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To Nurture a Discipline

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Yale University

It is time to take more seriously the nurture, that is, the support and planned development, of our discipline. The failure to do this implies more current unemployment than need be the case, poorer education than we are capable of providing, a training program incongruent with social needs, an ineffective address to public policy, lost information, and wasted talent. Since men cannot act without concepts to guide their actions, I wish first to set forth some paradigmatic models for our discipline and association. Then, following a brief sketch of the discipline, comparing it to some others, I plan to turn to two specific problems: graduate education and research creativity and productivity.

I. Association Paradigms

I think of university-based professional associations as having three stages of growth and development. First there was the *learned society*, the model that informed the consciences of the founding fathers in 1903 when they defined the purpose of the American Political Science Association as follows: "It shall be the object of this Association to encourage the study of political science. . ." The constitutions of the other social science associations were similar, except that the psychologists, geographers, and statisticians also mention a public service purpose. The principle activities of such learned societies were to publish one or more journals and hold meetings where scholarly papers were delivered and discussed. The National Office was not established until fifty years after the founding of the original learned political science society.¹

The second model, reflected in the term we use now, is that of the *professional association*. The constitution of the anthropologists, adopted one year before the political scientists', gives the main theme of this model: "to further the professional interest of the American anthropologists." In many ways this reflects the organizing principle of the associations formed by the doctors, lawyers, and engineers, even prior to the formation of discipline-based asso-

ciations.² Guided by the concepts implicit in this model, the social science associations established personnel services, committees on professional standards and ethics; they promoted their interests as these were affected by government and they sought to improve their working conditions, including in the early 'fifties and late 'sixties, the most important working condition, academic freedom. Finally, and belatedly, they sought to improve the conditions of such disadvantaged groups as Blacks, Chicanos, American Indians, and women. These activities, as reported to me by the executive secretaries of the eight main social science associations, were in addition to the learned society activities; it was an enlargement of duties and not a substitution of one set for the other.³

Underlying the operating principles of these two concepts were some fundamental beliefs about what might be called the "knowledge process," the process by which the sciences are developed, research conducted, ideas transmitted, men inducted into a training process and then placed in suitable occupations. The most important of these beliefs was the belief in *laissez-faire*, the satisfactory working of the market for trained specialists, for research information, and for information exchange on educational programs. This belief held that without central information services individuals were able to make intelligent decisions on graduate study and career choices, departments and universities were sufficiently informed to decide on what kinds of programs to offer and what degrees to award, research scholars, perhaps with the aid of a librarian, were able to locate the information they needed for their research, editors and regional or specialized associations were able to decide on what journals were needed and how circulation and business problems were to be met. I am arguing that under present conditions of size, specialization, and complexity the market forces, informal net-

²See Corinne L. Gilb, *Hidden Hierarchies: The Professions and Government* (New York: Harper & Row, 1966).

³"Social Science and Public Policy: The Role of the Professional Associations," address to the Annual Meeting of the National Research Council, March 22, 1971. A questionnaire to the executive secretaries of eight professional associations forms the basis for some of these remarks.

¹See Albert Somit and Joseph Tannenhaus, *The Development of Political Science: From Burgess to Behavioralism* (Boston: Allyn Bacon, 1967).

works, and unaided individual decisions now are wasteful and inefficient.⁴ It is time for a new paradigm.

I will refer to this as *science management* because this is an established term in other areas,⁵ but I hope you will understand that by "science" I mean all knowledge, humanistic as well as the more narrowly scientific, and by "management" I mean chiefly the provision of information and facilities by a central service to help guide individual freely made decisions. (I might have called it "knowledge nurturance" but for the awkwardness of the term.) This paradigm embraces several processes designed to help a discipline carry on its business more effectively. First, of course, there is the function of gathering information about the discipline, disseminating it, and analyzing it. That analysis is no longer a simple matter of generalizing from experience, or common sense inferences from raw data. The world has proceeded beyond that point, for along with the substantive development of the disciplines there have developed some meta-disciplines dealing with the organization, dissemination, and utilization of both knowledge and talent.⁶ Using the theo-

retical and empirical knowledge thus developed, we can begin to understand the recruitment and flow of students into the discipline, the more efficient ways of educating and training these students for the purposes we have in mind, the uses of our human resources, and the development of better information exchange systems in the discipline. These processes of analysis represent a form of disciplinary self-consciousness, one that we are just now beginning to employ (a little later than some disciplines—and earlier than others).

The second function involved in science management is a cost-accounting function. The economists have been neglectful of the social costs of the decisions of individual firms, calling them "externalities" and dismissing them. We have done the same thing; the benefits to any individual department of entering upon a Ph.D. training program may be substantial, but the effects on the discipline of these many individual decisions may be harmful. In the same way, it may serve the purposes of a regional association to publish a general journal, but the costs of information loss to the discipline may be very great. Some kind of social, discipline-wide cost-benefit analysis is implied in science management.

Third, there is the ingredient of forward planning, planning for new careers, planning for new archival facilities, planning for information exchange. Just as random unplanned use of land can result in ugliness and waste, so the random unplanned development and utilization of talent can result in personal tragedy and wasted resources. Plans need not and should not be coercive; but if they are well done, they are likely to be persuasive over the long run.

II. Portrait of a Discipline

The characteristics of a discipline help to shape both the agenda and the possibilities of

⁴ Political science shares the general characteristics of the growth of science, but in recent years has exceeded even these normal growth rates. See Derek D. Price, *Science Since Babylon* (New Haven: Yale University Press, 1961); for an intelligent critique of this, see Daniel Bell, "The Measurement of Knowledge and Technology," in Wilbert Moore and Eleanor B. Sheldon, eds., *Indicators of Social Change: Concepts & Measurements* (New York: Russell Sage, 1968) pp. 145-245, since Price reports a doubling of scientists and publications about every fifteen years, it is evident that in the past 25 years, at least, political science has exceeded the "normal" rate. For a different view of "the growth of science" see my "The Decline of Politics and Ideology in a Knowledgeable Society," *American Sociological Review*, 31 (1966), 649-62.

⁵ Robert Gilpin and Christopher Wright, eds., *Scientists and National Policy Making* (New York: Columbia University Press, 1960); Don K. Price, *Government and Science* (New York: New York University Press, 1954); Gene M. Lyons, *The Uneasy Partnership: Social Science and the Federal Government in the Twentieth Century* (New York: Russell Sage, 1969); *Reviews of National Science Policy: United States* (Paris: Organization for Economic Co-operation and Development, 1968).

⁶ There is an ample literature in these two fields of human resources policy and information science. In the first of these the *Journal of Human Resources* is especially valuable. There are two excellent recent studies on education and manpower: John K. Folger, Helen S. Astin, and Alan E. Bayer, *Human Resources and Higher Education: Staff Report of the Commission on Human Resources and Advanced Education* (New York: Russell Sage, 1970), and Dael Wolfe, *The Uses of Talent* (Princeton: Princeton University Press, 1971). The information field has its own professional organization, American Society for Informa-

tion Science. For political scientists one place to start is with W. J. Paisley, *The Flow of (Behavioral) Science Information: A Review of the Research Literature* (Stanford, Calif.: Institute for Communication Research, 1965); an excellent model for a disciplinary study is provided by W. D. Garvey and B. C. Griffith, *Reports of the American Psychological Association's Project on Scientific Information Exchange in Psychology* (Washington, D.C.: American Psychological Association, 1963-65); see also the report of the Committee on Information in the Behavioral Sciences (David Easton, Chairman), Division of the Behavioral Sciences, NRC: *Communication and Resources in the Behavioral Sciences* (Washington, D.C.: National Academy of Sciences, 1967), and Kenneth Janda, *Information Retrieval: Applications to Political Science* (Indianapolis: Bobbs-Merrill, 1968).

success for a program of disciplinary nurturance of science management. It is surprising how little we know about ourselves. Here are some rapid glimpses into the character of our discipline.⁷

Size. In terms of numbers of professionals, political science is among the smallest of the sciences in the *National Register of Scientific and Technical Personnel* (about a fifth of the size of physics and a quarter of the size of mathematics), but it is a medium sized social science. That is, it is about one quarter the size of psychology, half the size of economics, and about the same size as sociology.⁸ It is four times the size of anthropology. Its growth rate (in terms of earned degrees) has been a little slower than psychology and sociology, faster than economics.

Degrees and level of training. In 1970 about 61 per cent of the political science registrants in the National Register had doctorates (an increase of two per cent over two years.) This is a smaller percentage than anthropology and psychology, but a little larger than economics and sociology, and much larger than the natural sciences.

Salaries. In 1970 political scientists with the doctorate received a median salary less than

that of any other of 15 disciplines in the *National Scientific Register* except linguistics. This is due to the lower pay they receive in educational institutions; in the Federal government they receive among the two highest salaries (but only a few of the political scientists registered in 1970 worked in the Federal government.)

