantial should this difference be?

Considering the amount of standard error of estimate of "compensation on Average Rank Scores" in Table 2, the nature of the frequency distribution in Table 3, and the above analysis, there should be ten or more rank points difference for about 20 top schools and at least 15 points difference for other schools. This, coupled with the relatively small value in column (2) of the Appendix, would be an indicator of change. If the number in column (9) is large (say, 65 per cent or more), greater rank difference would be required to indicate the quality change of a school.

Column (14) is crucial in making estimates of change in quality for an individual school. A large value in column (2) and a large value in column (13) may indicate that the quality of a school is about to change. If this large value in column (13) is confirmed or reinforced by the corresponding value of column (14), then there is great probability that the quality of that school actually is undergoing a change. Of course, a value of equivalent magnitude but with an opposite sign in column (14) would mean a reversal of the trend.

If a school has a low value in column (9) and a large value in column (13), then it may be suspected that the change in quality actually is occurring. If the value in column (14) is small, the change will be consummated. A large value in column (14) means - depending on the sign - either reinforcement or arrest of change.

The differences in column (14) also indicate that changes in compensation are less drastic in private than in public schools. But they often are quite drastic. For example, within a five year span 11 schools changed compensation rank by 25 or more points.

The shape of the polygon of compensation data for 1968/69 (not shown here) is similar to 1963/64 polygon, but the dispersion is less. The percentile ratios for 1968/69 are: P_0/P_{20}=1.218, P_{20}/P_{40}=1.096, P_{40}/P_{60}=1.062, P_{60}/P_{80}=1.070, P_{80}/P_{100}=1.263, and P_0/P_{100}=1.916. These ratios can be compared with already quoted ratios for 1963/64: 1.380, 1.127, 1.080, 1.081, 1.179, and 2.148. The difference is significant and it may indicate a process toward diminution of the dispersion in quality between schools.

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APPENDIX

SUPPORTING DATA

DESCRIPTION OF COLUMNS: (1) QUALITY RANKING OF SCHOOLS. RANK NUMBERS BASED ON "AVERAGE RANK SCORES" DESCRIBED IN THE TEXT. (2) STUDENT-FACULTY RATIOS. (3) PERCENT OF ASSOCIATE AND FULL PROFESSORS FROM SELECTED DEPARTMENTS IN WHO'S WHO IN AMERICA. PERCENT OF DEPARTMENTS IN THE FOLLOWING QUALITY CATEGORIES: (4) "DISTINGUISHED"; (5) "STRONG"; (6) "GOOD"; (7) "ADEQUATE PLUS"; (8) "LESS THAN ADEQUATE PLUS". (9) SUM OF PERCENTAGES OF TWO NEIGHBORING QUALITY CATEGORIES IN WHICH THE NUMBER OF DEPARTMENTS IS GREATEST. (10) QUALITY RANKING OF SCHOOLS FOR WHICH 1963/4 AND 1968/9 COMPENSATION FIGURES WERE AVAILABLE. (11) SCHOOLS RANKED ACCORDING TO AVERAGE COMPENSATION FOR 1963/4 IN JUNE 1964 AAUP BULLETIN. (12) SCHOOLS RANKED ACCORDING TO AVERAGE COMPENSATION FOR 1968/9 IN JUNE 1969 AAUP BULLETIN. (13) COLUMN (10) MINUS COLUMN (11). (14) COLUMN (11) MINUS COLUMN (12).

