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ABSTRACT

Focus in this survey, conducted at the request of the National Science Foundation, is on young doctorate faculty (i.e., those receiving their Ph.D. in the last five years) employed full-time in science and engineering departments at Ph.D.-granting institutions. Questionnaire responses were obtained from 1,148 departments at 137 institutions. They indicate that the proportions of young faculty members have been declining over the past seven years and, in most fields, are estimated to continue to decline. The situation appears most critical in the fields of physics, biology, geology, mathematics, and mining and mineral engineering, physiology, and zoology. In all these fields, the proportions of young doctorates--either in 1975 or as estimated for 1980 or both--fall below what is regarded by most department heads as the most desirable proportion. Those department heads who expressed concern about the age imbalance within their faculties suggested a variety of means for increasing the proportion of young doctorates. Generally, however, they are not optimistic that these means will be adopted in the near future. (LBH)

Young Doctorate Faculty in Selected Science and Engineering Departments, 1975 to 1980

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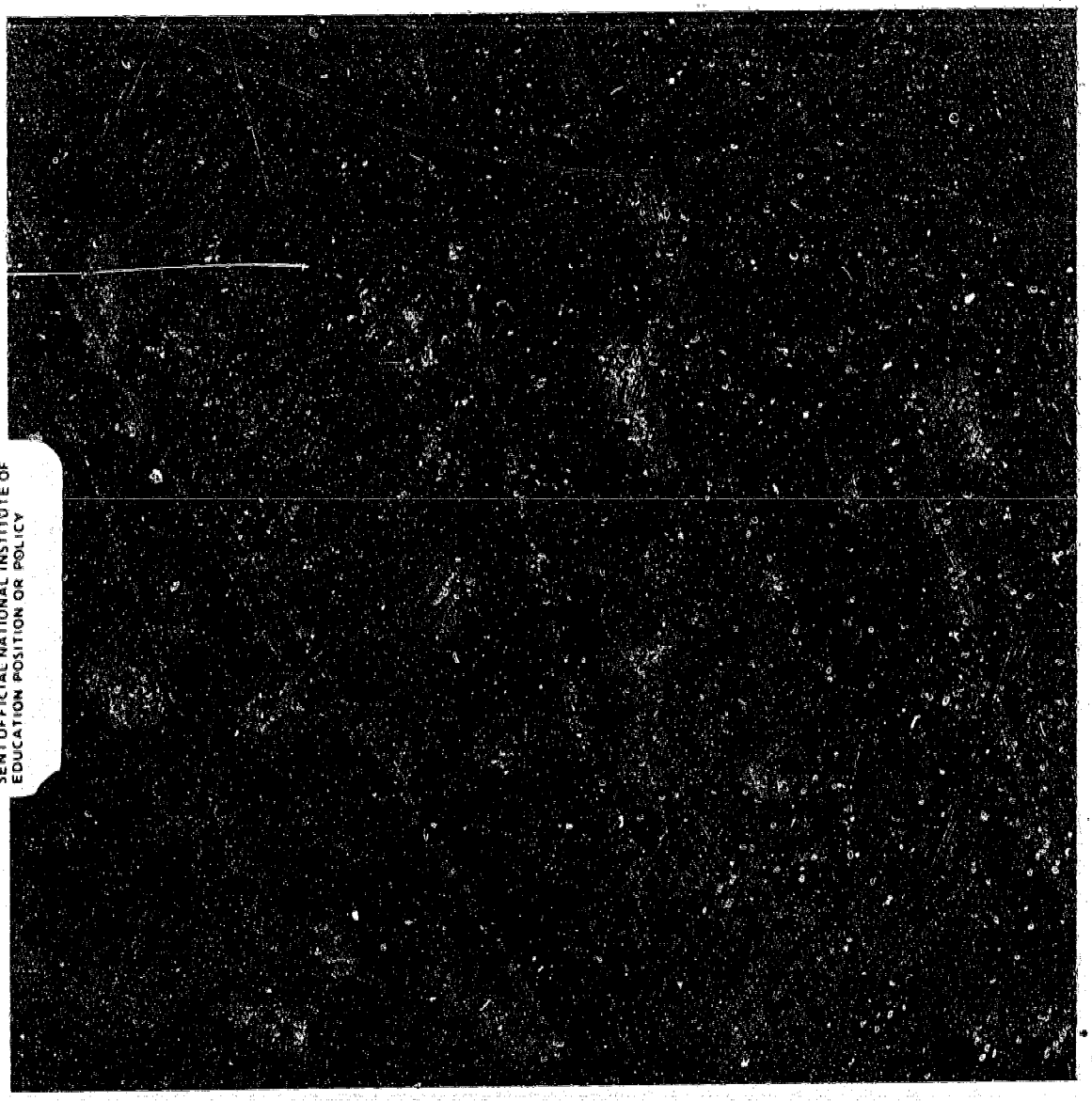

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Roger W. Heyns, *President*

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YOUNG DOCTORATE FACULTY IN SELECTED SCIENCE AND ENGINEERING DEPARTMENTS, 1975 TO 1980

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Irene L. Gomberg

Higher Education Panel Reports
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Acknowledgments

This survey grew from two earlier studies of young doctorate faculty conducted by the Division of Science Resources Studies at the National Science Foundation. Comparisons with the earlier studies, together with development of the current survey, were facilitated by Charles H. Dickens and Felix H.I. Lindsay of the Science Education Studies Group of that Division.

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In particular, we wish to thank the department heads who responded to the survey and our Panel representatives who administered it.

Highlights

- In the 1975-76 academic year, the average proportion of young doctorates on the full-time faculty in sixteen science and engineering fields at Ph.D.-granting institutions was 28 percent. The social sciences -- sociology, psychology, economics -- had the highest proportions, and the fields of physics, mining and mineral engineering, chemistry, chemical engineering, and biochemistry had the lowest proportions.

- The proportions of young doctorate faculty were expected to decrease over the five years to 1980, to an overall average of 25 percent. Most fields estimated a decline, though mining and mineral engineering, chemical engineering, and biochemistry anticipated increases from 3 to 6 percentage points.

- Generally, the ten highest ranked of the departments rated good or adequate in the fourteen science and engineering fields covered in the Roose-Andersen study had higher proportions of young doctorate faculty in 1975 than did either the 236 departments rated distinguished or strong or the Top Ten departments; the only exceptions were physics and economics, where the Top Ten had more young doctorates. Moreover, estimates for 1980 indicated that these differentials would continue in virtually all fields.

- In most of those departments for which longitudinal data were available, the proportions of young doctorates had declined since 1968. Between 1968 and 1974, the proportions had dropped by at least half in electrical engineering, physics, and chemical engineering, though the last of these fields anticipated an increase by 1980. There were no clear-cut and consistent differences between the Top Ten distinguished and strong departments in each field and the first ten good or adequate departments with respect to relative changes in the proportions of young doctorate faculty.

- About two in five department heads said that they considered the 1975 proportions of young doctorate faculty to be too low. Nearly half said they regarded the estimated 1980 proportions as too low. Concern over age imbalance was directly related to having (or expecting to have) a lower-than-average proportion of young doctorates on the full-time faculty.

- The most desirable proportion of young faculty, according to department heads, was 30 percent. For most fields, the "ideal" proportion was slightly higher than the actual (1975) proportion, the exceptions being the three social science fields.

- The most common measures initiated by either departments or institutions to increase the proportions of young doctorates were lengthening the probationary period before a tenure decision has to be made, and encouraging optional early retirement.

- About one in four department heads believed that financial constraints were solely responsible for limiting the hiring of young faculty. Other frequently mentioned factors were the lack of new positions, the low mobility of senior faculty, and the need to hire senior rather than junior faculty.

- Those department heads who felt that their proportions of young doctorates were too low most often recommended encouraging early retirement or partial retirement, increasing funding and research support, and hiring only or mostly young faculty as ways to overcome the age imbalance. Relatively few, however, felt that their recommendations would be put into operation.

YOUNG DOCTORATE FACULTY IN SELECTED SCIENCE AND ENGINEERING DEPARTMENTS, 1975 TO 1980

This survey, conducted at the request of the National Science Foundation, focuses on young doctorate faculty employed full-time in science and engineering departments at Ph.D.-granting institutions. In surveys conducted previously by the Foundation,[1] it was found, among other things, that the overall proportion of young doctorate faculty in Ph.D.-granting institutions dropped from 39 percent to 28 percent between 1968 and 1974.