Work settings. Of the fifteen scientific fields in the *National Register*, a higher proportion of political scientists worked in educational institutions than any other discipline, except for anthropology: three quarters of all political scientists (and 85 per cent of the doctorates) may be found in academia. Fewer political scientists worked in industry and business than any other disciplinary group, again except for anthropology. About 5 per cent worked in the Federal government in 1970 and this was about average for the social sciences. Further, and tragically, this proportion has declined over the past two years.

Type of work. Political scientists think of themselves more as teachers than research scholars. In the *National Register*, a higher proportion of political scientists recorded themselves as primarily teachers than is the case for the natural scientists, and more than the psychologists or economists, but about the same as the sociologists and anthropologists. At the same time, a relatively high proportion of political scientists are in administrative work (whatever the setting)—more than any of the natural sciences and also more than any of the social sciences except economics. For example, compared to all other natural or social sciences, political science has the second highest proportion of faculty serving as deans—and political science deans are the best paid.

Financial support. Of the fifteen disciplines in the NSF roster political science ties for last place in terms of the proportion of members of the discipline receiving federal research or fellowship support. Put another way, in 1969 the total support from the Federal government for the various social sciences including psychology was \$129 million; support for political science was by far the smallest amount awarded to any discipline, a little less than \$3 million.

Without regard to Federal support, fewer political science graduate students received fellowship, teaching assistantship, or other support than was true of any other social science (1966). The average stipend for political science graduate students was lower than that of any other social science and more of them were, perforce, self-supporting.

The Association. The APSA has the third

⁷ For the data underlying the following statements, I have relied on many sources. The chief one is *American Science Manpower 1968, a Report of the National Register of Scientific and Technical Personnel* (Washington, D.C.: National Science Foundation, 1969; NSF 69-38) as supplemented by a special report on political science from the 1970 Register, not yet in print, and *Reviews of Data on Science Resources* (NSF 70-50; No. 19, Dec. 1970); also the National Center for Educational Statistics, *Higher Education: Earned Degrees Conferred: (year) Part B—Institutional Data* (Washington, D.C.: Office of Education, various years: OE 5.254:54013-yr.); *Students Enrolled for Advanced Degrees, Fall (year). Part B—Institutional Data* (OE-54019-yr-B); National Research Council, *Summary Report 1970: Doctorate Recipients from United States Universities* (Washington, D.C.: NRC, various years); *Federal Funds for Research, Development and Other Scientific Activities, 1970-71*; Survey of Science Series (Washington, D.C., NSF, 1971); and the BASS report by Neil Smelser and others, *Sociology* (Englewood Cliffs: Prentice-Hall, 1969). I wish to thank my research assistant, Hiroko Shiozaki, for many long hours spent in locating data and calculating statistics.

⁸ The criteria employed for inclusion in the Register were as follows: 1968—"A master's degree in political science or 2 years of graduate work with one year of professional experience; or a Ph.D. in political science; or substantial professional achievement in political science; or the equivalent in professional experience. In 1970 the last clause was omitted and the next to the last clause was modified to read "... professional achievement in political science as evidenced by contribution to the professional literature." See PS, IV (1971), 33.

largest membership of the eight social science (including history and law professors) professional associations and it has grown more rapidly than any of the others in the past decade. On the other hand, financially our Association has increased its budget and resources less rapidly than most other associations, although APSA expenditures in 1970 were second only to psychology. About two-thirds of the political scientists with doctorates in the field are members of the Association, and less than a tenth of those with masters degrees in political science have joined. On the other hand, something like half of the political science graduate students are members—a higher proportion, I believe, than that of any other discipline.

Enrollments and student body. The number of political science majors has increased over the past ten years more rapidly than most natural sciences and humanities and more rapidly than any of the other social sciences except psychology and sociology. In this sense, undergraduate student interest in our subject is relatively high. On the graduate level, there are more political science enrollees than in any other discipline except history and psychology, and the rates of change suggest that this will not be altered rapidly, even though psychology, anthropology and sociology are increasing their enrollments more rapidly than we are. In the last four years there has been in all fields a declining rate of increase and by now an actual decrease in doctorates in some fields, such as international relations. (See Figure 1 and footnote 29)

As for the characteristics of these graduate students, something we shall refer to later, suffice it to say here that they are intellectually fully as able, by any measure so far employed, as those of other disciplines, with the exception of anthropology. Furthermore, for what it is worth, some studies show that these graduate students compared to those of almost all other disciplines come from homes of higher socioeconomic status.⁹ At the same time, except for the sociologists, they are more radical¹⁰—the usual mixture these days.

Morale and divisiveness. There are many is-

ues that divide us (teaching versus research, elite institutions versus others, behavioralism, and so forth); it may be asked whether a discipline so torn and wracked by division and uncertainty can pull itself together to govern itself and, beyond that, to engage in the science management activities I have described. The answer is "yes." The evidence for this is: (1) when we increased the dues for annual members from \$15 to a range up to \$30, in a depression year, we increased association membership by 3.7 per cent. (2) In 1969 when the American Council on Education asked junior and senior scholars to rate graduate programs, the junior scholars' ratings correlated with senior scholar ratings .98.¹¹ (3) When the ACE asked over two hundred members of each of several disciplines whether the educational programs they rated were getting better or worse, the ratios of "better" to "worse" in four social science disciplines were as follows: psychology 127, economics 165, sociology 191, and political science 257.¹² Since this is the only comparative study of morale we have, it deserves consideration. (4) When, in 1969, the mixed faculty-graduate student University of Oregon study group asked graduate students at 12 universities whether or not their graduate program was equipping them for the careers they had in mind, 79 per cent said yes and only 12.5 per cent said no.¹³ (5) When in 1966 Luttbeg and Kahn asked 56 department chairmen whether the behavioral-traditional split was seriously divisive in their departments, three quarters of them said no.¹⁴ Dahl's "epitaph for a monument to a successful protest" deserves a fresh wreath.¹⁵ And finally (6) given our concern about coalitions and congruent lines of conflict, we should note that "there is little relationship between the divisiveness of faculty in political science departments and the divisiveness of students."¹⁶

¹¹ Kenneth D. Roose and Charles J. Andersen, *A Rating of Graduate Programs* (Washington, D.C.: American Council on Education, 1970), p. 34.

¹² Roose and Andersen. Calculated from reported data for each of the disciplines.

¹³ Unpublished report sent to me (8/6/71) by John Orbell and Lawrence C. Pierce, Department of Political Science, University of Oregon.

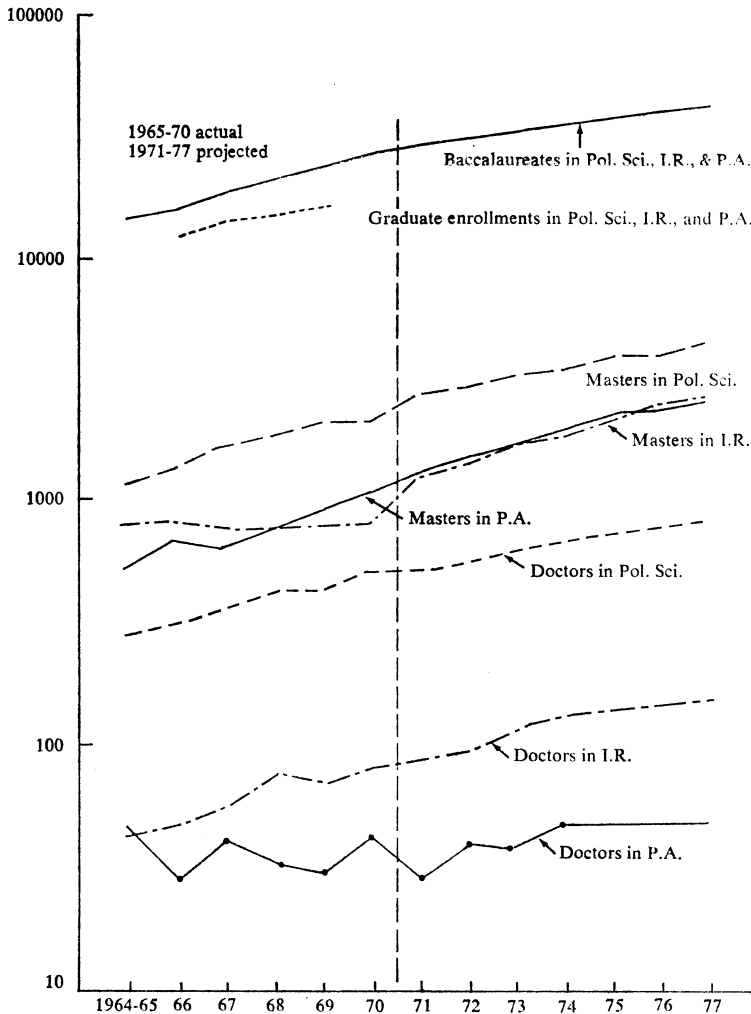
¹⁴ Norman Luttbeg and Melvin Kahn, *The Making of a Political Scientist: An Empirical Analysis of Ph.D. Programs* (Carbondale, Ill.: Public Affairs Research Bureau of Southern Illinois University, 1969), p. 67.