Name of School	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
U. OF CAL. BERKELEY	1	18.2	26.3	79.3	20.7	---	---	---	100.0	1	16	23	-15	- 7
HARVARD U.	2	3	68.9	92.3	3.8	3.8	---	---	96.1	2	1	1	+ 1	0
CAL. INST. OF TECH.	3	3	21.6	61.5	38.5	---	---	---	100.0	3	4	2	- 1	+ 2
M. I. T.	4	5	22.5	60.0	13.3	---	---	26.7	73.3	4	5	7	- 1	- 2
U. OF MICHIGAN	5	8.7	17.5	28.6	71.4	---	---	---	100.0	5	21	14	-16	+ 7
STANFORD U.	6	11	34.8	38.5	53.8	3.8	---	3.8	92.3	6	2	5	+ 4	- 3
PRINCETON U.	7	5.5	56.6	37.5	54.2	4.2	---	4.2	91.7	7	7	12	0	- 5
U. OF CHICAGO	8	10	47.2	33.3	66.7	---	---	---	100.0	8	3	3	+ 5	0
U. OF WISCONSIN	9	15.6	21.0	24.1	65.5	10.3	---	---	89.6	9	44	51	-35	- 7
YALE U.	10	5.5	49.7	35.7	46.4	7.1	7.1	3.6	82.1	10	13	9	- 3	+ 4
COLUMBIA U.	11	6	35.9	28.6	53.6	10.7	7.1	---	82.2	11	6	15	+ 5	- 9
U. OF ILLINOIS	12	15.7	10.1	20.7	55.2	17.2	---	6.9	75.9	12	53	37	-41	+16
CORNELL U.	13	4	21.2	3.6	78.6	7.1	7.1	3.6	85.7	13	8	10	+ 5	- 2
U. OF MINNESOTA	14	13	10.6	3.6	75.0	14.3	7.1	---	89.2	14	34	41	-20	- 7
JOHN HOPKINS U.	15	5.5	33.3	3.8	76.9	15.4	---	3.8	92.3	15	9	8	+ 6	+ 1
U. OF CAL. LOS ANG.	16	20.9	23.4	---	75.0	10.7	---	14.3	85.7	16	16	23	0	- 7
U. OF PENNSYLVANIA	17	7	23.1	3.6	60.7	17.8	7.1	10.7	78.6	17	19	17	- 2	+ 2
ROCKEFELLER INST.	18	0.3	44.4	33.3	---	8.3	---	58.3	---	--	--	--	---	---
PURDUE U.	19	11	6.5	---	47.1	35.3	11.8	5.9	82.4	18	27	32	- 9	- 5
NORTHWESTERN U.	20	7	32.1	---	59.2	22.2	14.8	3.7	81.5	19	10	6	+ 9	+ 4
INDIANA U.	20	17	12.0	---	54.2	37.5	---	8.3	91.7	20	23	33	- 3	-10
YESHIVA U.	22	3	15.0	---	42.8	---	14.3	42.8	---	21	41	34	-20	+ 7
U. OF WASHINGTON	23	15.7	12.0	---	50.0	32.1	3.6	14.3	82.1	22	29	36	- 7	- 7
U. OF TEXAS	24	19	15.5	3.6	32.1	32.1	25.0	7.1	64.2	23	57	47	-34	+10
U. OF DELAWARE	25	20.5	9.7	20.0	---	---	20.0	60.0	80.0	--	--	--	---	---
DUKE U.	26	7	14.3	---	35.0	45.0	5.0	15.0	80.0	24	12	16	+12	- 4
BRONN U.	27	6	15.7	---	45.0	30.0	20.0	5.0	75.0	25	25	13	0	+12
CARNEGIE TECH.	28	9	22.2	---	44.4	44.4	11.1	---	88.8	--	--	--	---	---
BRANDEIS U.	29	7	47.1	---	27.3	36.4	9.1	27.3	63.7	26	26	20	0	+ 6
BROOKLYN POLYTECH.	30	14	13.3	---	28.6	28.6	14.3	28.6	57.2	27	48	81	-21	-33
U. OF N. CAROLINA	31	11	13.9	---	37.5	25.0	20.8	16.7	62.5	28	83	38	-55	+45
N. Y. U.	32	8.4	23.3	4.3	21.7	47.8	17.4	8.7	69.5	29	22	30	+ 7	- 8
U. OF CAL. DAVIS	33	15.5	14.9	---	28.6	21.4	---	50.0	50.0	30	16	23	+14	- 7