Economic constraints and changing enrollment patterns in higher education may further reduce the capacity of academic institutions to add new doctorate-recipients to their faculties, with a resultant loss of vigor in both teaching and scientific research. To monitor this trend and to gain more insight into the situation, the present survey asked department heads in selected science and engineering fields to report what proportions of their faculties, as of December 1975, were *young* doctorate faculty (defined as those who had received the doctorate within the previous seven years); to estimate what that proportion would be "five years from now" (i.e., in 1980); to indicate whether they regarded those proportions as too low; to specify what steps the department or institution had taken (or planned to take in the next academic year) to change tenure or appointment policies and practices; and to give their opinions about what should be done to alleviate any age imbalance. (See Appendix A for a copy of the survey instrument, along with other material mailed to the institution or department in connection with the survey.)

Methods Summary

The data for this report were collected as part of the continuing research program of the Higher Education Panel of the American Council on Education. Created in 1971 to conduct quick-turnaround surveys on topics of general policy interest to the higher education community

[1] See National Science Foundation, Young and Senior Science and Engineering Faculty, 1974: Support, Research Participation, and Tenure, NSF 75-302 (Washington: U.S. Government Printing Office, 1975), and Support and Research Participation of Young and Senior Academic Staff, 1968, NSF 68-31 (Washington: U.S. Government Printing Office, 1968).

and to government agencies, the Panel is based upon a network of campus representatives at 643 academic institutions broadly representative of all colleges and universities in the nation. For any given survey, the entire Panel or a subset of institutions may be used.

For this survey, the subset comprised institutions that (1) had awarded the doctorate in at least one science or engineering field in the 1970-71 academic year, and (2) had received at least $1 million in federal support for research and development in fiscal 1974.[2] Of the 219 Ph.D.-granting institutions in the Higher Education Panel, 145 met both criteria. These institutions accounted for 85 percent of the nearly 18,500 science and engineering doctorates awarded in 1970-71. (See Appendix C for a list of the institutions surveyed.)

Like the recent HEP survey on faculty research activity (Higher Education Panel Report No. 29, January 1976), this inquiry was directed at individual science and engineering departments within the institution rather than at the institution itself. The respondents were department heads in the following sixteen fields:

Biochemistry	Chemistry	Mathematics	Physiology
Biology	Economics	Microbiology	Psychology
Botany	Electrical Engr.	Mining & Mineral Engr.	Sociology
Chemical Engr.	Geology	Physics	Zoology

Our experience with the earlier departmental survey, together with updated information received during the course of this survey, enabled us to arrive at a reliable count of eligible Ph.D.-level departments within each institution. The potential respondents ultimately comprised nearly 1,400 departments at 145 colleges and universities.

By the deadline for questionnaire returns, usable responses had been received from 1,148 departments[3] at 137 institutions. Thus, the departmental response rate was 82 percent,

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[2] Based on reports to the National Science Foundation derived from the government-wide data system originally established under the auspices of the Committee on Academic Science and Engineering (CASE). These institutions were selected because of their substantial research activity.

[3] Not all the responding departments provided usable data on each item in the survey questionnaire; therefore, totals vary from item to item.

and the institutional response rate was 94 percent. (For a more detailed discussion of institutional and departmental response to the survey, see Appendix B.) This report presents the basic data, separately by field, for all departments responding with usable information for a given item. In addition, for purposes of comparison, some data are also included on three sub-groups of departments: (1) those departments rated "distinguished" or "strong" (Roose and Andersen, 1970)[4]; (2) the Top Ten responding departments in the "distinguished" or "strong" categories; and (3) the ten highest ranked responding departments rated "good" or "adequate."[5]

Results

In December 1975, more than one-fourth (28 percent) of all full-time doctorate faculty in the 1,113 departments responding to the first item on the survey questionnaire were reported as young, having received the degree in the seven years since 1968 (Table 1A). The

[4]The Roose-Andersen ratings represent a summary of the assessments provided by 4,000 faculty members in 37 disciplines at 131 major institutions who rated as many of the major institutions offering doctoral study in their disciplines as they felt competent to judge. Specifically, respondents were asked to select from a given set of terms the one they felt best described the quality of graduate faculty and the effectiveness of the doctoral program, and to indicate the degree of change they perceived in the relative position of departments. Average scores were calculated for each department at each institution, and the departments within each discipline were then ranked-ordered.

In the summary ratings of graduate faculty, the highest-scoring departments were categorized as "distinguished." The next level was "strong," followed by "good," "adequate," "marginal," and "not sufficient for doctoral training." The top two categories were combined for separate tabulation. See Kenneth D. Roose and Charles J. Andersen, A Rating of Graduate Programs (Washington: American Council on Education, 1970).

[5]Not all institutions ranked by the Roose-Andersen study were members of the Higher Education Panel; conversely, not all HEP members were ranked by the Roose-Andersen study. Consequently, the departments categorized as "Top Ten" of the distinguished and strong and "first ten" of the good and adequate were selected on the basis of being the highest ranked respondents in their respective categories for which data were available from both sources.

proportions varied widely among the sixteen fields. The highest concentrations of young doctorates were found in the three social sciences included in the survey (sociology, 40 percent; psychology, 38 percent; and economics, 36 percent), and the lowest in physics (17 percent), followed by mining and mineral engineering, chemistry, chemical engineering (each with 21 percent), and biochemistry (22 percent).

Overall, the responding department heads estimated that the proportion of young doctorates would decline to 25 percent by 1980. All but four fields anticipated a decline, the exceptions being microbiology, biochemistry, chemical engineering, and mining and mineral engineering. Their estimated proportions of young faculty were closer to the average proportion for all departments than the other fields. The two fields with the very lowest proportions, physics and chemistry, predicted further decreases in the proportions of young doctorates on their full-time faculties by 1980.

The 236 departments rated "distinguished" or "strong" in the fourteen science and engineering fields covered by the Roose-Andersen study[6] had somewhat smaller proportions of young doctorates on their full-time faculties in December 1975 (24 percent), and that figure was expected to drop to 22 percent by 1980 (Table 1B). Variations by field among these distinguished and strong departments followed the same general pattern as that for all departments: The social sciences had the highest proportions of young doctorates, whereas physics, chemical engineering, biochemistry, geology and electrical engineering had the lowest, with fewer than one in five young doctorates on their full-time faculties. Two of these five fields -- chemical engineering and biochemistry -- expected the proportion to increase by 1980, and the three others anticipated slight declines. In addition, the three social sciences expected decreases from 3 to 7 percentage points, as did mathematics and zoology.

The patterns were similar for the Top Ten departments for which data were available in

[6]The Roose-Andersen study did not include biology departments as designated in the present study or departments of mining and mineral engineering.

the fourteen science and engineering fields rated "distinguished" or "strong" in the Roose-Andersen study (Table 1C). In 1975, about one in three full-time faculty members in the three social sciences was a young doctorate, and this proportion was expected to drop slightly over the next five years. Fields having lower-than-average proportions of young doctorates in 1975 were geology, chemical engineering, botany, biochemistry, physics, and electrical engineering; all six of these fields anticipated decreases or only slight increases (of no more than 3 percentage points) by 1980. The only fields expecting substantial proportionate increases were microbiology (from 24 percent in 1975 to 30 percent in 1980) and physiology (from 23 percent in 1975 to 28 percent in 1980). The eight reporting zoology departments anticipated a decline of 6 percentage points (from 27 percent in 1975 to 21 percent in 1980), which represents a 17 percent decrease in the absolute numbers of young doctorate faculty in this field. Department heads in other science and engineering departments expected only minor changes over the next five years.

For the ten highest ranked of departments rated good or adequate in the fourteen science and engineering fields rated in the Roose-Andersen study, the overall proportion of young doctorates was higher (28 percent) than that for the Top Ten distinguished or strong departments (24 percent), but there was considerable variation by field (Table 1D). The heads of sociology and psychology departments reported that about two in five of their full-time doctorate faculties were young, whereas the heads of physics departments reported that only three in twenty of their full-time faculties had received the doctorate in the last seven years. Departments in two fields expected substantial increases in the proportions of young doctorate faculty over the next five years: chemical engineering, from 17 percent in 1975 to 39 percent in 1980; and biochemistry, from 25 percent in 1975 to 35 percent in 1980. Departments in the three social sciences estimated that their proportions of young faculty would decline by 1980, but to a level that would remain well above the overall estimated average of 27 percent for all fields.