¹⁵ See Robert A. Dahl, "The Behavioral Approach in Political Science: Epitaph for a Monument to a Successful Protest," *American Political Science Review*, 55 (1961), 763-72.

¹⁶ John Orbell, Alvin H. Mushkatel, and Lawrence C. Pierce, "The Structure of Professional Education

⁹ James A. Davis, *Great Aspirations; The Graduate Plans of America's College Seniors* (Chicago: Aldine, 1964).

¹⁰ Everett Carl Ladd, Jr. and Seymour Martin Lipset, "The Politics of American Political Scientists," *PS*, 4 (1971), 135-44. The inference that graduate students are, next to sociologists, the most radical, rests on the finding that the junior faculty in political science is among the most "radical" group in the social sciences—a little tenuous, but probably valid.



Sources: see footnote 7.

Figure 1. Earned Degrees in Political Science, International Relations, and Public Administration 1965-77

There is, of course, other evidence of division: junior scholars are more radical than senior scholars and they would accord students more of a voice in departmental affairs.¹⁷ Graduate students are dissatisfied with their training as teachers but not with their training as research scholars.¹⁸ There is widespread dissatis-

faction with the “relevance to contemporary problems” of much of our research—shared, incidentally, by students and faculty.¹⁹ And both students and faculty believe, contrary to much evidence, that our enterprise lacks the prestige or status it should have.²⁰ But on the

in Departments of Political Science,” paper read at the Annual Meeting of the Western Political Science Association, April 1971, p. 17; also unpublished data from the same source.

¹⁷Ladd and Lipset, “The Politics of American Political Scientists.”

¹⁸“Obstacles to Graduate Education in Political Science,” Report of the APSA Committee for an Exploratory Study of Graduate Education in Political Science, *PS*, 2 (1969), 622-41.

¹⁹“Obstacles to Graduate Education . . .,” and Oregon study cited above in Footnote 16.

²⁰In the past, surveys have consistently revealed that college professors rank high in occupational prestige. For example, in Paul K. Hatt and C. C. North, “Prestige Ratings of Occupations,” in S. Nosow and W. H. Form, eds., *Man, Work, and Society* (New York: Basic Books, 1962), pp. 277-83, college professors rank 7th out of 90 occupations, well ahead of bankers and lawyers. Nevertheless, as reported in *The Academic Mind* by Paul Lazarsfeld

evidence as I see it, the division within the discipline, our dissatisfaction with our own research, and our sense of lack of public appreciation are not such as to hamper our common effort to improve the quality of the discipline.

The salient features of this discipline, then, are that it is modestly trained (in terms of proportions of Ph.D.'s), is relatively more concerned with teaching and administration than research, is located largely in academia, is relatively poorly paid (except in government), is poorly financed at both faculty and student level, has a professional association with more members than money (but even so fails to include many practitioners of the art), has disproportionately increasing enrollments at the undergraduate level and a levelling off of enrollments at the graduate level, has excellent students, and finally, has a membership divided on many issues but demonstrably capable of common effort.

I have briefly outlined the concept of disciplinary nurturance of science management and I have sketched a portrait of our discipline.

III. Graduate Training in Political Science

The problem for disciplinary nurturance or science management as it belatedly comes to grips with graduate education, is to think in terms of discipline-wide aspects of the field; the individual universities will take care of the teaching and to a large extent the curricular planning. A discipline-wide point of view is different from a departmental point of view in the following respects: (1) it often sees the virtues of the diversity of programs and specializations and the wastes of duplicated efforts, whereas the individual department may try to be like other departments, straining its resources to meet too many objectives within its own confines. (2) To the person with a disciplinary perspective, the mobility of faculty is a more or (often) less efficient method of personnel allocation and of improving individual satisfaction; to the department, mobility means the loss of a valued person (or relief that he is going) and the opportunity or requirement to hire a substitute. (3) The discipline-wide perspective offers possibilities for both special studies of common problems, that are too expensive for a single department, and for the simple exchange of in-

formation on curricula, courses, teaching methods, and so forth. At the department level, these matters are viewed idiosyncratically, often personally. In our efforts to understand what we are doing, everything that has been said of the advantages of comparative studies in politics applies to comparative study in education; perhaps even more so. The reason for this special importance has to do with the fact that we are studying ourselves, hence, without alternative models, we are unlikely to have perspective on the possibility or wisdom of change.²¹

The institutional complex. The Association has no committee concerning itself with graduate education, no staff person responsible for collecting and exchanging information about graduate education, indeed, little demonstrated concern, aside from a rather uninformative report ten years ago and a student inquiry two years ago.²² The costs of this neglect are substantial. The best we can do here is to sketch the general outline of the enterprise and propose some tentative recommendations.

There are about 108 institutions offering doctorates in political science, of which 74 were included in the 1969 American Council on Education survey.²³ Of these, 22 were rated "distinguished" and "strong." These superior institutions produced (1969) about half of the doctorates in political science (18 per cent from the six distinguished universities; 34 per cent from the 16 strong ones.) There were another 22 programs rated "good" or "adequate plus" which in 1969 all together produced another 24 per cent of the doctorates. There then remained in the ACE study 30 doctoral programs generally considered marginal or totally inadequate but included in the report because

²¹ For discussion of resistance to change in university faculties, see Theodore Caplow and Reece J. McGee, *The Academic Marketplace* (New York: Basic Books, 1958); Logan Wilson, *The Academic Man* (London and New York: Oxford University Press, 1942); Bernard Berelson, *Graduate Education in the United States* (New York: McGraw-Hill, 1960).

²² "Political Science as a Discipline: A Statement by the Committee on Standards of Instruction of the American Political Science Association," *American Political Science Review*, 56 (1962), 417-21; *Goals for Political Science: Report of the Committee for the Advancement of Teaching, APSA* (New York: Sloane, 1961); James W. Fesler and others, "Goals for Political Science: A Discussion," this *Review*, 45 (1951), pp. 996-1024. Somit and Tannenhaus's study mentioned above, and an earlier volume by the same authors, *American Political Science: A Profile of a Discipline* (New York: Atherton, 1964). The cited graduate student inquiry is the "Obstacles" report mentioned above. See also Luttbeg and Kahn and John Orbell and others, also cited above.

²³ K. D. Roose and C. J. Anderson, *A Rating of Graduate Programs*, pp. 64-5.

and Wagner Thielens, Jr. (Glencoe: Free Press, 1958), social scientists believe they would be ranked lower than businessmen and lawyers. The low estimate of occupational prestige by graduate students is reported in the APSA "Obstacles to Graduate Education" study cited above: only 32% are even slightly "satisfied with 'the prestige of political science today.'"

they were located in institutions that had been in the business some time and were producing doctorates. Finally, there are about 34 institutions offering doctorates in political science, not even included in the ACE report because they were too new or too weak, or often both. This complex of 64 inadequate programs, more than half of the total, turned out a quarter of the doctorates in that year—a possible tragedy for the discipline and for the individuals receiving this weak training.

Eleven years ago Berelson said “more students are needed more than more programs,”²⁴ and, with some modifications about the “more students,” this is equally true today. So far as I can tell from published reports, 20 programs (many of them new) had not awarded a single doctorate in the thirteen years up to 1969, while 16 others had awarded from one to three in this period.²⁵ They offer, but almost no one comes, or at least almost no one finishes. This does no great harm for those who do not enroll, but those who do enroll and don't finish are likely to have wasted their precious years in nonproductive study.

At a guess, I should judge that about 35 new political science doctoral programs have been established in the twelve years up to 1969 or about three a year.²⁶ New programs are almost always weak ones. For example, of the ten new programs in the ACE study (those in institutions with some modicum of strength) half were judged clearly marginal or inadequate, and only three were judged adequate or better. One of the reasons for this weakness is that it takes time to create both a faculty and a tradition of distinguished research and graduate study, a fact revealed in the clear relationship between a university quality rating (based on ACE data) and the years elapsed since a doctoral degree (in any field) was established: the median years for quality A group is 82 years,

²⁴ B. Berelson, *Graduate Education*, p. 106.

²⁵ This statistic, by no means easy to come by, is an inference from the fact that none of them was included in the ACE survey (which implies that none of them produced a Ph.D. in political science in the period from 1957–1966) and none of them awarded a degree in 1967, 1968, or 1969 (*Earned Degrees* series.) The data in the next paragraph come from the same source.

²⁶ Estimated from the above lists and a sampling of past reports on earned doctorates. This compares with a gross increase in the number of institutions offering the Ph.D. of 6.5 per year (1957–66) less those discontinuing such degrees, 2 per year; making a net increase of 4.5 per year. See National Science Board, *Graduate Education: Parameters for Public Policy* (Washington, D.C.: NSF, 1969), p. 30.

quality B is 66, and quality C is 30 years.²⁷

On balance it appears that the reasons for establishing a new research-oriented doctoral program are clearly local; the educational requirements of the national discipline do not call for many of these new programs, although some regional needs may modify this judgment. Furthermore, had the Association been alert to the clear warnings eleven years ago²⁸ (in spite of the recent BASS miscalculations) the current overextension of graduate research training might have been avoided and the cost of our inadequate attention to these problems might have been reduced. Perhaps we have learned a lesson.