WESTERN RESERVE U.	34	6	35.2	---	20.0	5.0	25.0	50.0	75.0	--	--	--	---	---
ROCHESTER U.	35	7	10.6	---	15.0	45.0	10.0	30.0	60.0	31	11	11	+20	0
OHIO STATE U.	36	14.8	14.9	---	17.2	44.8	24.1	10.3	68.9	32	24	31	+ 8	- 7
U. OF IOWA	37	15.4	12.7	---	8.0	40.0	28.0	24.0	68.0	33	35	26	- 2	+ 9
WASHINGTON U.	38	6	9.2	---	16.0	40.0	24.0	20.0	64.0	34	28	27	+ 6	+ 1
IOWA STATE U.	39	15.9	16.1	---	11.8	52.9	11.8	23.5	64.7	35	47	66	-12	-13
EMORY U.	40	10	27.3	---	---	25.0	16.7	58.3	75.0	36	61	61	-25	0
U. OF PITTSBURGH	41	7.9	11.9	---	12.5	16.7	54.2	16.7	70.9	--	--	--	---	---
BRYN MAWR	42	7	19.0	---	6.7	26.7	13.3	53.3	66.6	37	15	46	+22	-31
PENN. STATE U.	43	13	8.3	---	8.0	28.0	36.0	28.0	64.0	--	--	--	---	---
SYRACUSE U.	44	12	8.3	---	8.0	12.0	52.0	28.0	80.0	38	32	28	+ 6	+ 4
MICHIGAN STATE U.	45	18	10.8	---	11.5	42.3	23.1	23.1	65.4	39	43	43	- 4	0
CASE INST. OF TECH.	46	9	23.0	---	25.0	12.5	37.5	25.0	62.5	--	--	--	---	---
RICE U.	47	10	44.3	---	18.8	37.5	12.5	31.2	56.3	40	20	19	+20	+ 1
CLAREMONT GRAD.	48	7	15.5	---	14.3	28.6	28.6	28.6	57.2	41	14	4	+27	+10
U. OF UTAH	49	15	10.7	---	4.5	9.1	18.2	68.2	86.4	42	55	55	-13	0
U. OF KANSAS	50	8	13.8	---	7.4	14.8	33.3	44.4	77.8	43	65	60	-22	+ 5
U. OF CINCINNATI	51	8	12.0	---	4.8	4.8	33.3	52.4	85.7	44	67	59	-23	+ 8
RUTGERS STATE U.	52	12	9.9	---	3.8	26.9	15.4	53.8	69.2	45	56	29	-11	+27
U. OF VIRGINIA	53	8	30.7	---	5.3	15.8	26.3	52.6	78.9	46	30	22	+16	+ 8
RENSSELAER POLYTECH.	54	12	25.7	---	---	50.0	25.0	25.0	75.0	47	36	45	+11	- 9
U. OF MARYLAND	55	12	14.2	---	3.8	7.7	42.3	46.2	88.5	48	74	84	-26	-10
LEHIGH U.	56	10	10.3	---	9.1	---	27.3	63.6	90.9	49	45	40	+ 4	+ 5
U. OF OREGON	57	11	16.2	---	4.3	26.1	30.4	39.1	69.5	50	50	50	0	0
SUNY BUFFALO	58	7.9	12.1	---	6.7	6.7	13.3	73.3	86.7	51	69	18	-18	+51
OREGON STATE U.	59	16	4.3	---	---	28.6	28.6	42.8	71.5	52	62	71	-10	- 9
FLORIDA STATE U.	60	14	12.5	---	7.1	---	42.8	50.0	92.8	53	72	62	-19	+10
U. OF COLORADO	61	12	10.6	---	---	15.4	46.2	38.5	84.7	54	31	56	+23	-25
U. OF S. CALIFORNIA	62	10	14.4	---	---	12.5	50.0	37.5	87.5	55	66	39	-11	+27
TUFTS U.	63	9	19.1	---	---	10.5	10.5	78.9	89.4	56	33	54	+23	-21
GEORGIA TECH.	64	11	8.8	---	---	14.3	42.8	42.8	85.8	57	60	53	- 3	+ 7
VANDERBILT U.	65	5	18.8	---	4.3	17.4	21.7	56.5	78.2	58	39	21	+ 9	+18