Comparisons with Earlier Surveys

To get a clearer picture of trends in the hiring of young doctorates, the responses of departments to the present survey were matched with earlier responses by these same departments to previous surveys conducted by the National Science Foundation. Table 2 presents trends based on 899 departments for which data are available for three years -- 1974, 1975 and 1980. Longer-term trends based on 450 departments for which data are available for four years -- 1968, 1974, 1975 and 1980 -- are shown in Table 3.

Between spring 1974 and December 1975, there was slight but consistent decline in the proportion of young doctorates among full-time faculty in most of the fifteen fields covered by both surveys,[7] the sharpest drops occurring in mathematics and sociology (6 percentage points each) (Table 2). The 56 matched biology departments registered an overall increase of 3 percentage points during the period, and the fields of botany and physiology registered smaller increases.

The data from the 1968 survey indicate that the decline in the proportions of young doctorates evident between 1974 and 1975 was actually the continuation of a longer-range trend (Table 3). In 1968, of the 9,800 full-time doctorate faculty at the 450 departments in twelve fields[8] for which matched data from all three surveys were available, more than two in five (43 percent) were young doctorates; by 1974, the overall proportion was only three in ten; by 1975, it was slightly over one in four; and for 1980 it was estimated to be less than one in four. The decrease in the absolute numbers of young doctorates was 31 percent over the period from spring 1968 to December 1975. In some fields, the decline was modest: biology, from 31 percent in 1968 to 28 percent in 1975; microbiology, from 35 percent in 1968 to 32 percent in 1975. In others, it was precipitous. In three fields, the proportion of young doctorate faculty was virtually cut in half: electrical engineering, from 51 percent

[7] The field of mining and mineral engineering was not included in the 1974 NSF study.

[8] The fields of botany, geology, and zoology were not included in the 1968 NSF study; mining and mineral engineering was included in neither the 1968 nor the 1974 study.

to 25 percent; physics, from 41 percent to 18 percent; and chemical engineering from 40 percent to 19 percent. Mathematics also suffered a decrease of over 20 percentage points. In only one field was there an increase: The proportion of young doctorate faculty in physiology rose from 21 percent in 1968 to 33 percent in 1975.

Concern Over the Proportion of Young Doctorate Faculty

Another item on the 1975 survey instrument asked department heads to indicate whether they regarded the current projected proportions of young doctorates on their faculties as too low. Overall, two in five department heads said they considered the 1975 proportions to be too low, and almost half expressed the same opinion about the anticipated 1980 proportions (Table 4). Most frequent concern over age imbalance was indicated by department heads in physics (66 percent in 1975; 80 percent in 1980), biochemistry (53 percent in 1975; 54 percent in 1980), and chemistry (49 percent in 1975; 63 percent in 1980) -- fields which also had low average proportions of young doctorate faculty. On the other hand, those in fields with above-average proportions (e.g., economics, sociology, and psychology) were less likely to express such concern.

Table 5 shows the proportions of young doctorate faculty only in those departments whose heads judged that proportion to be "too low," and thus highlights the causes of concern over age imbalance. Overall, the departments judged to be "too low" averaged only seventeen young doctorates per hundred full-time doctorate faculty members in 1975 and anticipated having only eighteen per hundred by 1980.

Both figures were substantially lower than those reported by all departments surveyed (28 percent in 1975, and 25 percent anticipated for 1980). The same relations obtained in each field considered separately: That is, departments expressing concern over having too few young doctorates were also those departments where the proportions of young doctorates were below average for the field. For instance, in physics -- the field with the lowest proportion of young doctorate faculty in 1975 (17 percent) -- those departments whose heads judged the proportion as "too low" averaged only 12 percent.

Department heads were also asked to indicate what they regarded as the most desirable proportion of young doctorate faculty in their departments. The overall average cited was 30 percent, ranging from a low of 26 percent in chemistry to a high of 37 percent in sociology (Table 6). For most fields, the proportion thought desirable was greater than the actual proportion of young doctorate faculty shown in Table 1. Not suprisingly, the discrepancy between the ideal and the actual was greatest in physics, mining and mineral engineering, and biochemistry -- fields with very low proportions of young doctorate faculty. In economics, psychology, and sociology, however, the proportion regarded as desirable was slightly lower than the actual 1975 proportions. Department heads who believed that they had too low a proportion of young doctorates did not differ drastically from other department heads in their views of what constitutes a desirable proportion. Tabulations for the 229 responding departments rated distinguished or strong are shown in Table 6B; the patterns were essentially the same as those for all responding institutions.

Efforts to Increase the Proportion of Young Faculty

The present survey inquired about the kinds of tenure or appointment policies and practices (designed to increase the proportion of young doctorates and initiated either by the department or by the institution) that were in effect during the current academic year or that were planned to go into effect in the next academic year (Tables 7A and B). Policies in effect during the 1975-76 academic year, as reported by the 1,148 responding departments, were (in order of frequency):

- Lengthening the probationary period before a tenure decision has to be made (reported by 18 percent of the responding departments)
- Encouraging optional early retirement (18 percent)
- Replacing senior faculty with young faculty by hiring only at the assistant professor/instructor levels (8 percent)
- Reducing the mandatory retirement age (7 percent)
- Announcing quotas on the number or percentage of tenured faculty (5 percent)

Other efforts to increase the proportion of young faculty, mentioned by fewer than 5 percent of the responding departments, were making limited/temporary appointments and tightening standards for promotion.

In 73 instances, departments heads indicated that similar policies and practices were planned for implementation in the next academic year (1976-77). Most such plans involved lengthening the probationary period before granting tenure (mentioned by 27 department heads) or providing a mechanism for optional early retirement (mentioned by 23 department heads).

Respondents were asked to give their opinions as to what other factors, apart from financial constraints, had the effect of limiting the proportion of young doctorate faculty (Table 8). More than one in four department heads believed that no factors other than financial constraints were involved. The lack of new positions, the low mobility of senior faculty, and the need to hire senior rather than junior faculty were each mentioned by about one in five department heads. Tenure policies and practices were considered a limiting factor by about one in ten; a few respondents (4 percent) mentioned lack of space or of equipment, and fewer still (3 percent) said that a shortage of high-quality young applicants was a limiting factor. Comments indicated that the main limitation ultimately was financial.

Those department heads who, earlier in the survey questionnaire, indicated that they believed the proportions of young doctorate faculty in their departments were too low, also provided their opinions on what should be done to alleviate the situation. They offered a wide variety of proposals as to specific kinds of actions that should be undertaken by the department or institution (Table 9). The most frequently suggested remedies were:

- To encourage early retirements, including partial retirement with or without financial incentives (164 mentions)
- To increase funding, research support, postdoctorate research associate positions, sabbaticals, etc. (163 mentions)
- To make changes in the tenure system (126 mentions)
- To hire only or mostly young faculty (90 mentions)

The department heads were not, however, optimistic that their proposals would be implemented within their own departments or institutions. Almost half of the approximately 600 department heads responding to this item did not expect any action to be taken to alleviate the age imbalance. Among the actions that were regarded as most likely were hiring only or mostly young faculty (anticipated by 65 respondents), encouraging early retirement (anticipated by 40 respondents) and raising tenure standards (anticipated by 36 respondents). Forty-one respondents said they did not know what action would be taken, and an additional 47 did not accept the premise that any action was necessary, some believing that the age imbalance would eventually take care of itself. Many respondents expressed the belief that the encouragement of early retirement without financial assistance would not be very successful.

Conclusion

It is generally held that the vitality of the science enterprise in this country depends on the infusion of new blood, new ideas, and new vigor in teaching and research, as represented by young faculty members. The results of this study indicate that the prospects for continued vitality in the science and engineering departments of the nation's doctorate-granting institutions may not be bright.

The proportions of young faculty members have been declining over the past seven years or so and, in most fields, are estimated to continue to decline. The situation appears most critical in the fields of physics, chemistry, botany, and electrical engineering; and scarcely less so in biochemistry, biology, geology, mathematics, mining and mineral engineering, physiology, and zoology. In all these fields, the proportions of young doctorates -- either in 1975 or as estimated for 1980 or both -- fall below what is regarded by most department heads as the most desirable proportion.

Those department heads who expressed concern about the age imbalance within their faculties suggested a variety of means for increasing the proportion of young doctorates. Generally, however, they are not optimistic that these means will be adopted in the near future.

