DOCUMENT RESUME

ED 273 187 HE 019 600

AUTHOR Fuller, Carol H.
TITLE An Analysis of Leading Undergraduate Sources of Ph.D.s, Adjusted for Institutional Size. Revised and Expanded.
INSTITUTION Great Lakes Colleges Association, Ann Arbor, Mich.
SPONS AGENCY Lilly Endowment, Inc., Indianapolis, Ind.
PUB DATE Aug 86
NOTE 64p.; Revision and expansion of ED 261 605.
PUB TYPE Statistical Data (110) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Comparative Analysis; *Doctoral Degrees; Educational Attainment; *Educational Status Comparison; Higher Education; *Humanities; *Institutional Characteristics; Liberal Arts; National Surveys; Outcomes of Education; Productivity; School Size; *Sciences; Selective Colleges; Single Sex Colleges; Specialization

ABSTRACT

Data on Ph.D. productivity during 1951-1980 for all accredited institutions are presented, along with a narrative summary. Productivity ratios were computed by dividing the average number of Ph.D.s conferred per year (1951-1980) by the average number of bachelor's degrees conferred per year (1946-1976) for each institution. Liberal arts colleges constitute about half of the most productive institutions. Very large proportions of undergraduates at the California Institute of Technology and the Massachusetts Institute of Technology earned Ph.D.s. For science Ph.D.s, the leading technical institutions were highly productive in Ph.D. production, along with a significant number of liberal arts colleges. Liberal arts colleges that were high in science Ph.D. productivity (Reed College, Haverford College, Swarthmore College, and Oberlin College) are also among the most productive in the humanities. Data are also provided on the productivity of certain women's colleges, variation in productivity across Ph.D. fields, Ph.D. productivity adjusted for institutional size, the geographic distribution of highly productive institutions, and productivity for each of the Ph.D. fields for several groups of colleges (the Seven Sisters colleges, the Big Ten universities, and the Ivy League universities). (SW)

An Analysis of Leading Undergraduate Sources of Ph.D.'s, Adjusted for Institutional Size

(Revised and Expanded)

Carol H. Fuller

A Report Prepared for the
Great Lakes Colleges Association
220 Collingwood, Suite 240
Ann Arbor, MI 48103

August 1986

TABLE OF CONTENTS

DESCRIPTION OF THE STUDY

Ph.D. productivity has been a frequently used measure of comparative institutional achievement. The National Research Council (of the National Academy of Sciences) has collected data since 1920 on the numbers of baccalaureate graduates from colleges and universities who have gone on to earn Ph.D.'s. Listings showing the number of graduates earning Ph.D.'s predictably have been dominated by the larger universities, which award thousands of Bachelor's degrees annually.

This report updates and substantially broadens the analysis of earlier studies, which dealt with some selected groups of institutions. Data reported here are based on an examination of productivity for all accredited institutions, for Ph.D.'s earned during the years 1951-1980.

The productivity ratios shown on the accompanying tables were computed by dividing the average number of Ph.D.'s conferred per year (1951-1980) by the average number of Bachelor's degrees conferred per year (1946-1976) for each institution. This technique allowed comparisons to include recently founded institutions, which awarded their first baccalaureate sometime during the period covered by the study.

Readers who have seen earlier versions of these calculations may note a few changes in the numbers reported here. For some institutions, there were ambiguities in the published baccalaureate data, primarily because certain first professional degrees (such as law or theology) were included in the totals prior to 1961. We have been able to adjust some of those baccalaureate totals for this report, using the baccalaureate degrees conferred data reported by the American Council on Education between 1946 and 1959.

As one goes down the lists of the most productive institutions, the impressive achievements of the best undergraduate liberal arts colleges are notable. Liberal arts colleges constitute about half of the most productive institutions identified on these tables.

When one looks at Ph.D.'s earned in all fields, the productivity of a few leading technical institutions is also striking. Very large proportions of the undergraduates at Cal Tech and MIT have gone on to earn Ph.D.'s—more than one in five during the years covered by this study. Only a few institutions—Reed, Swarthmore, Haverford, and Oberlin among the liberal arts colleges—along with Chicago, Harvard, and Harvey Mudd, have productivity ratios comparable to these major technical institutions.

There are some variations in the rankings when one compares productivity of Ph.D.'s in various fields. For science Ph.D.'s, the leading technical institutions are highly productive, with a significant number of liberal arts colleges also in that group. However, the technical institutions, which are so strong on the science list (and particularly in empirical science), disappear completely from the list comparing productivity in Ph.D.'s in the humanities. Liberal arts colleges which ranked high on the science list—Reed, Haverford, Swarthmore, Oberlin—are also among the most productive in the humanities. The strength of certain women's colleges is also impressive—Bryn Mawr leads the list for productivity in the humanities.

Looking further at the variation in productivity across Ph.D. fields, seventeen institutions appear among the leading institutions for every one of the fields analyzed. These are presented in Table 1. This group is comprised almost entirely of small liberal arts colleges. Chicago, Harvard, and the University of California at Riverside are the only universities which rank high in each of the sciences and in the humanities as well.

As a further indication of the new insights about Ph.D. productivity made possible when one takes account of institutional size, it is interesting to compare the more familiar list of top institutions in total numbers of Ph.D.'s earned by their baccalaureate graduates (Table 8) with the list of the leading institutions when productivity is adjusted for institutional size. Only five institutions ranking among the top fifteen in total numbers (City College, Columbia, Cornell, Harvard, and MIT) are also among the leading institutions for productivity in all fields when institutional size is taken into account.

Institutional size was considered by Knapp and Goodrich in their classic study of the Origins of American Scientists, published in 1952. Their data were drawn from the period before the Second World War, and their calculations of productivity were based on the decade 1924-1934.

Comparisons of the geographic distribution of highly productive institutions of the 1920's and 1930's, identified by Knapp and Goodrich, with those appearing in this study, which is based on Ph.D.'s earned during the 1950's, 1960's, and 1970's, confirm some of the major changes which took place in American higher education following World War Two. The Midwest, with its concentration of liberal arts colleges, plus the University of Chicago, continues to be a highly productive region for scientists. But in the post-war data of this study, the older institutions of New England, almost totally absent from Knapp and Goodrich's lists, show the effect of their new academic selectivity, and are heavily represented. Also, many more West Coast institutions, particularly in California, appear on these post-war lists. Several campuses of the University of California join the ranks of institutions which are highly productive of science Ph.D.'s, reflecting the trend toward more selective undergraduate education in public institutions, which was demonstrated first in the post-war development of the University of California system. (For a list of institutions found to be highly productive by both Knapp and Goodrich and by this study, see Page 58.)

Also ranking high in science Ph.D. productivity in this new study are several institutions which did not exist before World War Two, including the most productive institution, Harvey Mudd College in California, which has seen more than 40% of its graduates go on to earn a Ph.D.

Data for several groups of institutions for each of the Ph.D. fields have also been calculated, and provide interesting comparisons (see Tables 9-16). The women's colleges known as the Seven Sisters are highly productive as a group (particularly Bryn Mawr, Barnard, Radcliffe, and Wellesley). They have the highest group productivity ratios in both humanities and social science. The productivity of the technical institutions is concentrated almost entirely in the empirical sciences. The Big Ten universities are also most productive in the empirical sciences, and least productive in the humanities.

The Ivy League universities show high productivity, spread across all the Ph.D. fields. The record of groups of selective undergraduate colleges—the Associated Colleges of the Midwest, the Great Lakes Colleges Association, and the selective northeast colleges known informally as the "Little Ivys"—is also impressive. The GLCA colleges match the Ivy League universities in productivity of life science Ph.D.'s, and the Little Ivys almost equal the productivity of both the Leading Technical universities and the Ivy League universities across all fields.

The productivity of the Seven Sisters is particularly impressive when one realizes that more than 80% of the Ph.D.'s awarded during the thirty years covered by this study (1950-1980), went to men.

This analysis of Ph.D. productivity was built on earlier work on this topic. Several summaries of productivity, not adjusted for institutional size, have been published. Harmon's Century of Doctorates (1978) is the most recent of these covering all institutions. Franklin and Marshall College has published data on Ph.D.'s earned by graduates of private, four-year colleges. However, these data did not take account of the variations in size, even within that group of about 900 institutions, nor did they allow comparisons of productivity with other types of universities and colleges.

A recent calculation of productivity, with an adjustment for the size of institutions, was made and published for the top 100 institutions from the Franklin and Marshall list by Professor Alfred Hall of the College of Wooster (Change, April 1984, pp. 40-43). Hall made comparisons for the period 1920-1980.