But the graduate training enterprise is much larger than the 108 institutions offering doctorates; there are in addition at least 104 institutions offering masters but not doctorate programs in international relations or political science. We will return to these in an Appendix, but taking these together we can estimate graduate enrollment. There are well over 13,000 students registered in advanced degree programs in political science and international relations—next to psychology the largest enrollment in the social sciences.²⁹ We have no idea of the size of the faculty teaching these students, certainly it is over 3,000, many of whom do not have doctoral degrees.³⁰ The cost of this enormous enterprise is about \$109 million dollars per year.³¹ The produce of this effort, aside from some valuable training for those who drop out, was in 1969 about 600 doctorates

²⁷ National Science Board, *Graduate Education*, p. 57.

²⁸ See Bernard Berelson, *Graduate Education*, pp. 70–80.

²⁹ These data are from the Office of Education *Enrollment* series mentioned above. The figures for recent years are: 1966 10,438; 1967 11,880; 1968 12,326; 1969 12,862. These are combined political science and international relations enrollment figures. The percentage increases in doctorates for 1967, 1968, 1969 are: political science: 13%, 6%, 5%; international relations 16%, -7%, 0.3%.

³⁰ The 1968 Register is inadequate for two reasons: (1) political science was included at the last minute and the survey was limited to members of APSA, and (2) there are many more political scientists, judged either by degrees or positions than are members of the APSA. This inadequate data base gives a total of 5,176 political scientists, of which 3,921 were employed by educational institutions. Of this latter group, 2,567 or 65% had doctorates. The 1970 data are better but do not yet provide the detailed breakdown necessary for these calculations.

³¹ Estimated by taking the NSB estimate of the total cost of graduate education in 1969 (6.4 billion) and multiplying by the proportion of political science graduate enrollees to total graduate enrollees in 1969 (1.7%) = \$108,800,000.

and 3,000 masters degrees (in political science and international relations, but not public administration.)

Geographic Distribution and Regionalization. In 1969 the National Science Board recommended that every state and every urban center of over 500,000 population be encouraged and helped to develop a major university. The argument rests on grounds of "equitable distribution of Federal funds for research and development," including access to the benefits of higher education by all segments of the population, "the benefits to society . . . directly realized by the interaction of the institution and the local population," and the influence of a university on the economic development of a region.³² For political scientists there is another argument: the mutual advantages of close working relations between a state or urban government and a university.

The contrary argument, of course, is expressed in the points made above: we do not need more programs, but better ones; if we need more scientifically trained persons, candidates should be directed to those quality institutions that have excess capacity. Since mobility increases with level of training, there are strong arguments for community colleges, but given the mobility of doctoral candidates, it would be better to bring them to the training institutions than to bring the institutions to them. The regionalization of master's programs has advantages and disadvantages: to the extent that they train for secondary education or local "practice" they might well be regionalized. But on the other hand, they should not be divorced from close association with doctoral training programs.

The regionalization of the markets (output as contrasted to input), for persons trained in some doctoral programs is already a feature of the system—but only for the lower quality institutions.³³ Because of the desirability of heterodoxy and cross-fertilization and because of the current availability of well-qualified persons from national institutions, regionally defined doctoral markets should be discouraged.

Given these considerations, it seems to me that, contrary to the NSB recommendations, our policy should be to encourage the strengthening of existing institutions before new ones are created, at least until a special case is made for a particular place. In 1964–65 the five

states with the lowest per capita graduate enrollments were: Texas, Virginia, Georgia, North Carolina, and Ohio. Four metropolitan areas with populations of over 500,000 and no graduate enrollments were: Gary, Norfolk, Tampa, and Youngstown.³⁴ The argument for new political science doctor's programs in these areas has yet to be made.

The distribution of quality is another, but related, matter. In political science, the South, with 31 per cent of the population has only one third of its share of quality programs (2 out of the top 22 in the ACE 1969 rating). More important for political science nationally is the low quality and high production record of the programs in the Washington, D.C. area. None of the five Washington programs in the ACE report received a rating as high as "adequate plus," yet they produced 165 doctorates in the ten years measured, or 7 per cent of the total. The development of a strong coordinated doctoral program in that area is a matter that should concern both the profession and the faculty of the Washington programs.

Changing quality of graduate education. Concern over the quality of graduate education and the expansion of programs is chronic; for example, in 1934 the Association of American Universities formally resolved that it "views with concern the growth of the number of institutions conferring the Ph.D. degree in fields in which . . . they are not adequately staffed or equipped for work."³⁵ There are three aspects to the problem: (1) the quality of training at the best universities, (2) the average quality, as affected by the new or inferior programs, and (3) the opportunity cost of those who enroll in inferior programs, combined with the quality of training of those displaced by the products of the new programs.

On the first of these, eleven years ago Berelson said, "as far as the paper standards are concerned, they have gone down," and he cited the loss of the dissertation publication and the language requirements, and what he believed were the less stringent examination requirements.³⁶ I do not agree, nor does the political science panel (or other social science panels) employed in the ACE report.

(2) The average quality of doctoral training may have declined, however, through the entry of new and weak programs. This would occur if the better programs produced decreasing proportions of the doctorates in a field—as they are bound to do if the higher quality programs

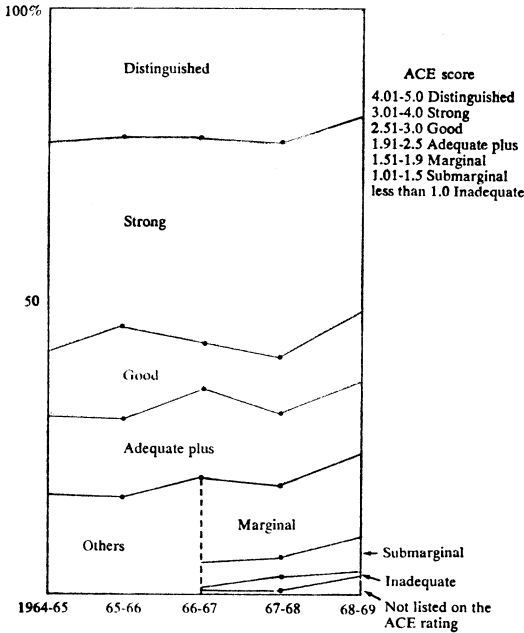
³² National Science Board, *Graduate Education: Parameters for Public Policy* (Washington, D.C.: NSB, 1969), pp. 35, 40; and NSB, *Toward a Public Policy for Graduate Education in the Sciences* (1969), p. 26.

³³ B. Berelson, *Graduate Education*, p. 118.

³⁴ NSB, *Graduate Education*, pp. 41, 42.

³⁵ Quoted in Berelson, *Graduate Education*, p. 31.

³⁶ Berelson, p. 217.



* ACE, *A Rating of Graduate Programs*, Washington, D.C.: 1970.

Figure 2. Percentage of Ph.D. Degrees in Political Science, By Quality of Program*, 1965-69

do not expand and the new programs attract the students they hope for. At this point the answer is not clear for many of the newer programs are growing and our most recent data are for 1969. As indicated in Table 1 and Figure 2, in 1966 54 per cent of the doctorates in political science were awarded by distinguished and strong departments (as measured in the 1969 ACE rating); in 1967 the percentage was 56 per cent; in 1968 it was 58 per cent; but in 1969 it drops to 52 per cent. Comparatively, this 1969 proportion is about the same as that

of the sociologists and historians, higher than that of the psychologists and economists, lower than that of the anthropologists. But Berelson's calm view of this growth process as seen eleven years ago is important to note:

The production of more second-class doctorates, even though they may lower the average, does not affect the production of first-class doctorates. We shall have as many or more of the latter plus the former as well.³⁷

(3) If the candidates enrolling in the new or inferior programs would otherwise have gone to better quality programs with excess capacity, there is a net loss in disciplinary quality. If they would not have applied, or if they would not have been admitted if they had applied, and if they take the places of persons with training less suited to their jobs (a master's degree in college teaching or policy analysis, for example), there is a net gain in quality of instruction and practice. The average figure is irrelevant. I am reasonably sure that the products of these new programs do take positions that otherwise would have been filled by persons with only the master's degree, but there is no way of knowing whether or not the establishment of new doctoral programs in their own institutions or regions affected their decisions to take a doctorate in political science.

Criteria for the structure and size of departments. In undergraduate education the fewer the students per faculty member the better the education. In graduate education, the National Science Board found that "as the quality of the graduate program [measured by ACE ratings] . . . increases, so does the student-faculty ratio." that is, the better the program the more students per faculty member.³⁸ On the other hand,

³⁷ Berelson, p. 109.

³⁸ NSB, *Graduate Education*, pp. 93-4.