CLARK U.	66	12	8.8	---	---	33.3	---	66.7	---	59	38	44	-21	+ 6
U. OF FLORIDA	67	12.1	10.3	---	---	13.6	36.4	50.0	86.4	60	77	72	-17	+ 5
TULANE U.	67	8	11.7	---	---	16.0	16.0	68.0	84.0	61	51	48	+10	+ 3
ILL. INST. OF TECH.	69	14	14.7	---	---	21.4	14.3	64.3	78.6	62	42	65	+20	-23
N. CAROLINA STATE	70	13.6	12.0	---	---	23.1	7.7	76.9	84.6	63	40	78	+23	-38
WASHINGTON STATE U.	71	17	16.1	---	---	15.8	21.0	63.2	84.2	64	36	45	+28	- 9
NOTRE DAME U.	72	13	23.9	---	---	7.1	35.7	57.1	92.8	65	46	57	+19	-11
KANSAS STATE U.	73	17	10.6	---	7.7	---	23.1	69.2	92.3	66	73	79	- 7	- 6
WAYNE STATE U.	74	24	6.6	---	---	5.3	26.3	68.4	94.7	67	52	52	+15	0
NEW SCHOOL FOR S. R.	75	6.1	8.7	---	---	---	40.0	60.0	100.0	--	--	--	---	---
FORDHAM U.	76	7	10.9	---	---	---	36.4	63.6	100.0	68	82	75	-14	+ 7
ST. LOUIS U.	77	8	10.5	---	---	5.9	17.6	76.5	94.1	69	76	88	- 7	-12
U. OF NEW MEXICO	78	23	11.1	---	---	8.3	16.7	75.0	91.7	70	58	73	+12	-15
LOUISIANA STATE U.	79	18	16.1	---	4.5	---	18.2	77.3	95.5	71	68	89	+ 3	-31
U. OF CONNECTICUT	80	17	9.8	---	---	---	31.2	68.8	100.0	72	64	35	+ 8	+29
U. OF ARIZONA	81	22	8.6	---	4.3	---	17.4	78.3	95.7	--	--	--	---	---
U. OF NEBRASKA	82	18	14.8	---	---	---	29.2	70.8	100.0	73	59	67	+14	- 8
CATHOLIC U.	82	10	7.8	---	---	7.1	14.3	78.6	92.9	74	70	63	+ 4	+ 7
U. OF OKLAHOMA	84	18	24.0	---	---	---	26.1	73.9	100.0	75	79	80	- 4	- 1
GEORGE PEABODY C.	85	11	10.5	---	---	---	25.0	75.0	100.0	76	89	87	-13	+ 2
U. OF MISSOURI	86	10	15.5	---	---	---	24.0	76.0	100.0	77	78	76	- 1	+ 2
TEXAS A & M	87	13	3.0	---	---	---	23.1	76.9	100.0	78	88	70	-10	+18
G. WASHINGTON U.	88	13.3	15.3	---	---	5.6	11.1	83.3	94.4	79	49	42	+30	+ 7
OKLAHOMA STATE U.	89	20	6.7	---	---	---	26.1	73.9	100.0	80	81	83	- 1	- 2
U. OF TENNESSEE	90	10	14.4	---	---	---	20.0	80.0	100.0	81	68	85	+13	-17
U. OF MASSACHUSETTS	90	15	8.8	---	---	---	20.0	80.0	100.0	82	75	69	+ 7	+ 6
VIRGINIA POLYTECH.	92	11	6.9	---	---	---	15.4	84.6	100.0	83	80	77	+ 3	+ 3
U. OF KENTUCKY	93	11	12.4	---	---	---	11.8	88.2	100.0	84	87	49	- 3	+38
BOSTON U.	93	10	12.1	---	---	---	12.5	87.5	100.0	85	63	64	+22	- 1
TEMPLE U.	95	16	10.5	---	---	---	9.1	90.9	100.0	86	54	68	+32	-14
GEORGETOWN U.	95	5	8.0	---	---	---	9.1	90.9	100.0	87	84	74	+ 3	+10
U. OF WYOMING	97	15	8.3	---	---	---	7.7	92.3	100.0	88	86	86	+ 2	0
WEST VIRGINIA U.	98	12	12.3	---	---	---	6.7	93.3	100.0	89	85	82	+ 4	+ 3