Elizabeth Tidball's comparisons of the productivity rates for men and women (published in Science in 1976) used a methodology similar to that of this report, applied to a small group (137) of institutions for Ph.D.'s awarded between 1910 and 1973.

Most of the research on which this article is based was made possible by a grant from the Lilly Endowment. Continued work on Ph.D. productivity, now focused on baccalaureate origins of Ph.D.'s earned by men and by women, has been made possible by a grant from the Ford Foundation.

In presenting this analysis, we hope to demonstrate both the possibility and the utility of productivity comparisons which take account of differences in institutional size. Comparative studies might be undertaken of the baccalaureate origins of leading corporate executives, political leaders, winners of various prizes and recognitions, and people with a special commitment to service, such as Peace Corps volunteers. We believe that such comparisons will add to our understanding of the effects of baccalaureate education, and of the comparative strengths of various institutions and groups of institutions.

TABLES

Table 1

INSTITUTIONS RANKING AMONG THE MOST PRODUCTIVE 20% IN HUMANITIES, AND IN EMPIRICAL, LIFE, AND SOCIAL SCIENCE:

Amherst
Antioch
Carleton
Chicago
Grinnell
Harvard
Haverford
Kalamazoo
New College
Oberlin
Pomona
Reed
Riverside
Swarthmore
Wabash
Wesleyan
Wooster

Table 2

Leading Undergraduate Sources of Humanities Ph.D.'s, Adjusted for Institutional Size

Rank	Institution	Humanities Total	Humanities Ratio
1	Bryn Mawr (PA)	282	6.0
2	Haverford (PA)	196	5.4
3	Swarthmore (PA)	350	5.2
4	Oberlin (OH)	666	5.1
5	Chicago (IL)	781	5.0
6	St. John's (MD)	55	4.9
7	Amherst (MA)	363	4.5
	Harvard (MA)	1551	4.5
9	Radcliffe (MA)	357	4.4
10	Reed (OR)	154	4.0
11	Peabody Institute (MD)	34	3.9
12	Barnard (NY)	426	3.8
13	Eckerd (FL)	33	3.6
	Juilliard (NY)	96	3.6
	Wesleyan (CT)	255	3.6
16	Carleton (MN)	253	3.5
	Yale (CT)	1085	3.5
18	Brandeis (MA)	218	3.3
	Hamilton (NY)	181	3.3

Table 2

Leading Undergraduate Sources of Humanities Ph.D.'s (continued)

Rank	Institution	Humanities Total	Humanities Ratio
	Wellesley (MA)	390	3.3
21	New College of the Univ. of South Florida	13	3.2
	Princeton (NJ)	741	3.2
23	Kenyon (OH)	120	3.0
	Univ. of the South (TN)	117	3.0
	Williams (MA)	255	3.0
26	Davidson (NC)	179	2.9
	New School (NY)	30	2.9
	Pomona (CA)	224	2.9
29	Cleveland Institute of Music (OH)	15	2.8
30	Columbia (NY)	1096	2.7
	Grinnell (IA)	168	2.7
	Vassar (NY)	284	2.7
	Wabash (IN)	105	2.7
34	Smith (MA)	389	2.6
35	Agnes Scott (GA)	89	2.4
	Bowdoin (ME)	156	2.4
	Univ. of Dallas (TX)	30	2.4
38	Wooster (OH)	190	2.3

Table 2

Leading Undergraduate Sources of Humanities Ph.D.'s (continued)

Rank	Institution	Humanities Total	Humanities Ratio
39	Bard (NY)	44	2.1
	Dartmouth (NH)	437	2.1
	Rice (TX)	229	2.1
	Sarah Lawrence (NY)	76	2.1
	Wheaton (IL)	264	2.1
44	UC-Santa Cruz (CA)	59	2.0
	Mount Holyoke (MA)	203	2.0
	Rochester (NY)	483	2.0
	Stanford (CA)	821	2.0
	Yeshiva (NY)	137	2.0
49	Middlebury (VT)	181	1.9
	Washington & Lee (VA)	127	1.9
51	Birmingham-Southern (AL)	100	1.8
	Catholic (DC)	217	1.8
	Hendrix (AR)	66	1.8
	Rhodes (TN)	77	1.8
	Trinity (CT)	137	1.8
56	Antioch (OH)	131	1.7
	Brown (RI)	405	1.7

Table 2

Leading Undergraduate Sources of Humanities Ph.D.'s (continued)

Rank	Institution	Humanities Total	Humanities Ratio
	Earlham (IN)	87	1.7
	Lawrence (WI)	121	1.7
60	Bates (ME)	97	1.6
	Bennington (VT)	36	1.6
	Calvin (MI)	187	1.6
	Goucher (MD)	87	1.6
	C. of the Holy Cross (MA)	212	1.6
	Maryville (TN)	62	1.6
	St. Olaf (MN)	195	1.6
67	UC-Riverside (CA)	126	1.5
	Colgate (NY)	162	1.5
	Fordham (NY)	474	1.5
	Gonzaga (WA)	113	1.5
	Kalamazoo (MI)	70	1.5
	Knox (IL)	92	1.5
	Randolph-Macon Women's College (VA)	58	1.5
	Wilson (PA)	43	1.5

Table 3

Leading Undergraduate Sources of Empirical Science Ph.D.'s, Adjusted for Institutional Size

Rank	Institution	Total	Ratio
1	Harvey Mudd (CA)	217	34.4
2	California Institute of Technology	1531	33.7
3	Massachusetts Institute of Technology	4461	17.3
4	Cooper Union (NY)	550	12.5
5	Webb Institute of Naval Architecture (NY)	46	11.0
6	Reed (OR)	334	8.7
7	Rice (TX)	886	8.0
8	Rensselaer Polytechnic Institute (NY)	1568	7.3
9	Polytechnic Institute of New York	892	7.2
10	Carnegie-Mellon (PA)	1217	6.8
11	Chicago (IL)	1011	6.5
12	UC-San Diego (CA)	143	5.5
	New Mexico Institute of Mining	87	5.5
14	Swarthmore (PA)	351	5.2
	Worcester Polytechnic Institute (MA)	368	5.2
16	Stevens Institute of Technology	316	5.0
17	Colorado School of Mines	278	4.9
18	Haverford (PA)	178	4.9
19	Harvard (MA)	1590	4.6

Table 3

Leading Undergraduate Sources of Empirical Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
20	Illinois Institute of Technology	756	4.5
	Princeton (NJ)	1051	4.5
22	South Dakota School of Mines	198	4.4
23	Johns Hopkins (MD)	652	4.2
24	Case Western Reserve (OH)	1203	4.1
25	Carleton (MN)	287	4.0
	Rose-Hulman Institute of Technology	142	4.0
27	Lehigh (PA)	749	3.9
	New College of the U. of South Florida	16	3.9
29	Pomona (CA)	288	3.7
30	Illinois Benedictine	92	3.6
31	UC-Riverside (CA)	283	3.5
	Cornell (NY)	1846	3.5
	Oberlin (OH)	459	3.5
	Wabash (IN)	134	3.5
35	Amherst (MA)	264	3.2
36	Columbia (NY)	1262	3.1
	Franklin & Marshall (PA)	294	3.1
	Kalamazoo (MI)	144	3.1

Table 3

Leading Undergraduate Sources of Empirical Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
	Union University (NY)	374	3.1
40	Allentown (PA)	6	3.0
	Wooster (OH)	247	3.0
	Yale (CT)	915	3.0
43	CUNY: City College (NY)	2343	2.9
	Georgia Institute of Technology	922	2.9
	King (TN)	40	2.9
	Williams (MA)	243	2.9
47	Brown (RI)	667	2.8
48	Alfred (NY)	198	2.7
	Stanford (CA)	1104	2.7
50	Drexel (PA)	652	2.6
	Lafayette (PA)	287	2.6
	Notre Dame (IN)	860	2.6
	Rochester (NY)	637	2.6
	Virginia Military Institute	148	2.6
	Wesleyan (CT)	187	2.6
56	Bowdoin (ME)	164	2.5
	Grinnell (IA)	153	2.5

Table 3

Leading Undergraduate Sources of Empirical Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
	Manhattan (NY)	453	2.5
59	UC-Irvine (CA)	79	2.4
	Davidson (NC)	146	2.4
	SUNY at Stony Brook (NY)	227	2.4
62	Dartmouth (NH)	477	2.3
	Spring Hill (AL)	100	2.3
	Yeshiva (NY)	160	2.3
65	Antioch (OH)	171	2.2
	UC-Berkeley (CA)	2971	2.2
	Juniata (PA)	110	2.2
	Purdue (IN)	1789	2.2