Table 1. Percentage of Ph.D. Degrees in Political Science, by Quality of Program,* 1965-69

Type of Institution	No. in Group	% Total (N=101)	Percentage of Ph.D.'s Awarded				
			1964-65	1965-66	1966-67	1967-68	1968-69
4.01-5.0 Distinguished	6	6%	23%	22%	22%	23%	18%
3.01-4.0 Strong	16	16	36	32	34	36	34
2.51-3.0 Good	10	10	11	16	9	10	11
1.91-2.5 Adequate plus	12	12	13	13	14	12	13
1.51-1.9 Marginal	15	15	—	—	15	12	13
1.01-1.5 Submarginal	12	12	—	—	5	5	6
Less than 1.0 Inadequate	3	3	—	—	0.5	2	0.6
Not included in the ACE list	27	29	—	—	0.8	1	3

* Rating according to the 1969 survey of graduate education by the American Council on Education. ACE, *A Rating of Graduate Programs* Washington, D.C.: 1970.

the Oregon study cited above found that the fewer students per faculty member, providing there were enough students, the better the "organizational climate," that is, the more informal and relaxed were faculty-student relationships.³⁹ Such an organizational climate is not related to the ACE quality ratings; it may or may not be found in the less distinguished universities. While the relationship between quality of program and high student-faculty ratios is probably an artifact of the greater attractiveness, hence enrollments, in these programs, there is something else which both the Oregon study and the NSB study support. Students learn from each other and a large number of students is important for this process to take place. In the Oregon study, 69 per cent of the graduate student sample were satisfied with student-student teaching, while only 40 per cent were satisfied with the formal programs.⁴⁰ For what it is worth (given the artifactual nature of the NSB conclusions about the desirability of a high student-faculty ratio), it may be reported that of the sixteen sciences and social sciences in the NSB study, the distinguished political science departments ranked third in "median graduate student-faculty ratio" (5.88), and even the marginal departments had high ratios.⁴¹ It seems to take fewer political scientists to teach graduate students than it does for the faculties of other disciplines.

Next, there is the question of the minimal size of a faculty that is required before a department should enter into graduate training. The National Science Board finds that the advantages of interaction among scholars, their mutual stimulation, the communications of new ideas, the representation of various approaches to a field, have a joint theoretical basis in the rapid rate of increase in combinatorial possibilities for conversational groups up to seven. Empirically, the NSB finds that of the 16 disciplines in their sample the minimum department size for the distinguished departments is, in fact, seven.⁴² But, unless the program is limited

³⁹ J. Orbell and others, "The Structure of Professional Education," p. 11. These authors find the relationship to be a weak one and they also find that the "organizational climate" is better in the larger universities.

⁴⁰ Unpublished data from the Oregon study cited above.

⁴¹ NSB, *Graduate Education*, p. 96.

⁴² After the seventh person the increment in combinatorial possibilities reaches its asymptote and levels off; at that point the addition of one more person doubles the number of combinations, but this doubling rate does not increase further (NSB, *Graduate Education*, pp. 97-8). A critique of this theory might point out that the doubling of a good thing, if it works that way and disutilities do not begin

to a very narrow range of specialties, perhaps mathematical political science, or, at most, a subfield like international relations, seven is too small for political science. With five major commonly used (although intellectually hard to justify) subfields in this discipline, and with the requirement that each subfield be represented by more than one faculty member, ten is minimal faculty size for doctoral programs in political science. In fact, the smallest of the 22 distinguished and strong departments on which we have data is 12.

Without some idea of the actual size of distinguished and strong departments, this is misleading. In the sixteen disciplines in the National Science Board sample, the median size for "distinguished" departments is 28.5; for "strong" departments it is 20.0. In political science, these median sizes are: "distinguished" about 40; "strong" 34.

Graduate instruction should be done by established research scholars; empirically the ranking of graduate programs declines as the proportion of full professors to the rest of the faculty declines.⁴³ This is for some obvious reasons, but among others, it is clear that the eminence of a graduate student's sponsor (or dissertation supervisor) is directly related to the student's later achievements, his placements, his creativity. And this, in turn, is because of the crucial importance of an early start along fruitful research lines. Indeed, the prestige of the student's sponsor is more closely related to his later productivity than the quality of the training institution—although, since closeness of the student-sponsor relationship is not a factor, the causal force here may be the selection by bright students of the most imaginative and productive faculty members. But the point is that on the principle of comparative advantage, the more distinguished research professors should spend more time with graduate students and less with undergraduates.

Admissions. In 1903 William James stated that the Ph.D. requirement for university employment meant the recruitment of "men without marked originality or native force . . . the unfit in the academic struggle for existence." In 1909 President Lowell of Harvard warned, "There is a danger of attracting an industrious mediocrity which will become later the teach-

to appear (such as anomie), is a good rate of return on any investment.

⁴³ In sixteen natural and social science fields the institutions characterized by a high proportion of distinguished departments had a median percentage of faculty positions held by full professors of 42 per cent; in the institutions of lowest quality this was 28 per cent (NSB, *Graduate Education*, p. 91).

ing force in colleges. . ."⁴⁴ These themes, as in so much else having to do with our enterprise, hardly change over the years. The problems are (1) attracting and selecting the best, and (2) developing the talents of students to the fullest extent possible.

For political science, attracting and selecting the best requires (a) attracting more persons with mathematical aptitude (our students already have the highest—or second highest—verbal ability scores in the social sciences),⁴⁵ and more persons with creativity; and (b) devising better measures for predicting achievement both in and beyond graduate school. The verbal and quantitative ability scores on the GRE, like other intelligence tests, are poorly related to life achievement, including scholarship, and related in curious and idiosyncratic ways (by field and institution) to graduate school achievement.⁴⁶ Further, we do not take advantage of measures of creative potential that identify important abilities only partially identified by intelligence type tests. The matter is complex, but since results are field-specific the discipline has an independent stake (separate from that of the graduate deans) in general ability measures as well as the advanced field tests.

Preparation is important: economics majors do as well as political science majors in our graduate work (as judged by advanced placement scores a year or two after admission to graduate school) and a minor in economics is particularly helpful. Within our own discipline specialists in political thought do best.⁴⁷ What these have in common, I think, is their training in the use of abstractions.

As for the distinctive qualities needed for teaching and "practice" (work in government), it has long been agreed that we should admit by criteria of intelligence (thus specified and broadened) and screen for other qualities later.

The best development of the pool of talent that is attracted and selected for the discipline is contingent on the strategic use of our

combined educational resources. There is every reason to admit "from the top down," maintaining full cohorts at the distinguished and strong universities at the cost of empty seats at the newer and weaker programs. This is not only good for the individuals concerned (the place of training marks a man for life—in that sense the academic class system is a caste system),⁴⁸ but it is good for the discipline as a whole, including, in the long run, the newer institutions and colleges that will later employ these new doctorates.

Program content. There is space here for only a few suggestions on doctoral programs: (1) Programs should be more diversified and specialized—we tend to copy each other too much; (2) conceptual analysis is a better preparation for a changing discipline and state of knowledge than is "mastery of its content"—it prepares for the utilization of new knowledge; (3) those who take methods courses do better on content tests⁴⁹—methodology may improve understanding of content; (4) while general social science programs tend to be "thin" and often fail, bilateral interdisciplinary training, as in sociology and law, psychological study of politics, political economy, serve useful purposes—emphasizing depth rather than breadth does not mean staying within disciplinary boundaries; (5) while "professionalization" is discouraged by graduate faculties,⁵⁰ economics and psychology offer single programs that serve both future "practitioners" and academic research scholars—we should develop our analytical applied fields, especially policy analysis; (6) our dissertations are the longest of any discipline (in a sample of 22 in 1958)⁵¹ and they should be shortened, with experience given in writing article length pieces; (7) in general, central intelligence on graduate programs, an exchange of information on them, will pay for itself many times over.

III. Creativity and Productivity

It is the function of a discipline to explain and interpret a certain range of phenomena. The nurturance of a discipline means, above all,

⁴⁸ See the works of Berelson, Folger et al., and Wolfe cited above; also Diana Crane, "Scientists at Major and Minor Universities: A Study of Productivity and Recognition," *American Sociological Review*, 30 (1965), 699–714. Hiring of one's own doctorates is directly related to quality: in the "top twelve" 47 per cent of the faculty were trained by the university that employed them (1958); in the next ten 27 per cent were inbred; the next group 20 per cent. Berelson, p. 115.

⁴⁹ Special report from ETS; see footnote 45.

⁵⁰ Berelson, *Graduate Education*, p. 86.

⁵¹ Berelson, p. 181.

⁴⁴ Quoted in Berelson, *Graduate Education*, pp. 18, 23.

⁴⁵ Special report from the Educational Testing Service on 1970 scores for students taking the advanced test in political science. Also, Philip R. Harvey and Gary L. Marco, *An Analysis of the Graduate Record Examinations Scores by the Undergraduate Major Field of Study, 1963–64* (Princeton, N.J.: ETS, Aug. 1965).