Table 1

Full-Time Doctorate Faculty and Young Doctorate Faculty in Selected Science and Engineering Fields: 1975 and 1980 (Estimated)

A. All Departments

Field	Number of Departments	December 1975			1980 (Estimated)		
		Total Number of Faculty	Young Faculty		Total Number of Faculty	Young Faculty	
			Number	Percent of Total		Number	Percent of Total
Biochemistry	72	1,005	224	22.3	1,121	279	24.9
Biology	67	1,740	502	28.9	1,930	504	26.1
Botany	32	507	127	25.0	539	120	22.3
Chemical Engineering	70	688	147	21.4	813	214	26.3
Chemistry	114	2,664	551	20.7	2,857	539	18.9
Economics	74	1,568	557	35.5	1,760	577	32.8
Electrical Engineering	80	1,607	426	26.5	1,829	413	22.6
Geology	68	968	242	25.0	1,089	252	23.1
Mathematics	99	3,229	1,005	31.1	3,549	968	27.3
Microbiology	70	822	224	27.3	971	270	27.8
Mining & Mineral Engr.	13	136	28	20.6	172	45	26.2
Physics	97	2,431	413	17.0	2,546	382	15.0
Physiology	56	869	269	31.0	961	282	29.3
Psychology	97	2,497	951	38.1	2,742	829	30.2
Sociology	72	1,331	534	40.1	1,475	486	32.9
Zoology	32	688	197	28.6	735	177	24.1
All Fields	1,113	22,750	6,397	28.1	25,089	6,337	25.3

B. Departments Rated "Distinguished" or "Strong" in the Roose-Andersen Study

Field	Number of Departments	December 1975			1980 (Estimated)		
		Total Number of Faculty	Young Faculty		Total Number of Faculty	Young Faculty	
			Number	Percent of Total		Number	Percent of Total
Biochemistry	18	336	65	19.3	364	81	22.3
Botany	12	228	46	20.2	239	45	18.8
Chemical Engineering	13	164	27	16.5	182	34	18.7
Chemistry	32	948	191	20.1	976	173	17.7
Economics	11	264	93	35.2	279	90	32.3
Electrical Engineering	21	660	129	19.5	698	132	18.9
Geology	16	280	47	16.8	301	49	16.3
Mathematics	17	750	197	26.3	776	173	22.3
Microbiology	14	180	47	26.1	201	57	28.4
Physics	20	800	131	16.4	798	120	15.0
Physiology	12	250	60	24.0	266	74	27.8
Psychology	24	804	287	35.7	847	247	29.2
Sociology	18	402	140	34.8	412	131	31.8
Zoology	8	200	54	27.0	216	45	20.8
All Fields[a]	236	6,266	1,514	24.2	6,555	1,451	22.1

[a]The Roose-Andersen study did not include biology departments as designated in the present study or departments of mining and mineral engineering.

Table 1 (cont.)

C. Top Ten of the Responding Departments Rated "Distinguished" or "Strong" in the Roose-Andersen Study

Field	Number of Departments	December 1975			1980 (Estimated)		
		Total Number of Faculty	Young Faculty		Total Number of Faculty	Young Faculty	
			Number	Percent of Total		Number	Percent of Total
Biochemistry	10	180	34	18.9	193	43	22.3
Botany	10	181	34	18.8	188	34	18.1
Chemical Engineering	10	126	22	17.5	139	27	19.4
Chemistry	10	329	73	22.2	341	72	21.1
Economics	10	249	88	35.3	266	89	33.5
Electrical Engineering	10	388	79	20.4	408	75	18.4
Geology	10	189	30	15.9	204	33	16.2
Mathematics	10	454	109	24.0	469	94	20.0
Microbiology	10	117	28	23.9	129	39	30.2
Physics	10	416	82	19.7	417	75	18.0
Physiology	10	219	50	22.8	234	66	28.2
Psychology	10	394	130	33.0	407	133	32.7
Sociology	10	222	74	33.3	227	68	30.0
Zoology[a]	8	200	54	27.0	216	45	20.8
All Fields[b]	138	3,664	887	24.2	3,838	893	23.3

[a]Of all zoology departments rated distinguished or strong, only 8 responded. Thus the "Top Ten" is really the "Top Eight" for zoology.

[b]The Roose-Andersen study did not include biology departments as designated in the present study or departments of mining and mineral engineering.

D. Ten Highest Ranked of the Responding Departments Rated "Good" or "Adequate" in the Roose-Andersen Study

Field	Number of Departments	December 1975			1980 (Estimated)		
		Total Number of Faculty	Young Faculty		Total Number of Faculty	Young Faculty	
			Number	Percent of Total		Number	Percent of Total
Biochemistry	10	169	42	24.9	182	64	35.2
Botany[a]	9	159	46	28.9	166	38	22.9
Chemical Engineering	10	116	20	17.2	136	53	39.0
Chemistry	10	257	55	21.4	286	68	23.8
Economics	10	284	92	32.4	304	93	30.6
Electrical Engineering	10	240	58	24.2	270	49	18.1
Geology	10	169	37	21.9	181	37	20.4
Mathematics	10	355	99	27.9	379	94	24.8
Microbiology	10	124	32	25.8	147	39	26.5
Physics	10	287	42	14.6	297	47	15.8
Physiology	10	184	67	36.4	195	69	35.4
Psychology	10	325	130	40.0	375	116	30.9
Sociology	10	189	77	40.7	203	67	33.0
Zoology	10	242	65	26.9	238	61	25.6
All Fields[b]	139	3,100	862	27.8	3,359	895	26.6

[a]Of all botany departments rated good or adequate, only 9 responded. Thus there are only 9, not 10, "highest ranked".

[b]The Roose-Andersen study did not include biology departments as designated in the present study or departments of mining and mineral engineering.

Table 2

Full-Time Doctorate Faculty and Young Doctorate Faculty:
All Departments Providing Data for 1974, 1975, and 1980 (Estimated)

Field	Number of Departments	Spring 1974[a]			December 1975			1980 (Estimated)		
		Total Number of Faculty	Young Faculty		Total Number of Faculty	Young Faculty		Total Number of Faculty	Young Faculty	
			Number	Percent of Total		Number	Percent of Total		Number	Percent of Total
Biochemistry	44	624	141	22.6	612	135	22.1	686	149	21.7
Biology	56	1,378	362	26.3	1,439	415	28.8	1,604	419	26.1
Botany	26	398	102	25.6	391	101	25.8	418	103	24.6
Chemical Engineering	63	619	141	22.8	638	134	21.0	752	195	25.9
Chemistry	105	2,474	542	21.9	2,491	512	20.6	2,674	506	18.9
Economics	61	1,335	489	36.6	1,331	468	35.2	1,480	474	32.0
Electrical Engineering	69	1,420	415	29.2	1,463	393	26.9	1,652	366	22.2
Geology	62	905	226	25.0	891	212	23.8	1,005	225	22.4
Mathematics	87	2,898	1,052	36.3	2,951	900	30.5	3,237	864	26.7
Microbiology	38	406	110	27.1	441	119	27.0	514	137	26.7
Physics	89	2,266	441	19.5	2,268	388	17.1	2,370	353	14.9
Physiology	22	278	83	29.9	341	103	30.2	382	98	25.7
Psychology	82	2,037	840	41.1	2,137	821	38.4	2,355	730	31.0
Sociology	67	1,240	564	45.5	1,260	500	39.7	1,399	458	32.7
Zoology	28	612	181	29.6	623	177	28.4	666	155	23.3
All Fields[b]	899	18,896	5,689	30.1	19,277	5,378	27.9	21,194	5,232	24.7

[a]The source of the 1974 data is National Science Foundation, Young and Senior Science and Engineering Faculty, 1974: Support, Research Participation, and Tenure, NSF 75-302 (1975).

[b]The field of mining and mineral engineering was not included in the 1974 NSF study.