Table 4

Leading Undergraduate Sources of Life Science Ph.D.'s, Adjusted for Institutional Size

Rank	Institution	Total	Ratio
1	UC-San Diego (CA)	134	5.1
2	Philadelphia College of Pharmacy (PA)	182	4.2
3	Reed (OR)	154	4.0
4	California Institute of Technology	173	3.8
	UC-Irvine (CA)	123	3.8
	Delaware Valley College of Science & Agriculture (PA)	63	3.8
7	Chicago (IL)	510	3.3
8	Swarthmore (PA)	209	3.1
9	Harvey Mudd (CA)	18	2.9
	Wabash (IN)	112	2.9
11	SUNY: C. of Environmental Science & Forestry	141	2.8
12	UC-Riverside (CA)	211	2.6
	Cornell (NY)	1372	2.6
	Haverford (PA)	94	2.6
15	Mass. College of Pharmacy (MA)	76	2.5
16	UC-Davis (CA)	693	2.4
	Earlham (IN)	124	2.4
	New College of the U. of South Florida	10	2.4
	Pomona (CA)	190	2.4

Table 4

Leading Undergraduate Sources of Life Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
20	UC-Santa Cruz (CA)	68	2.3
21	Blackburn (IL)	31	2.2
22	Brandeis (MA)	133	2.0
	Colorado State	718	2.0
	Kalamazoo (MI)	91	2.0
25	Bryn Mawr (PA)	87	1.9
	Carleton (MN)	139	1.9
	Eckerd (FL)	17	1.9
	Johns Hopkins (MD)	292	1.9
	Oberlin (OH)	251	1.9
30	Amherst (MA)	150	1.8
	Drew (NJ)	80	1.8
	Juniata (PA)	92	1.8
33	Berea (KY)	120	1.7
	Harvard (MA)	574	1.7
	Utah State	536	1.7
36	Grinnell (IA)	99	1.6
	Texas A&M	598	1.6
	Warren Wilson (NC)	2	1.6

Table 4

Leading Undergraduate Sources of Life Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
39	Antioch (OH)	121	1.5
	Hiram (OH)	70	1.5
	Iowa State	869	1.5
	Massachusetts Institute of Technology	375	1.5
	Muhlenberg (PA)	106	1.5
	Rice (TX)	162	1.5
	SUNY at Stony Brook (NY)	149	1.5
46	New Mexico Institute of Mining	23	1.4
47	Barnard (NY)	141	1.3
	Bates (ME)	77	1.3
	College of Charleston (SC)	34	1.3
	Goshen (IN)	73	1.3
	Kansas State	554	1.3
	Kenyon (OH)	51	1.3
	Radcliffe (MA)	105	1.3
	Rutgers (NJ)	886	1.3
	Saint Mary's (MN)	58	1.3
	Wesleyan (CT)	91	1.3
	Wooster (OH)	111	1.3

Table 4

Leading Undergraduate Sources of Life Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
58	UC-Berkeley (CA)	1596	1.2
	Cornell (IA)	55	1.2
	Hope (MI)	95	1.2
	U. of Idaho	279	1.2
	U. of Illinois	1358	1.2
	Knox (IL)	76	1.2
	Mount Holyoke (MA)	124	1.2
	North Central (IL)	60	1.2
	Oklahoma State	677	1.2
	U. of the South (TN)	47	1.2
	Western Maryland	62	1.2
	U. of Wisconsin	1313	1.2

Table 5

Leading Undergraduate Sources of Social Science Ph.D.'s, Adjusted for Institutional Size

Rank	Institution	Total	Ratio
1	Reed (OR)	278	7.3
2	Chicago (IL)	1071	6.9
3	Swarthmore (PA)	415	6.1
4	New School for Social Research (NY)	56	5.5
5	New College of the U. of South Florida	22	5.3
6	Brandeis (MA)	330	5.0
7	Oberlin (OH)	637	4.9
8	Eckerd (FL)	41	4.5
9	Antioch (OH)	328	4.1
10	Harvard (PA)	1363	4.0
11	Haverford (PA)	143	3.9
12	Radcliffe (MA)	295	3.6
13	Barnard (NY)	363	3.3
	Wesleyan (CT)	233	3.3
15	Grinnell (IA)	198	3.2
16	Pomona (CA)	235	3.0
17	Claremont McKenna (CA)	78	2.9
18	Amherst (MA)	228	2.8
	Carleton (MN)	205	2.8

Table 5

Leading Undergraduate Sources of Social Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
20	UC-Santa Cruz (CA)	82	2.7
21	UC-Riverside (CA)	215	2.6
	Clark (MA)	210	2.6
23	Bryn Mawr (PA)	118	2.5
	Yale (CT)	758	2.5
25	CUNY:City C. (NY)	1950	2.4
	SUNY at Binghamton (NY)	208	2.4
27	Bard (NY)	50	2.3
	Columbia (NY)	928	2.3
	Occidental (CA)	217	2.3
	Pitzer (CA)	15	2.3
	SUNY at Stony Brook (NY)	221	2.3
	Wellesley (MA)	269	2.3
33	Stanford (CA)	876	2.2
	Williams (MA)	189	2.2
35	CUNY: Brooklyn (NY)	1520	2.1
	Dartmouth (NH)	439	2.1
	Princeton (NJ)	496	2.1
38	Brown (RI)	467	2.0

Table 5

Leading Undergraduate Sources of Social Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
	Hamilton (NY)	111	2.0
	Wabash (IN)	78	2.0
41	Cornell (NY)	995	1.9
	Harvey Mudd (CA)	12	1.9
	Vassar (NY)	199	1.9
	Wooster (OH)	159	1.9
	Yeshiva (NY)	130	1.9
46	Beloit (WI)	123	1.8
	UC-San Diego (CA)	48	1.8
	Davidson (NC)	112	1.8
	Drew (NJ)	80	1.8
	Franklin & Marshall (PA)	170	1.8
	Knox (IL)	109	1.8
	Rhodes (TN)	78	1.8
53	Bowdoin (ME)	111	1.7
	California Institute of Technology	77	1.7
	Denison (OH)	163	1.7
	Johns Hopkins (MD)	263	1.7
	Kenyon (OH)	70	1.7

Table 5

Leading Undergraduate Sources of Social Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
	Lawrence (WI)	120	1.7
	Sarah Lawrence (NY)	60	1.7
	Whitman (WA)	83	1.7
61	UC-Irvine (CA)	51	1.6
	Colgate (NY)	170	1.6
	DePauw (IN)	211	1.6
	Earlham (IN)	82	1.6
	Kalamazoo (MI)	72	1.6
	Morehouse (GA)	60	1.6
	Rochester (NY)	379	1.6
	St. John's (MD)	18	1.6
	Warren Wilson (NC)	2	1.6
	Willamette (OR)	88	1.6

Table 6

Leading Undergraduate Sources of Science Ph.D.'s,
Adjusted for Institutional Size

Rank	Institution	Total	Ratio
1	California Institute of Technology	1781	39.2
2	Harvey Mudd (CA)	247	39.1
3	Reed (OR)	766	20.0
4	Massachusetts Institute of Technology	5141	19.9
5	Chicago (IL)	2592	16.6
6	Swarthmore (PA)	975	14.4
7	Cooper Union (NY)	586	13.4
8	UC-San Diego (CA)	323	12.4
9	New College of the U. of South Florida	48	11.7
10	Haverford (PA)	415	11.4
11	Webb Institute of Naval Architecture (NY)	47	11.2
12	Rice (TX)	1192	10.8
13	Harvard (MA)	3527	10.3
	Oberlin (OH)	1347	10.3
15	Pomona (CA)	713	9.2
16	Brandeis (MA)	578	8.7
	UC-Riverside (CA)	709	8.7
	Carleton (MN)	631	8.7
19	Eckerd (FL)	77	8.5