⁴⁶ Gerald Lannholm, *Review of Studies Employing GRE Scores in Predicting Success in Graduate Study, 1952–1967*; and G. V. Lannholm, G. L. Marco, and W. B. Schrader, *Cooperative Studies Predicting Graduate School Success* (both Princeton: ETS, 1968).

⁴⁷ Special report from ETS; see footnote 45.

the improvement of these explanatory capacities.

A. Creativity. What is creative political or social science?⁵² It is formulating an unconventional or novel question, as in Schelling's inquiries into rational strategies for "exploiting potential force," or the turning around of old questions, as the authors of *The Authoritarian Personality* did when they reversed questions on anti-Semitism to ask about the ethnocentric person. It is a novel juxtaposition of things not put together before, as in Herbert Spencer's use of evolutionary theory to "explain" the probable outcomes of political intervention in a system, or as in Deutsch's use of communications theory to explain facets of international relations. It is a perception of a new "figure" or theme against a familiar background, as in Lasswell's discernment of displacement mechanisms in political thinking, or the Supreme Court's finding of a "right to privacy" in the Constitution. It is the discovery of new logical relationships in old materials, as in Arrow's analysis of *Social Choice and Individual Values*, or in Popper's substitution of criteria of falsification for verification of universal propositions. It is in the development of new paradigms for analysis, as in Wiener's development of the ideas of cybernetics, or Almond and associates' restatement of elemental political processes and political crises, or in Daniel Lerner's theory of modernization. It is the invention or novel use of new methodologies, as in L. F.

⁵² Like the study of the use of human resources, information exchange, and education, the study of productivity and creativity has developed a corps of professionals, a body of literature, and a growing corpus of knowledge. Chapter 8 "Determinants of Professional Achievement and Rewards Among Scientists" in the Folger *et al.* book cited above summarizes some of this material. See also: Calvin W. Taylor and Frank Barron, eds., *Scientific Creativity: Its Recognition and Development* (New York: Wiley, 1963); Morris J. Stein and Shirley J. Heinze, *Creativity and the Individual: Summaries of Selected Literature in Psychology and Psychiatry* (New York: Free Press, 1960); John C. Gowan and others, eds., *Creativity: Its Educational Implications* (New York: Wiley, 1967); Howard E. Gruber, ed., *Contemporary Approaches to Creative Thinking* (New York: Atherton, 1962.) Studies emerging from the work of the Institute for Scientific Information employing the Science Citation Index are interesting, especially Jonathan and Stephen Cole, "Measuring the Quality of Sociological Research: Problems in the Use of the Science Citation Index," *American Sociologist*, 6 (1971), 23-29; C. Roger Myers, "Journal Citations in Scientific Eminence in Contemporary Psychology," *American Psychologist*, 25 (1970), 1041-48. I am indebted to Melvin Weinstock of the Institute for Scientific Information for bringing these last two studies to my attention.

Richardson and Quincy Wright's quantitative and mathematical studies of war, or in McPhee's or Simon's, or Pool, Abelson and Popkin's computer simulation of social and political systems. It is in the definition and elaboration of a new field of study, as in Luther Gulick and Leonard White's development of the field of public administration. It is in the discovery of ordered relationships in a novel way, as in S. M. Lipset's study of the conditions of stable democracy, or in Miller and Stokes's empirical study of representation, or in Riker's studies of political coalitions. It is in the successful use of metaphor and analogy as may be seen in Thurman Arnold's *The Folklore of Capitalism* and Veblen's *Theory of the Leisure Class*.

Deutsch, Platt and Senghaas identify "major advances" in the social sciences with creativity: such advances must help people "to see something not perceived before," or "create the possibility of doing something that had not been done before" (and have a "substantial impact that led to further knowledge").⁵³ The ingredients of this creativity are the recombination of elements into new wholes or decomposition of wholes into new elements, discernment of new patterns or orders, the reformulation of questions, the invention or novel application of new methods, and above all, the reconceptualization of a problem or field.

As a process, creativity has been said to involve four stages.⁵⁴ The first is *preparation*, the learning of the materials and content of a field, a stage which can, if improperly handled, destroy the possibility of creativity by encouraging premature closure and too great deference to authoritative scholars and materials. The second stage is *incubation*, the mulling and puzzling over some problem, sorting things out, tentative search procedures. It is at this stage that openness to fantasy, the promptings of the unconscious, the entry of heterodox ideas, come upon the scene. Almost all studies of creativity emphasize the importance of the unconscious free association process, and some specify that deliberate inattention to a problem, allowing the unconscious further scope, precedes the dis-

⁵³ Karl W. Deutsch, John Platt, and Dieter Senghaas, "Conditions Favoring Major Advances in Social Science," *Science*, 171 (1971), 450-59. See also critical letters and rejoinder, *Science*, (1971), 1191-92.

⁵⁴ Graham Wallas, *The Art of Thought* (London: Cape, 1926). For a brief review of the literature and further discussion of creativity as process, see Ralph J. Hallman, "The Necessary and Sufficient Conditions of Creativity," in J. C. Gowan and others, eds., cited above.

covery.⁵⁵ Simon argues that unconscious processes are identical to conscious processes, but he is virtually alone in this belief.⁵⁶ The third stage is *illumination*, when the germ of the new idea or solution enters consciousness, but, as is often pointed out, the stimulus to the new idea will only be recognized for what it is by a mind prepared for receiving it; Deutsch's familiarity with early cybernetics theories and his knowledge of previous studies of nationalism prepared him for the communications theory of national and international integration.

The fourth and more familiar stage is *verification*. Except, perhaps, for the use of novel methods or the invention of indicators and tests, verification is a standard procedure relatively well understood in the behavioral sciences. What is risky here is that the importance of verification be so stressed in graduate school that there is developed in the student an unconscious censorship of novel ideas. Almost all creativity studies mention the need for deferred judgment, for postponing the critical faculties until the new ideas have a chance to emerge. In short, rigor can stifle imagination (but imagination can also discourage rigor).

As a process, creativity can be encouraged and taught by conscious attention to its elements.⁵⁷ Students can be encouraged and shown how to avoid too narrow a definition of a problem at the outset, and also how to isolate elements of the problem from the background complexities. They can learn to identify and analyze the properties of these elements (e.g., the functional equivalents of Western "due process" in non-Western societies, the need-satisfying elements in social thinking, etc.). They can be encouraged to develop forced relationships and paradoxical statements for the stimulation of their imaginations; they can be taught to defer judgment and especially to postpone closure on any one solution before canvassing alternatives. The very notion of "idea production" is foreign to most of us, but there is evidence that encouraging the quantity develops

better quality, and that later ideas in an idea sequence are better and more original than earlier ones. Indeed, the encouragement to state research as problem solution, rather than as topics for investigation, often helps creativity, hence some attention to anomaly and problemicity will prove useful.

As a discipline we can encourage this rare quality of creativity in several ways. (1) I mentioned the "creation" of the field of public administration; attention might be paid, therefore, to the ways in which new fields are created by *branching*, as political socialization branched off of the field of attitude formation which had previously branched off of the broader field of political parties and public opinion. Branching develops new knowledge partly by intense concentration on a smaller area, but also through the process illustrated by the envelope curve: as the explanatory power of a new set of ideas levels off, those ideas then serve as a platform or culture for another new set of ideas with a thrust of their own.⁵⁸

(2) We can encourage synoptic thinking as a substitute for aggregative thinking, that is, the integration of separate fields of knowledge through the use of new and more abstract concepts, such as "system maintenance" or "interest aggregation."

(3) The conceptual tools for analysis are underemployed in political science. The current apparatus includes game theory, cybernetics, exchange theory, collective choice models, and various kinds of simulation. On the threshold of acceptance are ecological models, mutation models (as in the analysis of language), diffusion models (including epidemiology), and energy-entropy models. These items of intellectual machinery and metaphors have enormous capacities to stimulate the imagination as well as to give precision to analysis.

(4) The integration of concepts themselves awaits exploration: one thinks of the marriage of structural-functional (teleological) models with causal modelling; of developmental and economic theory (Freud used both to good effect, even speaking of "the economy of the mind"), or of the employment of cost-benefit analysis in normative theory, a natural integration since they both deal with the same thing: values given up for values gained.

(5) Creativity is not limited to pure science; it is equally needed and possible in the policy sciences, first in identifying problems and then

⁵⁵ See Sigmund Freud, *On Creativity and the Unconscious, Papers on the Psychology of Art, Literature, Love, Religion*, edited by Benjamin Nelson (New York: Harper, 1958); also reports by creative scientists and mathematicians in Brewster Ghiselin, ed., *The Creative Process* (New York: Mentor, 1955).

⁵⁶ Herbert Simon, "Understanding Creativity," in Gowan and others, *Creativity: Its Educational Implications*, pp. 43-52.

⁵⁷ See Sidney J. Parnes, "Education and Creativity," in Gowan, pp. 32-43, and especially the seminal piece by J. W. Getzels and P. W. Jackson, "The Highly Intelligent and the Highly Creative Adolescent," in C. W. Taylor and F. Barron, eds., *Scientific Creativity*, pp. 161-72.