Table 3

Full-Time Doctorate Faculty and Young Doctorate Faculty:
All Departments Providing Data for 1968, 1974, 1975, and 1980 (Estimated)

Field	Number of Depts.	Spring 1968[a]			Spring 1974[b]			December 1975			1980 (Estimated)		
		Total Number of Faculty	Young Faculty		Total Number of Faculty	Young Faculty		Total Number of Faculty	Young Faculty		Total Number of Faculty	Young Faculty	
			Number	Percent of Total		Number	Percent of Total		Number	Percent of Total		Number	Percent of Total
Biochemistry	17	222	68	30.6	287	56	19.5	277	55	19.9	303	56	18.5
Biology	26	492	150	30.5	578	157	27.2	587	166	28.3	651	153	23.5
Chemical Engr.	41	401	162	40.4	430	99	23.0	428	80	18.7	507	138	27.2
Chemistry	84	1,892	670	35.4	2,051	431	21.0	2,055	417	20.3	2,185	398	18.2
Economics	33	749	327	43.7	785	259	33.0	778	254	32.6	826	250	30.3
Electrical Engr.	49	1,055	541	51.3	1,137	310	27.3	1,169	294	25.1	1,301	269	20.7
Mathematics	53	1,788	921	51.5	2,010	713	35.5	2,021	607	30.0	2,186	585	26.8
Microbiology	12	136	48	35.3	163	46	28.2	183	58	31.7	204	51	25.0
Physics	59	1,460	592	40.5	1,493	300	20.1	1,498	270	18.0	1,570	234	14.9
Physiology	5	42	9	21.4	55	13	23.6	51	17	33.3	57	18	31.6
Psychology	45	1,091	494	45.3	1,225	498	40.7	1,280	464	36.3	1,398	407	29.1
Sociology	26	465	221	47.5	553	242	43.8	552	209	37.9	594	174	29.3
All Fields[c]	450	9,793	4,203	42.9	10,767	3,124	29.0	10,879	2,891	26.6	11,782	2,733	23.2

[a]The source of the 1968 data is National Science Foundation, Support and Research Participation of Young and Senior Academic Staff, 1968, NSF 68-31 (1968).

[b]The source of the 1974 data is National Science Foundation, Young and Senior Science and Engineering Faculty, 1974: Support, Research Participation, and Tenure, NSF 75-302 (1975).

[c]The fields of botany, geology, and zoology were not included in the 1968 NSF study; mining and mineral engineering was not included in the 1968 or the 1974 NSF study.

Table 4

Departments in Which Proportions of Young Doctorate Faculty are Considered by Department Heads to be Too Low: 1975 and 1980 (Estimated)

Field	December 1975		1980 (Estimated)	
	Number of Departments	Percent with Proportion Too Low	Number of Departments	Percent with Proportion Too Low
Biochemistry	75	53.3	74	54.1
Biology	69	33.3	66	33.3
Botany	33	33.3	33	45.5
Chemical Engineering	71	42.3	70	38.6
Chemistry	117	48.7	116	62.9
Economics	74	18.9	72	25.0
Electrical Engineering	79	44.3	79	57.0
Geology	69	36.2	68	38.2
Mathematics	100	28.0	98	53.1
Microbiology	72	44.4	71	39.4
Mining & Mineral Engr.	13	46.2	13	38.5
Physics	102	65.7	100	80.0
Physiology	56	35.7	55	41.8
Psychology	96	22.9	95	42.1
Sociology	74	20.3	73	41.1
Zoology	33	27.3	32	34.4
All Fields	1,133	38.3	1,115	48.0

Table 5

Composition of Faculty in Departments in Which the Proportions of Young Doctorate Faculty Are Considered To Be Too Low: 1975 and 1980 (Estimated)

Field	December 1975			1980 (Estimated)		
	Number of Departments	Total Number of Faculty	Percent Young Faculty	Number of Departments	Total Number of Faculty	Percent Young Faculty
Biochemistry	40	592	15.9	40	669	20.3
Biology	23	611	21.6	22	624	17.5
Botany	11	173	20.2	15	260	15.4
Chemical Engineering	30	310	11.9	27	316	22.2
Chemistry	57	1,328	14.9	73	1,788	15.9
Economics	14	275	22.9	18	404	25.0
Electrical Engineering	35	710	14.5	45	1,105	18.0
Geology	25	385	15.6	26	437	14.2
Mathematics	28	991	19.6	52	1,693	17.5
Microbiology	32	367	15.8	28	394	22.1
Mining & Mineral Engr.	6	70	12.9	5	76	11.8
Physics	67	1,760	11.6	80	2,010	12.6
Physiology	20	318	21.1	23	434	22.4
Psychology	22	568	28.5	40	1,084	21.9
Sociology	15	295	27.1	30	631	24.7
Zoology	9	230	19.1	11	251	17.5
All Fields	434	8,983	17.1	535	12,176	17.9

Table 6

Average of Most Desirable Percentage of Young Doctorates
Among the Total Doctorate Faculty, in the Opinion of Department Heads

A. All Departments

Field	All Departments		Departments Reporting Proportions Too Low in 1975 or 1980	
	Number	Average Desirable Percentage of Young Faculty	Number	Average Desirable Percentage of Young Faculty
Biochemistry	74	31	52	31
Biology	69	30	34	31
Botany	32	27	16	27
Chemical Engineering	71	27	38	28
Chemistry	113	26	81	27
Economics	71	33	23	36
Electrical Engineering	78	29	56	30
Geology	67	28	34	26
Mathematics	96	31	56	30
Microbiology	71	30	44	32
Mining & Mineral Engr.	13	32	7	31
Physics	99	27	82	27
Physiology	55	34	29	35
Psychology	94	34	45	35
Sociology	71	37	34	40
Zoology	30	31	13	32
All Fields	1,104	30	644	30

B. Departments Rated "Distinguished" or "Strong"
in the Roose-Andersen Study

Field	All Departments		Departments Reporting Proportions Too Low in 1975 or 1980	
	Number	Average Desirable Percentage of Young Faculty	Number	Average Desirable Percentage of Young Faculty
Biochemistry	18	28	12	26
Botany	12	24	7	26
Chemical Engineering	13	27	10	30
Chemistry	31	25	21	26
Economics	9	32	4	29
Electrical Engineering	21	29	18	29
Geology	16	25	11	25
Mathematics	17	32	11	30
Microbiology	14	28	8	27
Physics	22	25	17	25
Physiology	11	35	7	36
Psychology	21	34	13	33
Sociology	17	35	8	40
Zoology	7	28	3	31
All Fields[a]	229	29	150	29

[a]The Roose-Andersen study did not include biology departments as designated in the present study or departments of mining and mineral engineering.

Table 7

Percentage of Departments Reporting Changes in Tenure or Appointment Policies or Practices:

A. In Effect This Academic Year (1975-76)

Field	Total Number of Departments	Percentage of Departments Reporting: Quotas on Tenured Faculty	Lengthened Probationary Period	Encouraged Early Retirement	Reduced Mandatory Retirement Age	Hiring Faculty at Lower Levels	Increased Promotion Standards	Temporary Appoint-ments	Other
Biochemistry	76	3.9	13.2	21.1	3.9	10.5	1.3	3.9	1.3
Biology	69	7.2	14.5	15.9	7.2	2.9	2.9	2.9	1.4
Botany	33	3.0	21.2	24.2	6.1	6.1	0	0	0
Chemical Engr.	72	5.6	20.8	20.8	6.9	4.2	1.4	1.4	0
Chemistry	117	5.1	24.8	23.1	6.8	6.0	4.3	6.0	1.7
Economics	75	4.0	17.3	12.0	6.7	12.0	4.0	1.3	1.3
Electrical Engr.	81	6.2	22.2	18.5	11.1	8.6	2.5	1.2	1.2
Geology	70	10.0	18.6	21.4	7.1	10.0	4.3	1.4	1.4
Mathematics	100	3.0	15.0	11.0	9.0	8.0	2.0	6.0	2.0
Microbiology	72	4.2	9.7	13.9	4.2	4.2	0	6.9	2.8
Mining & Mineral Engr.	13	15.4	7.7	23.1	7.7	15.4	0	0	0
Physics	105	7.6	23.8	15.2	9.5	6.7	1.9	9.5	3.8
Physiology	57	3.5	8.8	14.0	1.8	5.3	3.5	7.0	5.3
Psychology	99	4.0	22.2	16.2	5.1	11.1	6.1	4.0	2.0
Sociology	75	5.3	17.3	20.0	10.7	16.0	6.7	2.7	0
Zoology	34	2.9	20.6	8.8	2.9	8.8	2.9	2.9	0
All Fields	1,148	5.3	18.3	17.2	7.0	8.2	3.0	4.2	1.7

B. Planned for Next Academic Year (1976-77)

Field	Total Number of Departments	Percentage of Departments Reporting: Quotas on Tenured Faculty	Lengthened Probationary Period	Encouraged Early Retirement	Reduced Mandatory Retirement Age	Hiring Faculty at Lower Levels	Increased Promotion Standards	Temporary Appoint-ments	Other
Biochemistry	76	0	1.3	0	0	0	0	0	0
Biology	69	1.4	1.4	2.9	1.4	0	1.4	0	1.4
Botany	33	0	3.0	3.0	0	0	0	0	0
Chemical Engr.	72	1.4	1.4	1.4	0	0	0	0	1.4
Chemistry	117	0	0	1.7	.9	.9	.9	.9	0
Economics	75	1.3	5.3	4.0	0	0	0	0	0
Electrical Engr.	81	1.2	4.9	2.5	0	0	0	0	0
Geology	70	0	1.4	0	0	0	0	1.4	0
Mathematics	100	0	4.0	3.0	0	0	0	0	0
Microbiology	72	0	2.8	1.4	0	1.4	1.4	0	1.4
Mining & Mineral Engr.	13	0	0	15.4	0	0	0	0	0
Physics	105	0	1.0	1.0	0	0	0	0	0
Physiology	57	0	1.8	0	0	0	0	0	0
Psychology	99	2.0	3.0	4.0	1.0	0	0	2.0	0
Sociology	75	0	1.3	1.3	0	0	1.3	0	0
Zoology	34	2.9	5.9	0	0	0	0	0	0
All Fields	1,148	.6	2.4	2.0	.3	.2	.3	.3	.3