Table 6

Leading Undergraduate Sources of Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
	Rensselaer Polytechnic Institute (NY)	1819	8.5
21	Wabash (IN)	324	8.4
22	Amherst (MA)	642	7.9
	Carnegie-Mellon (PA)	1422	7.9
	Cornell U. (NY)	4213	7.9
25	Antioch (OH)	620	7.8
	UC-Irvine (CA)	253	7.8
	Johns Hopkins (MD)	1207	7.8
28	Polytechnic Institute of New York	935	7.6
	Princeton (NJ)	1765	7.6
30	Grinnell (IA)	450	7.3
31	Wesleyan (CT)	511	7.2
32	New Mexico Institute of Mining	111	7.0
33	Kalamazoo (MI)	307	6.7
34	Yale (CT)	1996	6.5
35	UC-Santa Cruz (CA)	192	6.4
	Columbia (NY)	2609	6.4
37	CUNY: City College (NY)	4990	6.2
	SUNY: Stony Brook (NY)	597	6.2
	Wooster (OH)	517	6.2

Table 6

Leading Undergraduate Sources of Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
40	Case Western (OH)	1751	6.0
	Stanford (CA)	2401	6.0
	Williams (MA)	507	6.0
43	Bryn Mawr (PA)	276	5.9
	Earlham (IN)	308	5.9
	Franklin & Marshall (PA)	554	5.9
	Philadelphia College of Pharmacy (PA)	252	5.9
47	Brown (RI)	1388	5.8
	Radcliffe (MA)	469	5.8
49	New School (NY)	57	5.6
	Stevens Institute (NJ)	359	5.6
	Worcester Polytechnic (MA)	400	5.6
52	Illinois Institute of Technology	904	5.4
53	Barnard (NY)	590	5.3
	Bowdoin (ME)	345	5.3
	Dartmouth (NH)	1109	5.3
	Drew (NJ)	231	5.3
	Rochester (NY)	1288	5.3
58	Union University (NY)	621	5.2
59	Allentown (PA)	10	5.1
	Colorado School of Mines	293	5.1

Table 6

Leading Undergraduate Sources of Science Ph.D.'s (continued)

Rank	Institution	Total	Ratio
	Knox (IL)	310	5.1
62	Davidson (NC)	306	5.0
	Kenyon (OH)	202	5.0
	Lehigh (PA)	965	5.0
65	UC-Berkeley (CA)	6494	4.9
	Clark (MA)	390	4.9
	Illinois Benedictine (IL)	126	4.9
	Occidental (CA)	464	4.9
	Yeshiva (NY)	341	4.9
70	Warren Wilson (NC)	6	4.8

Table 7

Leading Undergraduate Sources of Ph.D.'s in All Fields, Adjusted for Institutional Size

Rank	Institution	All Fields Total	All Fields Ratio
1	Harvey Mudd (CA)	257	40.7
2	California Institute of Technology	1818	40.0
3	Reed (OR)	968	25.3
4	Chicago (IL)	3805	24.4
5	Massachusetts Institute of Technology	5438	21.1
6	Swarthmore (PA)	1418	20.9
7	Haverford (PA)	683	18.8
8	Oberlin (OH)	2321	17.8
9	Harvard (MA)	5554	16.2
10	New College of the U. of South Florida	63	15.3
11	UC-San Diego (CA)	362	13.9
12	Amherst (MA)	1118	13.7
	Carleton (MN)	993	13.7
	Cooper Union (NY)	602	13.7
	Pomona (CA)	1066	13.7
16	Rice (TX)	1501	13.6
17	Brandeis (MA)	893	13.5
18	Eckerd (FL)	119	13.1
19	Wabash (IN)	501	12.9

Table 7

Leading Undergraduate Sources of Ph.D.'s in All Fields (continued)

Rank	Institution	All Fields Total	All Fields Ratio
20	Bryn Mawr (PA)	593	12.7
21	Webb Institute of Naval Architecture (NY)	52	12.4
	Wesleyan (CT)	877	12.4
23	Princeton (NJ)	2713	11.7
24	Grinnell (IA)	706	11.4
25	Radcliffe (MA)	923	11.3
26	Yale (CT)	3407	11.1
27	Antioch (OH)	875	11.0
28	UC-Riverside (CA)	897	10.9
29	Columbia (NY)	4392	10.8
30	Barnard (NY)	1163	10.5
31	St. John's (MD)	117	10.4
	Wooster (OH)	868	10.4
33	Cornell (NY)	5329	10.0
34	Davidson (NC)	599	9.9
	Johns Hopkins (MD)	1524	9.9
36	Williams (MA)	835	9.8
37	New School for Social Research (NY)	99	9.7
38	Hamilton (NY)	507	9.4

Table 7

Leading Undergraduate Sources of Ph.D.'s in All Fields (continued)

Rank	Institution	All Fields Total	All Fields Ratio
39	Carnegie-Mellon (PA)	1678	9.3
	Kalamazoo (MI)	427	9.3
41	UC-Irvine (CA)	299	9.2
42	Stanford (CA)	3703	9.2
43	Earlham (IN)	476	9.1
44	Rensselaer Polytechnic Institute (NY)	1929	9.0
45	Bowdoin (ME)	578	8.8
46	UC-Santa Cruz (CA)	262	8.7
	Kenyon (OH)	348	8.7
48	CUNY: City College (NY)	6893	8.6
49	Dartmouth (NH)	1771	8.5
	Rochester (NY)	2056	8.5
51	Wellesley (MA)	1002	8.4
52	Brown (RI)	1977	8.3
	Yeshiva (NY)	579	8.3
54	Occidental (CA)	780	8.2
55	Catholic (DC)	962	7.9
56	Drew (NJ)	340	7.8
	Knox (IL)	473	7.8

Table 7

Leading Undergraduate Sources of Ph.D.'s in All Fields (continued)

Rank	Institution	All Fields Total	All Fields Ratio
	Polytechnic Institute of New York	965	7.8
59	Case Western Reserve (OH)	2270	7.7
	Franklin & Marshall (PA)	720	7.7
	Wheaton (IL)	957	7.7
62	Rhodes (TN)	316	7.4
	Saint Mary's (MN)	338	7.4
64	Cornell (IA)	338	7.3
65	Morehouse (GA)	266	7.2
	Univ. of the South (TN)	281	7.2
	SUNY at Stony Brook (NY)	692	7.2
68	Bates (ME)	425	7.1
	Birmingham-Southern (AL)	395	7.1
	Hope (MI)	559	7.1
	Whitman (WA)	346	7.1

Table 8A

Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

15 Leading Institutions: Total Number of Ph.D.'s

	All Ph.D.'s		Humanities Ph.D.'s		Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
UC-Berkeley (CA)	8801	6.6	1218	0.9	6494	4.9
CUNY: City (NY)	6893	8.6	797	1.0	4990	6.2
Illinois	6761	6.0	634	0.6	4876	4.3
Michigan	6569	6.1	1091	1.0	4397	4.1
Wisconsin	6049	5.3	798	0.7	4020	3.6
UC-Los Angeles (CA)	5717	5.4	947	0.9	3675	3.5
Harvard (MA)	5554	16.2	1551	4.5	3527	10.3
Massachusetts Institute of Technology	5438	21.1	114	0.4	5141	19.9
Cornell (NY)	5329	10.0	595	1.1	4213	7.9
Minnesota	5321	4.6	681	0.6	3443	3.0
CUNY: Brooklyn (NY)	4817	6.7	813	1.1	3044	4.2
Texas	4684	4.5	698	0.7	3047	2.9
Ohio State	4615	4.1	439	0.4	2829	2.5
Pennsylvania State	4440	4.0	310	0.3	3194	2.9
Columbia (NY)	4392	10.8	1096	2.7	2609	6.4
Group	85380	6.4	11782	0.9	59499	4.5

Table 8B

Science Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

15 Leading Institutions: Total Number of Ph.D.'s

	Empirical Science Ph.D.'s		Life Science Ph.D.'s		Social Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
UC-Berkeley (CA)	2971	2.2	1596	1.2	1927	1.4
CUNY: City (NY)	2343	2.9	697	0.9	1950	2.4
Illinois	2434	2.1	1358	1.2	1084	1.0
Michigan	2120	2.0	870	0.8	1407	1.3
Wisconsin	1611	1.4	1313	1.2	1096	1.0
UC-Los Angeles (CA)	1495	1.4	770	0.7	1410	1.3
Harvard (MA)	1590	4.6	574	1.7	1363	4.0
Massachusetts Institute of Technology	4461	17.3	375	1.5	305	1.2
Cornell (NY)	1846	3.5	1372	2.6	995	1.9
Minnesota	1294	1.1	1084	0.9	1065	0.9
CUNY: Brooklyn (NY)	962	1.3	562	0.8	1520	2.1
Texas	1579	1.5	580	0.6	888	0.9
Ohio State	1040	0.9	990	0.9	799	0.7
Pennsylvania State	1446	1.3	1002	0.9	746	0.7
Columbia (NY)	1262	3.1	419	1.0	928	2.3
Group	28454	2.1	13562	1.0	17483	1.3