⁵⁸ See Daniel Bell, "The Measurement of Knowledge and Technology," in Wilbert Moore and Eleanor B. Sheldon, eds., *Indicators of Social Change* (see footnote 4).

in inventing solutions. For example: how shall we develop the moral equivalent of community in a contract society? Or, if freedom of movement concentrates social problems: what selective disincentives to migration should be combined with more direct attacks on the problems at their sites?

Creativity is sometimes studied in terms of the *capacities of individuals*, or as the product of certain personality characteristics. To the extent that these capacities are fixed at the time of student selection, the problem for the discipline is one of selecting the most creative students. One thing is clear: creativity is related to but not the same as the intelligence measured by intelligence tests. Measured separately (through word association tests, imagining various new uses for things, discernment of hidden shapes, making up fables, inventing problems), creativity predicts scholastic achievement as well as intelligence tests do.⁵⁹ Moreover it is a relatively general faculty (not subject- or situation-bound). It is associated with social heterodoxy and a sense of humor, and involves a relatively high risk intellectual strategy. In some studies it is seen to be positively associated with dominance, with self-esteem and self-confidence, with the kind of personal security that permits regression and fantasy because an assured return to reality is present,⁶⁰ and with the exceptional courage needed to challenge conventional thought as well as some guilt over this challenge process.⁶¹ The important point here is that if it may be reliably measured, such measures should be employed in our graduate student selection. There are obstacles to the selection of creative minds: some studies show that teachers prefer the highly intelligent (high I.Q.) to the highly creative.⁶² Thus letters of evaluation may be misleading. But at least we should look for it.

In puzzling over the flowering of creativity in the natural sciences compared to what he thought to be a lower rate of creativity in the social sciences, Wiebe concludes that one important cause for this is the greater discouragement of heterodoxy in the social sciences. To counteract this, he suggests:

If the social scientists are to increase creativity in their field, they should select their young people with an eye to intellectual audacity, personal

courage, and the kind of psychological autonomy that can weather the pressures toward conformity that characterize the fields in which social scientists work. Such people having been selected, their professional training should blend academic rigor with the promotion of dissent, skepticism, unorthodoxy, and audacious innovation.⁶³

As indicated in these words of Wiebe's, the environment in which creativity flourishes is both important and subject to some degree of control. Following one line of thought, Maslow's, we might say that the identification of creativity with the process of self-actualization (developing one's potentials), taken together with the belief that self-actualization takes place only after other basic needs, such as safety and "belongingness," are reasonably satisfied, means that some attention to these basic needs is called for.⁶⁴ Thus the provision of tenure for faculty and of guaranteed fellowships for a period of time for students helps satisfy the need for safety, while the development of a better organizational climate (warm faculty-student relationships and non-competitiveness) helps satisfy the "belongingness and love needs," both serving to promote creativity.

The earlier argument for encouraging some professionalism (as contrasted to academic emphases) in our graduate programs may, through a tendency to define problems more narrowly, discourage creativity. But given what we said above about the importance of creativity in identifying social problems and inventing solutions, the contradiction might be resolved by seeking, within the confines of professional training, to encourage creative policy solutions. High level business executives come out well on creativity tests.

The kinds of creativity identified by Deutsch, Platt, and Senghaas flourish in metropolitan areas, large universities, and well-financed research centers. More generally we might say that cosmopolitanism and the tolerance of heterodoxy, the achievement of a critical mass of innovative scholars and hence an appropriate on-campus atmosphere of stimulation, and the provision of time and resources are favorable environmental conditions.

Finally, the very lack of coherence in the discipline that we all deplore may imply less pressure towards orthodoxy; the state of knowledge in the discipline is ripe for creative development—perhaps more than in economics or the law.

⁵⁹ J. W. Getzels and P. W. Jackson.

⁶⁰ Frank Barron, "Originality in Relation to Personality and Intellect," *Journal of Personality*, 23 (1957), 730-41.

⁶¹ Gerhart D. Wiebe, "An Exploration into the Nature of Creativity," *Public Opinion Quarterly*, 26 (1962), 391-97.

⁶² Getzels and Jackson.

⁶³ G. Wiebe, "An Exploration . . .," p. 397.

⁶⁴ A. H. Maslow, *Motivation and Personality* (New York: Harper, 1954), pp. 80-98.

B. Productivity. Measured by books and articles published, regardless of quality, political scientists are as productive as members of other disciplines and they seem to be more productive than they used to be. In a recent study of the productivity of biologists, psychologists, and political scientists, where the measure of productivity was weighted in favor of continuity of research (thus implying "impact") all three disciplines were equally productive.⁶⁵ Two earlier studies of productivity in mathematics and political science (1958) found 46 per cent of the mathematicians but only 25 per cent of the political scientists totally non-productive.⁶⁶ In 1960, Berelson found that 33 per cent of the psychologists and 66 per cent of the historians ten years from the degree had published nothing; the comparable figure for political scientists (not quite comparable since the data are for 1968 and the method is a little different) is about 13 per cent. Average publications for this group of ten year doctorates (books and articles) is a little lower for political scientists (3.5) than for psychologists (5.4) but higher than for historians (0.5).⁶⁷

Are political scientists becoming more productive? V. O. Key found in 1958 that 25 per cent of the doctorates awarded twenty years earlier had been totally nonproductive; I find that 17 per cent of the reporting political scientists in the *Biographical Directory* are nonproductive. The findings are noncomparable in many ways, but there is reason to believe that the indicated direction is correct; individually we are more productive of research than we

⁶⁵Diana Crane, "Scientists at Major and Minor Universities."

⁶⁶The data on mathematicians are cited in Logan Wilson, *The Academic Man*, p. 107; the data on political scientists are from V. O. Key, "The State of the Discipline," *American Political Science Review*, 52 (1958), 969. V. O. Key goes on to say "The meaning of the data . . . is that we allocate the most inadequate resources to the labor of inquiry essential to the development of the discipline. . . . From my examination of my sample, I would judge, by what seem to me to be latitudinarian standards, that not over 10 per cent had made . . . [significant] contributions." Perhaps this comparison was hard on mathematicians but Folger *et al.* find that their mean citation count is lower than that in other sciences, but higher than psychology (p. 261).

⁶⁷Berelson, *Graduate Education*, pp. 54-55. The figure for political scientists is derived by selecting a random sample of 150 from those with biographical entries (not all political scientists, but most of the doctorates, I think) in the 1968 APSA *Biographical Directory* and counting listed publications. These figures are more reliable for locating nonpublishers than for "average number of publications" due to the shortening of bibliographical entries for older scholars with many entries. The ten-year limit, however, makes this shortening less likely.

used to be. This, taken together with the increase in doctorates produced each year (about 10 per cent increase per year for the past ten years) has created the information explosion that concerns us all and lies behind the increased *Review* backlog and the increase in the number of journals—at the rate of about five new journals per year. If all political science doctorates produced articles at the rate of those in the *Biographical Directory*, the group of doctorates from one to eight years from their degree would alone have produced about 1,000 articles in 1970-71, enough to fill twenty years of the *Review*. Similarly, they would have produced about 588 books in that one year, almost twice the number that could be reviewed in the *Review*.⁶⁸ Fortunately (I guess) these figures overestimate research productivity because (1) there is an attrition in the profession (about 20 per cent in the first five years), and (2) doctorates from the new programs are probably less productive. Nevertheless, something must be done about our abstracting and book reviewing capabilities.

C. Conditions of Productivity. The factors related to productivity are much better understood than those related to creativity; we will discuss them together.

1. *High intelligence.* Creative productivity studies using such sensitive measures as the citation index, reveal that after the minimal intelligence level is reached (one estimate of minimal I.Q. is 122, another is 130) additional intelligence is not related to research productivity—indeed the independent influence disappears when other factors are controlled.⁶⁹ Since political science gets its full share of the able and the very able—more than most social sciences—whatever defects our research productivity may have, they do not come, comparatively speaking, because we are stupid.

2. *Motivation.* Speaking of a group of distinguished natural and social scientists, Anne Roe says, "Perhaps the most influential of these other (than intelligence) aspects is motivation—the degree to which the individual's work is important to him. All of these men are, and always have been, so immersed in their work that

⁶⁸Average articles published per person for the first eight years after the doctorate (when articles are still reported in the *Directory*) is .36. In the eight years 1963-70 we produced 3277 doctorates. Multiplying, the result is 1180 articles, reduced to 1,000 because of the lower productivity rate (.28) of those from one to three years from the degree.

⁶⁹Folger, Astin, and Bayer, *Human Resources and Higher Education*, pp. 259-60.

other considerations play much smaller roles."⁷⁰ Another study of a large group of scientists found that research motivation, as measured by the time a scientist took to get his degree, had an independent effect on later productivity.⁷¹ Students planning to go into political science at the graduate level are as interested in research as others, but unfortunately, fewer of the very best are so oriented.⁷² Further, asked about their primary work activity, the mature political scientists in the scientific manpower register were less inclined to say "research" than was the case in other disciplines.⁷³ Putting these various studies together, I find the pattern of high research productivity and low motivation puzzling and disturbing. It does not suggest much creativity and raises questions about the quality of the research produced under these circumstances.