Table 8

Current Factors, Besides Financial Constraints, Which Limit the Proportion of Young Doctorate Faculty

Field	Total *Number* of Depts.	Number of Departments Reporting:[a] No *New* Positions	No *Vacated* Positions	*Tenure* Policies	Need for *Senior* Faculty	Lack of *Quality of* Young Faculty	Space or *Equipment* Needs	None: *Financial* Only	Other	*Not Usable/* No Response
Biochemistry	76	9	10	9	9	2	12	23	4	8
Biology	69	11	16	7	11	0	1	17	1	11
Botany	33	10	6	1	6	0	0	9	0	4
Chemical Engineering	72	17	12	5	10	10	0	14	3	6
Chemistry	117	34	25	11	20	3	5	26	3	13
Economics	75	14	6	8	12	1	0	30	0	12
Electrical Engineering	81	17	24	7	20	2	0	15	2	9
Geology	70	15	9	8	12	2	1	19	0	12
Mathematics	100	17	16	9	23	0	0	27	2	14
Microbiology	72	13	13	5	9	3	16	20	6	3
Mining & Mineral Engr.	13	2	2	2	3	7	0	0	0	0
Physics	105	23	20	8	15	1	0	31	5	13
Physiology	57	6	4	4	11	2	7	18	2	6
Psychology	99	15	24	8	30	0	1	24	2	11
Sociology	75	12	20	9	11	0	0	22	0	12
Zoology	34	5	9	4	4	0	1	10	0	4
All Fields	1,148	220	216	105	206	33	44	305	39	138
Percent of Depts.	100.0%	19.2%	18.8%	9.1%	17.9%	2.9%	3.8%	26.6%	3.4%	12.0%

[a]Since some department heads reported more than one factor and others reported none, the sum of factors will not equal the total number of departments.

Table 9

A. Remedial Actions Proposed by Department Heads Who Consider the Current or Projected Proportions of Young Doctorate Faculty to be Too Low

Field	Total Number Departments	Encourage Early Retirement	Number of Department Heads[a] Proposing to: Lower Mandatory Retirement Age	Make Temporary Appointments	Eliminate Tenure	Lengthen Tenure Probation Period	Raise Tenure Standards	Announce Quotas on Tenure	Other Tenure Changes	Hire Only or Mostly Young Faculty	Improve Funding	Increase Gov't Support	Increase Faculty Mobility	No Action Necessary	Other	Don't Know	Not Usable/ No Response
Biochemistry	52	17	1	2	4	2	5	3	1	4	16	8	3	2	8	2	4
Biology	34	13	1	1	1	0	7	1	2	5	6	4	1	2	2	0	1
Botany	16	8	1	2	1	0	2	0	1	2	4	1	0	1	1	1	1
Chemical Engineering	38	3	1	1	1	0	1	0	1	7	11	3	3	2	5	3	3
Chemistry	82	23	3	2	2	0	7	2	4	9	21	4	4	10	7	4	3
Economics	23	1	0	0	0	1	0	0	1	4	7	0	0	4	2	2	2
Electrical Engineering	56	14	3	1	3	3	3	2	0	9	10	5	1	5	11	2	4
Geology	35	11	3	3	2	2	2	0	3	2	12	2	2	4	3	0	1
Mathematics	58	13	1	3	0	2	2	0	3	7	20	4	2	6	5	4	4
Microbiology	44	10	2	0	1	2	1	1	0	7	17	6	2	3	1	1	3
Mining and Mineral Engr.	7	1	0	0	0	0	0	0	1	3	3	0	0	1	0	0	0
Physics	84	20	3	8	2	4	3	2	3	10	17	15	7	6	8	11	6
Physiology	29	4	1	2	0	0	1	0	1	5	7	5	1	3	3	3	2
Psychology	45	13	0	7	0	2	7	1	4	8	6	2	5	0	7	1	3
Sociology	35	7	0	1	0	0	5	0	1	7	4	0	1	2	5	3	5
Zoology	14	6	1	0	1	1	2	0	3	1	2	1	0	4	1	0	1
All Fields	652	164	21	33	18	19	48	12	29	90	163	60	32	55	69	37	43
Percent of Depts.	100.0%	25.2%	3.2%	5.1%	2.8%	2.9%	7.4%	1.8%	4.4%	13.8%	25.0%	9.2%	4.9%	8.4%	10.6%	5.7%	6.6%

[a]Since some department heads proposed more than one action and others proposed none, the sum of proposals will not equal the total number of departments.

Table 9

B. Remedial Actions Which Department Heads Believe Will Be Taken

Field	Total Number Departments	Number of Department Heads[a] Proposing to: Encourage Early Retirement	Lower Mandatory Retirement Age	Make Temporary Appointments	Eliminate Tenure	Lengthen Tenure Probation Period	Raise Tenure Standards	Announce Quotas on Tenure	Other Tenure Changes	Hire Only or Mostly Young Faculty	Improve Funding	Increase Gov't Support	Increase Faculty Mobility	No Action Necessary	Other	Don't Know	No Action Expected	Not Usable/ No Response
Biochemistry	52	4	0	1	0	0	2	0	0	3	3	1	0	3	4	3	26	5
Biology	34	6	0	0	0	0	8	1	0	4	0	0	0	1	4	1	14	2
Botany	16	3	0	1	0	0	2	0	0	2	1	0	0	1	0	1	6	1
Chemical Engineering	38	0	0	2	0	0	0	0	1	6	1	0	1	1	1	3	16	6
Chemistry	82	7	1	2	0	0	5	1	0	3	2	0	2	9	7	4	43	2
Economics	23	0	0	0	0	0	0	0	1	3	2	0	0	4	0	3	8	2
Electrical Engineering	56	2	1	0	1	1	3	0	0	6	1	0	1	3	6	4	29	3
Geology	35	4	1	0	0	0	0	0	0	2	1	0	1	3	2	2	21	1
Mathematics	58	3	0	2	0	1	1	0	0	6	1	0	1	5	3	1	31	6
Microbiology	44	1	0	0	0	0	1	0	0	5	3	1	1	3	4	0	24	2
Mining and Mineral Engr	7	1	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3	0
Physics	84	2	0	6	0	1	3	2	0	6	3	1	1	5	9	9	38	7
Physiology	29	0	0	0	0	0	0	0	1	4	1	0	0	3	3	2	14	1
Psychology	45	4	0	5	0	2	5	0	0	7	0	0	1	0	3	3	14	8
Sociology	35	2	0	0	0	0	5	0	0	5	0	0	1	2	2	3	12	6
Zoology	14	1	0	0	0	0	1	0	0	1	0	0	0	3	0	2	4	2
All Fields	652	40	3	19	1	5	36	4	3	65	19	3	10	47	48	41	303	54
Percent of Depts.	100.0%	6.1%	.5%	2.9%	.2%	.8%	5.5%	.6%	.5%	10.0%	2.9%	.5%	1.5%	7.2%	7.4%	6.3%	46.5%	8.3%

[a]Since some department heads reported more than one factor and others reported none, the sum of factors will not equal the total number of departments.

Appendix A: Survey Instrument

AMERICAN COUNCIL ON EDUCATION
ONE DUPONT CIRCLE
WASHINGTON, D. C. 20036

HIGHER EDUCATION PANEL

November 24, 1975

Dear Higher Education Panel Representative:

Enclosed is the thirtieth survey of the Higher Education Panel. Requested by the National Science Foundation, this survey concerns the status of "young" doctorate faculty in selected science and engineering departments.

You will note that, instead of a single institutional response, replies are requested from heads of doctorate-level departments in selected science and engineering fields. A list of the selected fields and an explanation of the survey procedures and enclosed materials are provided on the following page.

The Director of the National Science Foundation has written a letter to department heads explaining the purpose of the survey. His letter appears as the cover page of the questionnaire.