Table 9A

Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Associated Colleges of the Midwest

	All Ph.D.'s		Humanities Ph.D.'s		Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Beloit	433	6.5	70	1.1	301	4.5
Carleton	993	13.7	253	3.5	631	8.7
Coe	231	4.8	28	0.6	131	2.7
Colorado	380	4.9	63	0.8	254	3.3
Cornell	338	7.3	64	1.4	175	3.8
Grinnell	706	11.4	168	2.7	450	7.3
Knox	473	7.8	92	1.5	310	5.1
Lake Forest	212	3.7	40	0.7	135	2.4
Lawrence	493	6.9	121	1.7	267	3.7
Macalester	462	5.1	93	1.0	270	3.0
Monmouth	222	4.5	23	0.5	143	2.9
Ripon	190	4.9	28	0.7	122	3.2
St. Olaf	776	6.4	195	1.6	408	3.4
Group	5909	6.9	1238	1.4	3597	4.2

Table 9B

Science Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Associated Colleges of the Midwest

	Empirical Science Ph.D.'s		Life Science Ph.D.'s		Social Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Beloit	109	1.6	69	1.0	123	1.8
Carleton	287	4.0	139	1.9	205	2.8
Coe	54	1.1	32	0.7	45	0.9
Colorado	91	1.2	75	1.0	88	1.1
Cornell	76	1.6	55	1.2	44	1.0
Grinnell	153	2.5	99	1.6	198	3.2
Knox	125	2.1	76	1.2	109	1.8
Lake Forest	35	0.6	28	0.5	72	1.3
Lawrence	83	1.2	64	0.9	120	1.7
Macalester	73	0.8	59	0.7	138	1.5
Monmouth	78	1.6	33	0.7	32	0.6
Ripon	59	1.5	28	0.7	35	0.9
St. Olaf	212	1.8	105	0.9	91	0.8
Group	1435	1.7	862	1.0	1300	1.5

Table 10A

Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Big Ten Universities

	All Ph.D.'s		Humanities Ph.D.'s		Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Illinois	6761	6.0	634	0.6	4876	4.3
Indiana	2784	3.5	497	0.6	1292	1.6
Iowa	2148	4.2	377	0.7	1205	2.3
Michigan	6569	6.1	1091	1.0	4397	4.1
Michigan State	3973	3.2	370	0.3	2576	2.1
Minnesota	5321	4.6	681	0.6	3443	3.0
Northwestern	2770	5.6	605	1.2	1613	3.3
Ohio State	4615	4.1	439	0.4	2829	2.5
Purdue	3786	4.6	120	0.1	3085	3.7
Wisconsin	6049	5.3	798	0.7	4020	3.6
Group	44776	4.7	5612	0.6	29336	3.1

Table 10B

Science Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Big Ten Universities

Institution	Empirical Science Ph.D.'s		Life Science Ph.D.'s		Social Science Ph.D.'s	
	Total	Ratio	Total	Ratio	Total	Ratio
Illinois	2434	2.1	1358	1.2	1084	1.0
Indiana	362	0.5	361	0.5	569	0.7
Iowa	423	0.8	289	0.6	493	1.0
Michigan	2120	2.0	870	0.8	1407	1.3
Michigan State	804	0.6	1027	0.8	745	0.6
Minnesota	1294	1.1	1084	0.9	1065	0.9
Northwestern	734	1.5	252	0.5	627	1.3
Ohio State	1040	0.9	990	0.9	799	0.7
Purdue	1789	2.2	868	1.0	428	0.5
Wisconsin	1611	1.4	1313	1.2	1096	1.0
Group	12611	1.3	8412	0.9	8313	0.9

Table 11A

Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Great Lakes Colleges Association

	All Ph.D.'s		Humanities Ph.D.'s		Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Albion	382	4.7	51	0.6	215	2.7
Antioch	875	11.0	131	1.7	620	7.8
Denison	527	5.3	113	1.1	312	3.2
DePauw	874	6.8	165	1.3	525	4.1
Earlham	476	9.1	87	1.7	308	5.9
Hope	559	7.1	104	1.3	324	4.1
Kalamazoo	427	9.3	70	1.5	307	6.7
Kenyon	348	8.7	120	3.0	202	5.0
Oberlin	2321	17.8	666	5.1	1347	10.3
Ohio Wesleyan	682	4.8	116	0.8	388	2.8
Wabash	501	12.9	105	2.7	324	8.4
Wooster	868	10.4	190	2.3	517	6.2
Group	8840	8.9	1918	1.9	5389	5.4

Table 11B

Science Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Great Lakes Colleges Association

	Empirical Science Ph.D.'s		Life Science Ph.D.'s		Social Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Albion	69	0.9	84	1.0	62	0.8
Antioch	171	2.2	121	1.5	328	4.1
Denison	91	0.9	58	0.6	163	1.7
DePauw	193	1.5	121	0.9	211	1.6
Earlham	102	2.0	124	2.4	82	1.6
Hope	152	1.9	95	1.2	77	1.0
Kalamazoo	144	3.1	91	2.0	72	1.6
Kenyon	81	2.0	51	1.3	70	1.7
Oberlin	459	3.5	251	1.9	637	4.9
Ohio Wesleyan	131	0.9	93	0.7	164	1.2
Wabash	134	3.5	112	2.9	78	2.0
Wooster	247	3.0	111	1.3	159	1.9
Group	1974	2.0	1312	1.3	2103	2.1

Table 12A

Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Ivy League

	All Ph.D.'s		Humanities Ph.D.'s		Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Brown	1977	8.3	405	1.7	1388	5.8
Columbia	4392	10.8	1096	2.7	2609	6.4
Cornell	5329	10.0	595	1.1	4213	7.9
Dartmouth	1771	8.5	437	2.1	1109	5.3
Harvard	5554	16.2	1551	4.5	3527	10.3
Pennsylvania	2703	5.4	550	1.1	1743	3.5
Princeton	2713	11.7	741	3.2	1765	7.6
Yale	3407	11.1	1085	3.5	1996	6.5
Group	27846	10.1	6460	2.3	18350	6.6

Table 12B

Science Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Ivy League

	Empirical Science Ph.D.'s		Life Science Ph.D.'s		Social Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Brown	667	2.8	254	1.1	467	2.0
Columbia	1262	3.1	419	1.0	928	2.3
Cornell	1846	3.5	1372	2.6	995	1.9
Dartmouth	477	2.3	193	0.9	439	2.1
Harvard	1590	4.6	574	1.7	1363	4.0
Pennsylvania	752	1.5	337	0.7	654	1.3
Princeton	1051	4.5	218	0.9	496	2.1
Yale	915	3.0	323	1.1	758	2.5
Group	8560	3.1	3690	1.3	6100	2.2

Table 13A

Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Twelve Highly Selective Undergraduate Colleges Located in the Northeast

("Little Ivy")

	All Ph.D.'s		Humanities Ph.D.'s		Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Amherst	1118	13.7	363	4.5	642	7.9
Bates	425	7.1	97	1.6	246	4.1
Bowdoin	578	8.8	156	2.4	345	5.3
Colby	340	4.3	101	1.3	170	2.2
Colgate	655	6.0	162	1.5	364	3.3
Hamilton	507	9.4	181	3.3	255	4.7
Haverford	683	18.8	196	5.4	415	11.4
Middlebury	587	6.3	181	1.9	304	3.2
Swarthmore	1418	20.9	350	5.2	975	14.4
Trinity	482	6.3	137	1.8	280	3.7
Wesleyan	877	12.4	255	3.6	511	7.2
Williams	835	9.8	255	3.0	507	6.0
Group	8505	9.7	2434	2.8	5014	5.7

Table 13B

Science Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Twelve Highly Selective Undergraduate Colleges Located in the Northeast

("Little Ivy")

	Empirical Science Ph.D.'s		Life Science Ph.D.'s		Social Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Amherst	264	3.2	150	1.8	228	2.8
Bates	99	1.7	77	1.3	70	1.2
Bowdoin	164	2.5	70	1.1	111	1.7
Colby	53	0.7	46	0.6	71	0.9
Colgate	120	1.1	74	0.7	170	1.6
Hamilton	100	1.8	44	0.8	111	2.0
Haverford	178	4.9	94	2.6	143	3.9
Middlebury	122	1.3	66	0.7	116	1.2
Swarthmore	351	5.2	209	3.1	415	6.1
Trinity	130	1.7	44	0.6	106	1.4
Wesleyan	187	2.6	91	1.3	233	3.3
Williams	243	2.9	75	0.9	189	2.2
Group	2011	2.3	1040	1.2	1963	2.2

Table 14A

Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Seven Sisters

	All Ph.D.'s		Humanities Ph.D.'s		Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Barnard	1163	10.5	426	3.8	590	5.3
Bryn Mawr	593	12.7	282	6.0	276	5.9
Mount Holyoke	642	6.3	203	2.0	365	3.6
Radcliffe	923	11.3	357	4.4	469	5.8
Smith	873	5.8	389	2.6	369	2.5
Vassar	715	6.8	284	2.7	355	3.4
Wellesley	1002	8.4	390	3.3	461	3.9
Group	5911	8.3	2331	3.3	2885	4.0

Table 14B

Science Ph.D. Productivity

Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Seven Sisters

	Empirical Science Ph.D.'s		Life Science Ph.D.'s		Social Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
Barnard	86	0.8	141	1.3	363	3.3
Bryn Mawr	71	1.5	87	1.9	118	2.5
Mount Holyoke	85	0.8	124	1.2	156	1.5
Radcliffe	69	0.8	105	1.3	295	3.6
Smith	50	0.3	102	0.7	217	1.4
Vassar	54	0.5	102	1.0	199	1.9
Wellesley	68	0.6	124	1.0	269	2.3
Group	483	0.7	785	1.1	1617	2.3

Table 15A

Ph.D. Productivity
Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Fifteen Leading Technical Institutions

	All Ph.D.'s		Humanities Ph.D.'s		Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
California Institute of Technology	1818	40.0	17	0.4	1781	39.2
Carnegie-Mellon	1678	9.3	90	0.4	1422	7.0
Case Western Reserve	2270	7.7	235	0.6	1751	4.8
Colorado School of Mines	301	5.3	0	0.0	293	5.1
Illinois Institute of Technology	1005	6.0	28	0.2	904	5.3
Lehigh	1114	5.8	65	0.3	965	5.0
Massachusetts Institute of Technology	5438	21.1	114	0.4	5141	19.8
New Mexico Institute of Mining and Technology	112	7.0	0	0.0	111	7.0
Polytechnic Institute of New York	965	7.8	9	0.1	935	7.6
Rensselaer Polytechnic Institute	1929	9.0	26	0.1	1819	8.5
Rose-Hulman Institute of Technology	175	4.9	2	0.1	158	4.4
South Dakota School of Mines and Technology	211	4.7	1	0.0	208	4.7
Stevens Institute of Technology	375	5.9	2	0.0	359	5.6
Webb Institute of Naval Architecture	52	12.4	1	0.2	47	11.2
Worcester Polytechnic Institute	414	5.8	2	0.0	400	5.6
Group	17857	10.1	592	0.3	16294	9.2

Table 15B

Science Ph.D. Productivity
Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976

Fifteen Leading Technical Institutions

	Empirical Science Ph.D.'s		Life Science Ph.D.'s		Social Science Ph.D.'s	
Institution	Total	Ratio	Total	Ratio	Total	Ratio
California Institute of Technology	1531	33.7	173	3.8	77	1.7
Carnegie-Mellon	1217	6.8	71	0.4	134	0.7
Case Western Reserve	1203	4.1	207	0.6	341	0.9
Colorado School of Mines	278	4.9	2	0.0	13	0.2
Illinois Institute of Technology	756	4.5	50	0.3	98	0.6
Lehigh	749	3.9	93	0.5	123	0.6
Massachusetts Institute of Technology	4461	17.3	375	1.5	305	1.2
New Mexico Institute of Mining and Technology	87	5.5	23	1.4	1	0.1
Polytechnic Institute of New York	892	7.2	26	0.2	17	0.1
Rensselaer Polytechnic Institute	1568	7.3	148	0.7	103	0.5
Rose-Hulman Institute of Technology	142	4.0	11	0.3	5	0.1
South Dakota School of Mines and Technology	198	4.4	7	0.2	3	0.1
Stevens Institute of Technology	316	5.0	14	0.2	29	0.5
Webb Institute of Naval Architecture	46	11.0	0	0.0	1	0.2
Worcester Polytechnic Institute	368	5.2	20	0.3	12	0.2
Group	13812	7.8	1220	0.7	1262	0.7

Table 16

GROUP VALUES

Ph.D. Productivity Ratios:
(Ph.D.'s Conferred, 1951-1980/Bachelor's Degrees Conferred, 1946-1976)

	All Ph.D.'s	Humanities	Science	Empirical Science	Life Science	Social Science
ACM	6.9	1.4	4.2	1.7	1.0	1.5
Big Ten	4.7	0.6	3.1	1.3	0.9	0.9
GLCA	8.9	1.9	5.4	2.0	1.3	2.1
Ivy League	10.1	2.3	6.6	3.1	1.3	2.2
"Little Ivy"	9.7	2.8	5.7	2.3	1.2	2.2
Seven Sisters	8.3	3.3	4.0	0.7	1.1	2.3
Leading Technicals	10.1	0.3	9.2	7.8	0.7	0.7
15 Leading Institutions: Total Ph.D.'s	6.4	0.9	4.5	2.1	1.0	1.3

APPENDICES

DESCRIPTION OF METHODOLOGY

The total Ph.D.'s numbers were obtained directly from data supplied by the National Academy of Sciences. Average numbers per year were computed to make the Ph.D. figures comparable for institutions of different ages. The average baccalaureate-Ph.D. lapse is ten years (Harmond, A Century of Doctorates). Those receiving their baccalaureate degrees in 1971 or later would not, on average, have completed a Ph.D. by 1980. Thus institutions awarding their first baccalaureate in 1971 or later were not included in this study. For those institutions awarding their first baccalaureate after 1941, the number of years over which the Ph.D. totals were averaged was computed by subtracting the date of first baccalaureate from 1971. For institutions which awarded their first baccalaureate degree prior to 1942, the number of years used for the average was 30.

Preliminary ratios were computed, based on a 10-year sample of baccalaureate data for all accredited institutions. Those with a ratio of at least 3.5 for Ph.D.'s in all fields were identified (a total of 335 institutions). Complete data for baccalaureates awarded, 1946-1976, were compiled for those institutions, and for the top 15 in total numbers of Ph.D.'s awarded. The top 20% of this group of 335 institutions have been identified for each of the Ph.D. fields: humanities, social sciences, empirical sciences, and life sciences, and for all science and all fields. These institutions are shown in the accompanying tables.

The groupings of disciplines are those used by the National Academy of Sciences in organizing Ph.D. data. The field of Humanities includes History, English and American Language and Literature, Foreign Language and Literature, and Other Humanities. Empirical Sciences include Physics, Astronomy, Chemistry, Earth Sciences, Mathematics, Chemical Engineering and Engineering. Life Sciences include Biochemistry, Basic Medical Sciences, Other Biosciences, Medical Sciences, and Agricultural Sciences. Social Science includes Psychology, Economics, Anthropology and Sociology, Political Science, and Other Social Science. Total Science Ph.D.'s were the sum of those included in Empirical Sciences, Life Sciences, and Social Sciences. All Fields included Professional Fields, Education, and Other Unspecified Fields, as well as Total Sciences and Humanities degrees.

In ranking various groups of "leading institutions," institutions with the same productivity ratio are listed in alphabetical order. For institutions with more than one campus, calculations were based on data for the main campus only. The published data made it necessary, however, to merge all data for the campuses of Rutgers University. The data for Columbia University represent all divisions except Barnard. (For institutions which merged during the period covered, data for all predecessor institutions were included.) Excluded from the final analysis were those institutions which had all of these characteristics: they awarded an average of fewer than 25 baccalaureate degrees, their graduates had earned a total of fewer than 25 Ph.D.'s, and there had been fewer than 25 years since the awarding of their first baccalaureate.