We realize that for some institutions there will be a number of individual departments to contact and that, in some instances, the department head may not be available during the survey period. In such cases the acting department head or the department's director of graduate studies should be asked to complete the questionnaire.

Please understand that responses from your institution will be held in strictest confidence. As with all our surveys, the data you provide will be reported in summary fashion only and will not be identified with your institution.

We would appreciate having the completed questionnaires returned to us by December 15th, 1975. A self-addressed, stamped envelopehas been enclosed for your convenience. We ask that you not delay the return of completed questionnaires past the due date even if some of the departmental replies are missing.

If you or the department heads have any questions or problems with the survey procedures, please do not hesitate to telephone us (collect) at (202) 833-4757.

Thank you for your continued cooperation.

Sincerely,

Frank Atelsek

Frank Atelsek, Director

Encls.

American Council on Education
Higher Education Panel Survey Number 30

Status of "Young" Doctorate Faculty in Selected Science and Engineering Departments, 1975 to 1980

GENERAL INSTRUCTIONS

Enclosed in this package are the following materials:

1. Multiple copies of the questionnaire including an introductory letter from H. Guyford Stever, Director of the National Science Foundation. Please distribute these as soon as possible to the heads of selected science and engineering departments (see list below).

2. Cover Sheet to accompany completed questionnaires. Please use this form to indicate the departments: (1) for which completed questionnaires are being submitted, and (2) for which completed questionnaires will be submitted later.

3. Prepaid, self-addressed return envelope.

Please return completed questionnaires to the Higher Education Panel by December 15th. Questionnaires completed after December 15th should be returned to us individually as soon as possible.

SELECTED SCIENCE AND ENGINEERING DEPARTMENTS (DOCTORATE-GRANTING ONLY)

(If your institution has a medical school, please also include the appropriate doctorate-level departments within the medical school.)

BIOCHEMISTRY - Include departments of biochemistry or biological chemistry.

BIOLOGY - Include only departments designated as biology or biological science. Do not include departments covering only specialized fields such as cellular biology or molecular biology.

BOTANY - Include departments of botany or botany combined with other subjects, e.g., department of botany and plant pathology.

CHEMICAL ENGINEERING

CHEMISTRY

ECONOMICS - Do not include departments of agricultural economics.

ELECTRICAL ENGINEERING

GEOLOGY - Include only departments designated as geology or geological science.

MATHEMATICS - Do not include departments limited to applied mathematics, computer science, or statistics.

MICROBIOLOGY - Include only departments designated as microbiology or bacteriology.

MINING AND MINERAL ENGINEERING

PHYSICS - Include only departments designated as physics or physics and astronomy. Do not include highly specialized departments such as molecular physics or electrophysics.

PHYSIOLOGY - Include departments of physiology or physiology combined with other subjects, e.g., department of physiology and biophysics.

PSYCHOLOGY - Do not include highly specialized departments or fields of education such as departments of child development, child studies, educational psychology, or counseling.

SOCIOLOGY - Include departments designated as sociology or sociology and anthropology.

ZOOLOGY - Include departments of zoology or zoology combined with other subjects, e.g., department of zoology and entomology.

American Council on Education
Higher Education Panel Survey Number 30

Status of "Young" Doctorate Faculty in Selected Science and Engineering Departments, 1975 to 1980

COVER SHEET

(to accompany completed questionnaires)

Reports are requested only for departments granting the doctorate degree. Please make appropriate notations for reports submitted or to be submitted.

Eligible Departments at Your Institution* (underlined in red)	Completed Survey Enclosed (✓)	Survey to be Submitted by: (Indicate date)
Biochemistry		
Biology		
Botany		
Chemical Engineering		
Chemistry		
Economics		
Electrical Engineering		
Geology		
Mathematics		
Microbiology		
Mining and Mineral Engineering		
Physics		
Physiology		
Psychology		
Sociology		
Zoology		

*According to the postcard you completed for the previous HEP survey. Please note above any corrections.

Name of Institution

Person to be called regarding departmental forms to be submitted at a later date

Phone Number

NATIONAL SCIENCE FOUNDATION
OFFICE OF THE DIRECTOR
WASHINGTON, D.C. 20550

November 24, 1975

Dear Colleague:

The National Science Foundation has previously conducted surveys to gain information about the status of young doctorate faculty in college and university science and engineering departments. These surveys found, for example, that the overall proportion of young doctorate faculty in doctorate-level science and engineering departments dropped from 39 percent in 1968 to 27 percent in 1974.

Economic constraints and changing enrollment patterns in higher education may further reduce academic institutions' abilities to add new doctorate recipients to their faculty. This may affect the vigor of teaching and scientific research at universities. Therefore, the Foundation believes that it is important to have up-to-date information on the present and projected numbers of young doctorate faculty, on certain administrative policies and practices that affect their status, and on your views and opinions. To meet this need, we have asked the American Council on Education to conduct this fast-response survey through the Higher Education Panel. The Panel is a mechanism designed to obtain quickly a limited amount of information from a sample of institutions.

This questionnaire is being sent to you and to heads of other selected departments in a sample of institutions granting doctorates in the sciences. Since the sample is not large, it is important that your answers be included along with those of others in your field. Your helpfulness in assisting us in this endeavor by completing the questionnaire promptly will be appreciated. The American Council on Education will publish a report of survey findings, probably in the spring. As in the case with all Higher Education Panel surveys, the confidentiality of the data you provide will be safeguarded.

We trust that you share our interest in this matter and thank you for your assistance.

Sincerely,

H. Guyford Stever
Director

INSTRUCTIONS AND DEFINITIONS

Coverage

This questionnaire should be completed for each doctorate-granting department (including those in medical schools) in the designated science and engineering fields. Please return the completed questionnaire to your institution's HEP Representative a few days before December 15th so that it may be forwarded with other questionnaires from your institution to the American Council on Education (Higher Education Panel).

Full-Time Faculty

The questions herein relate to all regular full-time faculty assigned to your department, including instructors and assistant professors. Please do not include the following as regular full-time faculty: visiting professors, postdoctorates and research associates, graduate students, or others who are not regular full-time members of your departmental faculty. Be sure to include yourself.

Please note that this questionnaire has been distributed to heads of doctorate-level departments in the following fields:

Biochemistry	Chemistry	Mathematics	Physiology
Biology	Economics	Microbiology	Psychology
Botany	Electrical Engineering	Mining & Mineral Engrg	Sociology
Chemical Engineering	Geology	Physics	Zoology

If any full-time faculty who serve half-time in your department also serve half-time in one of the above departments, please confer with the head of the other department to decide who will provide the information about those faculty. The reporting department should provide information as if the individuals were assigned solely to that department. Do not include in this report any regular full-time faculty serving less than half-time in your department. Faculty employed part-time at your institution should also be excluded from this report.

Young Faculty

Faculty members are defined as "young" if they were awarded the doctorate after July 1, 1968. For your five year estimate, in item 1, remember to advance your definition of "young" faculty by five (5) years.

NOTE

If you have any questions, please call the Higher Education Panel staff (collect) at (202) 833-4757.

American Council on Education
One Dupont Circle, N.W.
Washington, D.C. 20036

OMB No. 99-0265
Expires 6/76

Higher Education Panel Survey Number 30

Status of Young Doctorate Faculty in Selected Science and Engineering Departments, 1975 to 1980

Name of Department _____

1. Please provide the numbers of regular full-time doctorate faculty in your department for the years specified. What numbers are young doctorates? (In making your estimate for five years from now, please assume no significant changes in the availability of federal research funds.)

	December 1975 (actual)	Five years from now (estimate)
Number of full-time doctorate faculty	_____	_____
Number of young doctorate faculty (i.e., 7 years or less since doctorate)	_____	_____

2a. Do you consider that the present or projected proportions of young to the total doctorate faculty, as reported above, are too low? (Please check one response for each period of time.)

	December 1975 (actual)	Five years from now (estimate)
Yes	☐	☐
No	☐	☐

b. For your department, what do you consider to be the most desirable percentage of young doctorates of the total doctorate faculty?

_____%

3. Since 1970, has your department or institution implemented any of the following changes in tenure or appointment policies or practices? (Check all that apply.)