Leading Undergraduate Sources of Ph.D.'s,
Adjusted for Institutional Size

INSTITUTIONAL DATA AND INDEX

Institution	List	Average Bachelor's Degrees	N Yrs Ph.D. Data
Agnes Scott (GA)	HUM	124.97	30
Albion	GLCA	268.86	30
Alfred (NY)	EMP	243.71	30
Allentown (PA)	SCIENCE EMP	98.38	2
Amherst (MA)	ALL HUM SCIENCE EMP LIFE SOC "LITTLE IVY"	271.72	30
Antioch (OH)	ALL HUM SCIENCE EMP LIFE SOC GLCA	264.31	30
Bard (NY)	HUM SOC	71.00	30
Barnard (NY)	ALL HUM SCIENCE LIFE SOC 7 SISTERS	369.46	30
Bates (ME)	ALL HUM LIFE "LITTLE IVY"	198.24	30
Beloit (WI)	SOC ACM	222.17	30
Bennington (VT)	HUM	75.41	30
Berea (KY)	LIFE	231.62	30
Birmingham-Southern (AL)	ALL HUM	186.34	30
Blackburn (IL)	LIFE	64.96	22
Bowdoin (ME)	ALL HUM SCIENCE EMP SOC "LITTLE IVY"	217.79	30
Brandeis (MA)	ALL HUM SCIENCE LIFE SOC	348.33	19
Brown (RI)	ALL HUM SCIENCE EMP SOC IVY LEAGUE	796.52	30
Bryn Mawr (PA)	ALL HUM SCIENCE LIFE SOC 7 SISTERS	155.96	30

Leading Undergraduate Sources of Ph.D.'s (continued)

INSTITUTIONAL DATA AND INDEX

Institution	List	Average Bachelor's Degrees	N Yrs Ph.D. Data
UC-Berkeley (CA)	SCIENCE EMP LIFE TOTAL	4440.73	30
UC-Davis (CA)	LIFE	966.66	30
UC-Irvine (CA)	ALL SCIENCE EMP LIFE SOC	812.91	4
UC-Los Angeles (CA)	TOTAL	3543.53	30
UC-Riverside (CA)	ALL HUM SCIENCE EMP LIFE SOC	512.00	16
UC-San Diego (CA)	ALL SCIENCE EMP LIFE SOC	653.00	4
UC-Santa Cruz (CA)	ALL HUM SCIENCE LIFE SOC	752.00	4
California Institute of Technology	ALL SCIENCE EMP LIFE SOC	151.59	30
Calvin (MI)	HUM	389.72	30
Carleton (MN)	ALL HUM SCIENCE EMP LIFE SOC ACM	241.97	30
Carnegie-Mellon (PA)	ALL SCIENCE EMP	600.57	30
Case Western Reserve (OH)	ALL SCIENCE EMP	977.37	30
Catholic (DC)	ALL HUM	403.45	30
College of Charleston (SC)	LIFE	86.17	30
Univ. of Chicago (IL)	ALL HUM SCIENCE EMP LIFE SOC	520.40	30
CUNY: Brooklyn (NY)	SOC TOTAL	2398.90	30
CUNY: City College (NY)	ALL SCIENCE EMP SOC TOTAL	2681.07	30
Claremont McKenna (CA)	SOC	116.19	23
Clark (MA)	SCIENCE SOC	266.21	30
Cleveland Institute of Music (OH)	HUM	18.14	30

INSTITUTIONAL DATA AND INDEX

Institution	List	Average Bachelor's Degrees	N Yrs Ph.D. Data
Coe (IA)	ACM	160.28	30
Colby (ME)	"LITTLE IVY"	263.14	30
Colgate (NY)	HUM SOC "LITTLE IVY"	365.00	30
Colorado College	ACM	256.00	30
Colorado School of Mines	SCIENCE EMP	190.83	30
Colorado State Univ.	LIFE	1177.53	30
Columbia (NY)	ALL HUM SCIENCE EMP SOC TOTAL IVY LEAGUE	1352.13	30
Cooper Union (NY)	ALL SCIENCE EMP	146.31	30
Cornell (IA)	ALL LIFE ACM	153.79	30
Cornell (NY)	ALL SCIENCE EMP LIFE SOC TOTAL IVY LEAGUE	1780.29	30
Univ. of Dallas (TX)	HUM	112.31	11
Dartmouth (NH)	ALL HUM SCIENCE EMP SOC IVY LEAGUE	695.40	30
Davidson (NC)	ALL HUM SCIENCE EMP SOC	202.41	30
Delaware Valley College of Science & Agriculture (PA)	LIFE	102.92	21
Denison (OH)	SOC GLCA	329.21	30
DePauw (IN)	SOC GLCA	430.62	30
Drew (NJ)	ALL SCIENCE LIFE SOC	145.17	30
Drexel (PA)	EMP	837.78	30
Earlham (IN)	ALL HUM SCIENCE LIFE SOC GLCA	173.55	30
Eckerd (FL)	ALL HUM SCIENCE LIFE SOC	151.17	6

Leading Undergraduate Sources of Ph.D.'s (continued)

INSTITUTIONAL DATA AND INDEX

Institution	List	Average Bachelor's Degrees	N Yrs Ph.D. Data
Fordham (NY)	HUM	1042.70	30
Franklin & Marshall (PA)	ALL SCIENCE EMP SOC	311.17	30
Georgia Institute of Technology	EMP	1047.70	30
Gonzaga (WA)	HUM	253.74	30
Goshen (IN)	LIFE	187.90	30
Goucher (MD)	HUM	177.67	30
Grinnell (IA)	ALL HUM SCIENCE EMP LIFE SOC ACM	206.21	30
Hamilton (NY)	ALL HUM SOC "LITTLE IVY"	180.55	30
Harvard (MA)	ALL HUM SCIENCE EMP LIFE SOC TOTAL IVY LEAGUE	1146.18	30
Harvey Mudd (CA)	ALL SCIENCE EMP LIFE SOC	52.59	12
Haverford (PA)	ALL HUM SCIENCE EMP LIFE SOC "LITTLE IVY"	121.41	30
Hendrix (AR)	HUM	125.45	30
Hiram (OH)	LIFE	160.66	30
College of the Holy Cross (MA)	HUM	443.55	30
Hope (MI)	ALL LIFE GLCA	264.28	30
Univ. of Idaho	LIFE	777.62	30
Illinois Benedictine	SCIENCE EMP	85.43	30
Illinois Institute of Technology	SCIENCE EMP	560.70	30
Univ. of Illinois	LIFE TOTAL BIG TEN	3785.10	30

Leading Undergraduate Sources of Ph.D.'s (continued)

INSTITUTIONAL DATA AND INDEX

Institution	List	Average Bachelor's Degrees	N Yrs Ph.D. Data
Indiana University	BIG TEN	2631.03	30
Iowa State	LIFE	1929.21	30
Univ. of Iowa	BIG TEN	1714.17	30
John Hopkins (MD)	ALL SCIENCE EMP LIFE SOC	513.57	30
Juilliard (NY)	HUM	88.93	30
Juniata (PA)	EMP LIFE	170.07	30
Kalamazoo (MI)	ALL HUM SCIENCE EMP LIFE SOC GLCA	152.83	30
Kansas State	LIFE	1398.73	30
Kenyon (OH)	ALL HUM SCIENCE LIFE SOC GLCA	133.80	30
King (TN)	EMP	45.54	30
Knox (IL)	ALL HUM SCIENCE LIFE SOC ACM	202.83	30
Lafayette (PA)	EMP	366.00	30
Lake Forest (IL)	ACM	188.62	30
Lawrence (WI)	HUM SOC ACM	238.03	30
Lehigh (PA)	SCIENCE EMP	644.62	30
Macalester (MN)	ACM	300.76	30
Manhattan (NY)	EMP	607.07	30
Maryville (TN)	HUM	127.69	30
Massachusetts College of Pharmacy	LIFE	100.63	30
Massachusetts Institute of Technology	ALL SCIENCE EMP LIFE TOTAL	860.63	30
Michigan State	BIG TEN	4132.13	30

Leading Undergraduate Sources of Ph.D.'s (continued)

INSTITUTIONAL DATA AND INDEX

Institution	List	Average Bachelor's Degrees	N Yrs Ph.D. Data
Univ. of Michigan	TOTAL BIG TEN	3598.00	30
Middlebury (VT)	HUM "LITTLE IVY"	311.93	30
Univ. of Minnesota	TOTAL BIG TEN	3873.72	30
Monmouth (IL)	ACM	164.66	30
Morehouse (GA)	ALL SOC	122.55	30
Mount Holyoke (MA)	HUM LIFE 7 SISTERS	338.83	30
Muhlenberg (PA)	LIFE	235.79	30
New College of the Univ. of South Florida	ALL HUM SCIENCE EMP LIFE SOC	102.88	4
New Mexico Institute of Mining & Technology	SCIENCE EMP LIFE	53.00	30
New School for Social Research (NY)	ALL HUM SCIENCE SOC	40.75	25
North Central (IL)	LIFE	163.85	30
Northwestern (IL)	BIG TEN	1641.58	30
Notre Dame (IN)	EMP	1115.97	30
Oberlin (OH)	ALL HUM SCIENCE EMP LIFE SOC GLCA	435.30	30
Occidental (CA)	ALL SCIENCE SOC	315.21	30
Ohio State	TOTAL BIG TEN	3796.76	30
Ohio Wesleyan (OH)	GLCA	469.31	30
Oklahoma State	LIFE	1851.72	30
Peabody Institute (MD)	HUM	29.29	30
Pennsylvania State	TOTAL	3732.80	30

Leading Undergraduate Sources of Ph.D.'s (continued)

INSTITUTIONAL DATA AND INDEX

Institution	List	Average Bachelor's Degrees	N Yrs Ph.D. Data
Univ. of Pennsylvania	IVY LEAGUE	1665.60	30
Philadelphia College of Pharmacy & Science (PA)	SCIENCE LIFE	143.14	30
Pitzer (CA)	SOC	109.90	6
Polytechnic Institute of New York	ALL SCIENCE EMP	412.24	30
Pomona (CA)	ALL HUM SCIENCE EMP LIFE SOC	259.55	30
Princeton (NJ)	ALL HUM SCIENCE EMP SOC IVY LEAGUE	771.28	30
Purdue (IN)	EMP BIG TEN	2761.83	30
Radcliffe (MA)	ALL HUM SCIENCE LIFE SOC 7 SISTERS	271.83	30
Randolph-Macon Women's (VA)	HUM	132.70	30
Reed (OR)	ALL HUM SCIENCE EMP LIFE SOC	127.52	30
Rensselaer Polytechnic Institute (NY)	ALL SCIENCE EMP	713.60	30
Rhodes (TN)	ALL HUM SOC	142.66	30
Rice (TX)	ALL HUM SCIENCE EMP LIFE	367.90	30
Ripon (WI)	ACM	128.17	30
Rochester (NY)	ALL HUM SCIENCE EMP SOC	803.37	30
Rose-Hulman Institute of Technology (IN)	EMP	118.93	30
Rutgers (NJ)	LIFE	2313.30	30
St. John's (MD)	ALL HUM SOC	37.54	30
St. Mary's (MN)	ALL LIFE	151.62	30

Leading Undergraduate Sources of Ph.D.'s (continued)

INSTITUTIONAL DATA AND INDEX

Institution	List	Average Bachelor's Degrees	N Yrs Ph.D. Data
St. Olaf (MN)	HUM ACM	401.24	30
Sarah Lawrence (NY)	HUM SOC	120.90	30
Smith (MA)	HUM 7 SISTERS	498.53	30
Univ. of the South (TN)	ALL HUM LIFE	130.28	30
South Dakota School of Mines & Technology	EMP	148.72	30
Spring Hill (AL)	EMP	147.38	30
Stanford (CA)	ALL HUM SCIENCE EMP SOC	1344.77	30
SUNY at Binghamton (NY)	SOC	428.64	20
SUNY at Stony Brook (NY)	ALL SCIENCE EMP LIFE SOC	963.73	10
SUNY: College of Environ. Science & Forestry (NY)	LIFE	167.77	30
Stevens Institute of Technology (NJ)	SCIENCE EMP	212.69	30
Swarthmore (PA)	ALL HUM SCIENCE EMP LIFE SOC "LITTLE IVY"	226.28	30
Texas A&M	LIFE	1284.05	30
Univ. of Texas	TOTAL	3448.13	30
Trinity (CT)	HUM "LITTLE IVY"	253.80	30
Union University (NY)	SCIENCE EMP	401.41	30
Utah State	LIFE	1056.34	30
Vassar (NY)	HUM SOC 7 SISTERS	352.55	30
Virginia Military Institute	EMP	191.10	30
Wabash (IN)	ALL HUM SCIENCE EMP LIFE SOC GLCA	129.07	30

Leading Undergraduate Sources of Ph.D.'s (continued)

INSTITUTIONAL DATA AND INDEX

Institution	List	Average Bachelor's Degrees	N Yrs Ph.D. Data
Warren Wilson (NC)	SCIENCE LIFE SOC	61.88	2
Washington & Lee (VA)	HUM	221.43	30
Webb Institute of Naval Architecture (NY)	ALL SCIENCE EMP	14.00	30
Wellesley (MA)	ALL HUM SOC 7 SISTERS	395.31	30
Wesleyan (CT)	ALL HUM SCIENCE EMP LIFE SOC "LITTLE IVY"	236.48	30
Western Maryland	LIFE	178.97	30
Wheaton (IL)	ALL HUM	415.41	30
Whitman (WA)	ALL SOC	161.79	30
Willamette (OR)	SOC	187.79	30
Williams (MA)	ALL HUM SCIENCE EMP SOC "LITTLE IVY"	283.17	30
Wilson (PA)	HUM	98.41	30
Univ. of Wisconsin	LIFE TOTAL BIG TEN	3770.88	30
Wooster (OH)	ALL HUM SCIENCE EMP LIFE SOC GLCA	278.17	30
Worcester Polytechnic Institute (MA)	SCIENCE EMP	237.79	30
Yale (CT)	ALL HUM SCIENCE EMP SOC IVY LEAGUE	1024.24	30
Yeshiva (NY)	ALL HUM SCIENCE EMP SOC	232.77	30

COMPARISONS TO KNAPP AND GOODRICH FINDINGS

Institutions among the most productive in one or more science fields for 1950-80, which were also ranked among the 50 most productive for Science Ph.D.'s by Knapp and Goodrich in their analysis of the 1924-34 period in **Origins of American Scientists:**

Antioch	Kalamazoo
Beloit	Lawrence
Cal Tech	Oberlin
Chicago	Pomona
Clark	Reed
Carleton	Rochester
Charleston	Swarthmore
DePauw	S.D. Mines and Technology
Earlham	Utah State
Grinnell	Wesleyan
Hope	Wooster
Haverford	Willamette
Hiram	Wabash
Johns Hopkins	Wisconsin

SOURCES

American Council on Education. **American Universities and Colleges**, 12th ed. Walter de Gruyter, NY, 1983.

Brumbaugh, A.J. (Ed.) **American Universities and Colleges**, 5th ed. American Council on Education, Washington, DC, 1948.

Hall, Alfred E. Starting at the Beginning—The Baccalaureate Origins of Doctorate Recipients, 1920-1980. **Change**, April 1984, Volume 16, Number 3, pp. 40-43.

Harmon, Lindsey R. **A Century of Doctorates: Data Analysis of Growth and Change.** National Academy of Sciences, Washington, DC, 1978.

Irwin, Mary (Ed.) **American Universities and Colleges**, 6th ed. American Council on Education, Washington, DC, 1952.

Irwin, Mary (Ed.) **American Universities and Colleges**, 7th ed. American Council on Education, Washington, DC, 1956.

Irwin, Mary (Ed.) **American Universities and Colleges**, 8th ed. American Council on Education, Washington, DC, 1960.

Knapp, R.H. and Goodrich, H.B. **Origins of American Scientists.** University of Chicago Press, Chicago, 1952.

McSparren, Pat and Synodinos, John. **Baccalaureate Sources of Ph.Ds: Rankings According to Institution of Origin.** Office of Institutional Research, Franklin and Marshall College, Lancaster, Pennsylvania, 1978.

National Academy of Sciences. **FY 1951-FY 1980 Doctorates by Baccalaureate Institutions in 32 Doctoral Fields, 4 Time Periods.** Unpublished statistics, Washington, DC, 1985.

National Center for Educational Statistics, Department of Health, Education and Welfare. **Earned Degrees Conferred, 1947-48 to 1971-72; and 1973-74.** U.S. Government Printing Office, Washington, DC.

National Center for Educational Statistics, Department of Education. **Bachelor's, Masters, and Doctors Degrees Conferred by Institutions of Higher Education, 1972-73, and 1974-75.** Unpublished statistics, Washington, DC, 1985.

Office for Civil Rights, Department of Health, Education and Welfare. **Data on Earned Degrees Conferred from Institutions of Higher Education by Race, Ethnicity and Sex, Academic Year 1975-1976.** Vol. 1. U.S. Government Printing Office, Washington, DC, 1978.

Singletary, Otis A. (Ed.) **American Universities and Colleges**, 10th ed. American Council on Education, Washington, DC, 1968.

Tidball, M.E. and Kistiakowsky, V. Baccalaureate Origins of American Scientists and Scholars. **Science**, 20 August 1976, 193, 646-652.