	In Effect this Academic Year	Planned for Implementation Next Academic Year
a. Announce quotas on number or percentage of tenured faculty.	_____	_____
b. Lengthen the probationary period before a tenure decision has to be made.	_____	_____
c. Encourage optional early retirement.	_____	_____
d. Reduce mandatory retirement age from age_____to age_____.	_____	_____
e. Other actions designed to increase the number of young faculty, or having that effect. Please specify:		
_____	_____	_____
_____	_____	_____
f. None	_____	_____

Over

4. Besides financial constraints, what other factors currently have the effect of limiting the proportion of young doctorate faculty? (For example, the need to hire recognized senior faculty to maintain previous levels of extramural research support.)

5. IF YOU RESPONDED "YES" TO ANY PART OF ITEM 2a (indicating that the proportion of young doctorate faculty in your department is now too low or is expected to be too low five years from now), PLEASE ANSWER THE FOLLOWING:

a. What, in your opinion, should be done to alleviate the situation?

b. What actions do you believe your department (or institution) will be able to take in this matter?

Thank you for your cooperation.

Please retain a copy of this survey for your records.

Person completing this form: _____

Office: _____

Telephone Number: _____

Appendix B:

Response to Survey #30: Young Doctorate Faculty

Among the 219 doctorate-granting institutions in the Higher Education Panel, 145 institutions were considered eligible for inclusion in the survey in that each (1) awarded at least one doctorate in a science or engineering field in 1970-71, and (2) received at least $1 million for research and development from the federal government in FY 1974. Responses were received from all relevant departments at 73 of these institutions; from more than half of the relevant departments at 60 institutions; and from fewer than half at four institutions. Thus some data were collected from 137 of the 145 eligible institutions, for an overall institutional response rate of 94.5 percent.

Of the 1,392 science and engineering departments within the responding institutions, 1,148 (82.5 percent) submitted usable data before the deadline for return of questionnaires. The response rates varied considerably by field (Table B-1), however, ranging from over 90 percent for geology and chemistry departments to only 68 percent for mining and mineral engineering departments and 71 percent for physiology departments. Chemical engineering had a higher-than-average response rate (88 percent); lower-than-average response rates occurred in botany (75 percent), biochemistry (77 percent), and zoology (77 percent).

Responses were received from 245 of the 295 sampled departments rated "distinguished" or "strong" by the Roose-Andersen study, for an overall response rate of 83 percent. Within individual fields, response rates ranged from a low of 54.5 for physiology departments to a high of 100 percent for chemistry departments.

Table B-1

Departmental Response to Survey #30:

Young Doctorate Faculty

Field	All Departments			"Distinguished" or "Strong" Departments		
	Number Sampled	Number of Respondents	Response Rate	Number Sampled	Number of Respondents	Response Rate
All Fields	1,392	1,148	82.5	295	245	83.0
Biochemistry	100	76	77.0	24	18	75.0
Biology	85	69	81.2	a	a	a
Botany	44	33	75.0	14	12	85.7
Chemical Engineering	82	72	87.8	16	14	87.5
Chemistry	129	117	90.7*	33	33	100.0*
Economics	96	75	78.1	16	11	68.8*
Electrical Engineering	95	81	85.3	23	21	91.3*
Geology	76	70	92.1*	17	16	94.1*
Mathematics	120	100	83.3	23	18	78.3
Microbiology	92	72	78.3	20	15	75.0
Mining and Mineral Engineering	19	13	68.4*	a	a	a
Physics	123	105	85.4	26	24	92.3*
Physiology	80	57	71.2*	22	12	54.5*
Psychology	118	99	83.9	29	24	82.8
Sociology	89	75	84.3	19	18	94.7*
Zoology	44	34	77.3	13	9	69.2*

*Response rate exceeds or falls short of overall response rate by 10 percent.

[a]The Roose-Andersen study did not include biology departments as designated in the present study nor departments of mining and mineral engineering.

Appendix C: List of Surveyed Institutions

University of Alabama-University
University of Alaska-Fairbanks
American University
Arizona State University
University of Arizona
University of Arkansas-Main Campus
Auburn University-Main Campus

Boston College
Boston University
Brandeis University
Brown University

University of California-Berkeley
University of California-Davis
California Institute of Technology
University of California-Irvine
University of California-LA
University of California-Riverside
University of California Med Ctr-SF
University of California-Santa Barbara
University of California-Santa Cruz
Carnegie-Mellon University
Case Western Reserve University
Catholic University of America
University of Cincinnati-Main Campus
Clemson University
University of Colorado-Main Campus
Colorado School of Mines
Colorado State University
Columbia University-Main Division
Columbia University Teachers College
Cornell U. Endowed Colleges

Dartmouth College
University of Dayton
University of Delaware
University of Denver
Drexel University
Duke University

Emory University

Florida State University
University of Florida

Georgia Institute of Tech-Main Campus
George Peabody College for Teachers
George Washington University
Georgetown University
University of Georgia

Hahnemann Med Col and Hospital
Harvard University
University of Hawaii at Manoa
University of Houston-Main Campus
Howard University

University of Idaho
University of Illinois-Chicago Circle
University of Illinois-Urbana Campus
Illinois Institute of Technology
Indiana University at Bloomington
Iowa State U Sciences and Technology

Johns Hopkins University

Kansas State U Agr. & Applied Sciences
University of Kentucky-Main Campus

Louisiana State University-Baton Rouge
Lehigh University
Loma Linda University
University of Louisville
Loyola University

University of Maine at Orono
University of Massachusetts-Amherst
University of Maryland-College Park
College of Medicine and Dentistry-Newark
Medical College of Georgia
Medical University of South Carolina
Medical College of Pennsylvania
University of Miami
University of Michigan-Ann Arbor
University of Minn-Mnpls St Paul
University of Mississippi-Main Campus
Mississippi State University
University of Missouri-Columbia
University of Missouri-Rolla
Montana State University
University of Montana

University of North Carolina-Chapel Hill
North Carolina State University-Raleigh
N Dakota State University-Main Campus
University of Nevada-Reno
University of New Hampshire
New York Medical College
New York University
University of New Mexico-Main Campus
New Mexico State University-Main Campus
Northeastern University
Northwestern University
University of Notre Dame

Ohio State University-Main Campus
Oklahoma State University-Main Campus
University of Oklahoma-Norman Campus
University of Oregon-Main Campus
Oregon State University

Pennslyvania State University-Main Campus
University of Pennsylvania

List of Surveyed Institutions (continued)

University of Pittsburgh-Main Campus
Polytechnic Institute of New York
Princeton University
Purdue University-Main Campus

Rensselaer Polytechnic Institute
University of Rhode Island
Rice University
University of Rochester
Rutgers University-New Brunswick

St. Louis University-Main Campus
University of South Carolina-Main Campus
South Dakota State University
University of South Florida
University of Southern California
Stanford University
Stevens Institute of Technology
SUNY Downstate Medical Center
SUNY State University Buffalo-Main Campus
SUNY State University Stony Brook Main
SUNY State U at Albany
SUNY Upstate Medical Center
Syracuse University Main Campus

Temple University-Main Campus
University of Tennessee Knoxville
University of Texas at Austin-Main Campus
Texas A&M University-Main Campus
Texas Tech University
Tufts University
Tulane University of Louisiana

Utah State University
University of Utah

Virginia Polytechnic Institute and St. U
Vanderbilt University
Virginia Commonwealth University
University of Virginia-Main Campus
University of Vermont & St Agrl College

Washington State University
Washington University
University of Washington
Wayne State University
West Virginia University
University of Wisconsin-Madison
University of Wisconsin-Milwaukee
University of Wyoming

Yale University
Yeshiva University

Other Reports of the Higher Education Panel
American Council on Education

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Astin, A., Blandford, B., and Mahn, T. **Freshman Class Vacancies in Fall 1971 and Recent Trends in Enrollment of Minority Freshmen.** Higher Education Panel Report, No. 3, February, 1972.

Changes in Graduate Programs in Science and Engineering 1970-72 and 1972-74. Science Resources Studies Highlights. Washington: National Science Foundation, July, 1972.

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Kinzer, J. L. and El-Khawas, E. H. **Compensation Practices for Graduate Research Assistants: A Survey of Selected Doctoral Institutions.** Higher Education Panel Report, No. 21, October, 1974.

El-Khawas, E. H. and Furniss, W. T. **Faculty Tenure and Contract Systems: 1972 and 1974.** Higher Education Panel Report, No. 22, December, 1974.

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Atelsek, Frank J. and Gomberg, Irene L. **Nonfederal Funding of Biomedical Research and Development: A Survey of Doctoral Institutions.** Higher Education Panel Report, No. 25, July 1975.

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Single copies of the above reports may be obtained from the Higher Education Panel, American Council on Education, One Dupont Circle, Washington, D.C. 20036.