3. *Research and quality of training.* All studies of research productivity, creativity, and reputation stress the importance of the quality of the training institution, where quality is measured either by the American Council on Education ratings or some similar earlier studies. There is an interaction, of course, between the quality of the training institution and the quality of the current work setting, but the relationship to productivity is stronger in the case of quality of training. In Diana Crane's careful study, which included the field of political science, the proportions of highly productive scientists under the four conditions possible with these two variables were:⁷⁴

Educated in a major university and working in a major university	48%
Educated in a major university and working in a minor university	41%
Educated in a minor university and working in a major university (a small group)	36%
Educated in a minor university and working in a minor university	12%

⁷⁰ Anne Roe, "Changes in Scientific Activity with Age," *Science*, 150 (1965), 313.

⁷¹ Folger *et al.*, p. 260; Bernard M. Meltzer, "The Productivity of Social Scientists," *American Journal of Sociology*, 55 (1949-50), p. 28.

⁷² Davis, *Great Aspirations*, p. 230. Of those in the top fifth of their classes the proportions in each discipline indicating research interests are: psychology 84%, anthropology and related fields 69%, sociology 56%, economics 55%, and political science 49%.

⁷³ The percentages of the members of the various disciplines in the 1968 *National Register* who report "research" as their primary work activity are: psychology 26%, sociology 22%, anthropology 21%, economics 21%, and political science 12%. In 1970 this political science percentage dropped to 10.5%.

⁷⁴ Diana Crane, "Scientists in Major and Minor Universities," p. 704.

An early study of the productivity of sociologists reveals the same pattern; the later major study by the Commission on Human Resources, working with a very large sample, confirms it.⁷⁵

Under these circumstances, how should one appraise the influence of the new graduate programs on research training and capacity? I have argued above that there are advantages for college teaching to be derived from the new doctorate programs if (1) they are additive to (and not substitutive for) the stronger and older programs, and (2) substitutive for the master's degree programs. But as training institutions and work settings for research, the contribution of these programs is different, since there is no substitution effect for the master's programs and there is reason to believe they are only marginally additive to the stronger programs in generating high quality research. I think the summary answer is that these new programs should be regarded as primarily teacher training; their doctorates and faculty may, of course, contribute to quality research, but historical experience does not offer much hope of rapid fulfillment of this aspiration.

4. *Research and quality of work setting.* The proportion of political scientists working in distinguished or strong departments has been predicted to decline from 34 per cent in 1961 to 29 per cent this year, to 28 per cent in 1976.⁷⁶ Yet interaction of these two principle conditions of creative research productivity may have an interesting effect. If Crane is right, then the products of the better universities going to the lesser places will, after a little time—because this syndrome produces delay more than despair—increase the productivity and research orientation of the faculties of the less distinguished universities.⁷⁷

⁷⁵ Folger *et al.*, pp. 262-65; B. Meltzer, "The Productivity of Social Scientists," p. 28.

⁷⁶ Heinz Eulau and James G. March, eds., *Political Science* (Englewood Cliffs: Prentice-Hall, 1969.) The increased number of programs rated "distinguished" and "strong" should not affect these predictions since the proportions of programs with these ratings has remained constant.

⁷⁷ D. Crane, "Scientists at Major and Minor Universities," p. 704. I have limited this discussion to universities, but something should be said about colleges as work settings. In Folger *et al.*, *Human Resources and Higher Education*, the ratio of distinguished work in the natural sciences (measured by citation counts) done in universities compared to colleges was 5.85 to 1.0; but in psychology, a hybrid natural-social science, it was only 3.25 to 1.0 (calculated from data on p. 261). In political science, because of its humanistic components, the ratio might be smaller. The matter needs further investigation, but certainly one thinks easily of distinguished political scientists at Swarthmore, Williams, Oberlin, Amherst, and so forth.

5. *Time and resources.* Both the single creative scholar, working with library resources and his own rich store of ideas, and the empirically oriented, data-using work team need as a prime condition of creative productivity the factor of *time*. In speaking of the environmental conditions of creativity, Taylor and Barron say that only one thing is known for certain: "the obvious need for ample time in which to work freely on problems of one's own choice."⁷⁸ Time can be "made" and it can be "bought"; if "made" it is squeezed by an act of will out of other duties, and the conflicts, harassments, and guilts that ensue are familiar to all of us. For these reasons bought time is better. The sources of funds to buy time, are, of course, the individual universities and colleges, the private foundations, and the national government, especially, in our case, the National Science Foundation. Consider, then, the cumulative implications of the following:

Almost half of the political science departments in graduate schools have normal teaching loads for junior faculty of more than 10 hours a week; about 70 per cent of the graduate schools have virtually no way in which they can reduce these loads to help a man get over a hump in his research schedule.

Seventy per cent of the political science departments in four year colleges have teaching loads of ten or more hours a week; 84 per cent of them have no way of reducing these loads for research purposes.⁷⁹

Apparently, then, aside from sabbaticals, which are by no means universal, there is little help from the universities and colleges.

As reported above, fewer political scientists (29 per cent) get help from government than any other natural or social science, except linguistics.⁸⁰

Postdoctoral fellowships and traineeships are specifically and consistently correlated with high research productivity. Thus it is disturbing to find that while about 15 per cent of all new doctorates in all fields taken together receive some kind of postdoctoral study grants or fellowships, only 5 per cent of the political scientists do (although this is more than the econo-

mists or historians receive).⁸¹

In political science, bought time is hard to come by.

D. Disciplinary Policy and Research. If we think of research findings and publications as a disciplinary "joint-product," measures to improve the educational, communications, and manpower infrastructure may find more support.

(1) Given what we know about the importance of training in a major university as a condition of future productivity, as stated above the disciplinary policy should be to devise ways of filling training capacity from the top down, with no reduction in admissions by these quality universities, continued and improved free-choice fellowships by the Federal government (now threatening to close down),⁸² and informed advice by all counsellors of college students, taking into account the above information.⁸³

(2) Providing that there are enough first rate universities to ensure heterogeneity (and there are), the policy of collective inbreeding—but not necessarily inbreeding by each university—should be encouraged. This traditional hiring policy has been somewhat eroded with the growth of the number of quality institutions, but it is still strong: from 1958 to 1965 the proportion of the faculty at the "top twelve" with degrees from any of the top twelve seems to have declined.⁸⁴

(3) The 22 universities in the ACE ranks of "good" and "adequate plus" should avoid collective inbreeding; rather they should recruit from the now plentiful supply of doctorates from the stronger universities. Again this is a traditional policy; in 1958 about 57 per cent of their faculties came from these sources.⁸⁵ In this way the current rate of improvement from "good" to "strong" of .6 universities upgraded per year may continue.

⁸¹ National Research Council, *Summary Report 1970*, Table 2.

⁸² See M. Crawford Young and Robert M. Bock, "Hard Times for the Graduate Schools," *Change Magazine*, 3 (1971), pp. 20-22.

⁸³ For accounts of the nonprofessional and uninform criteria employed by candidates for graduate school, see T. Caplow and R. J. McGee, *The Academic Marketplace*, p. 225; B. Berelson, *Graduate Education*, p. 143.

⁸⁴ Berelson, p. 115; D. Crane, "The Academic Marketplace Revisited: A Study of Faculty Mobility Using the Cartter Ratings," *American Journal of Sociology*, 75 (1970), 953-64. If the rate of erosion were to continue at one per cent per year, the 1971 figure would be 72 per cent.

⁸⁵ Berelson, p. 115.

⁷⁸ C. W. Taylor and F. Barron, *Scientific Creativity*, p. 373.

⁷⁹ Calculated from data in *The Political Science Job Market: Arizona Survey of Hiring Practices and Employment Conditions* (Tucson: Institute of Government Research, University of Arizona, 1970), pp. 57, 59. The survey on which the data are based received useable answers from 163 graduate schools and 461 four year colleges.

⁸⁰ 1968 *American Science Manpower*, p. 42.

(4) The evidence that the doctorates of minor universities working in major universities have research records almost as good as any, implies that a constant open search for talent at all levels by the top universities is in their interest as well as in the public interest.

(5) A recent study of the invisible colleges shows that their members (working jointly and severally on a common set of problems) need both the stimulation of ideas from outside their special fields and the assured cumulation of research findings in an identifiable place.⁸⁶ In political science there is too much scatteration of articles in too many general journals. Perhaps this is one reason why political scientists are less concerned with continuity, and therefore the cumulative impact of their work, than psychologists or biologists.⁸⁷ It may also help explain the high rate of information loss.

(6) Information search instruments should be strengthened. *The International Political Science Abstracts* contains only about 2,000 abstracts per year; the *Sociological Abstracts* contains about 6,000 and the *Psychological Abstracts* about 20,000. Furthermore, journals need more frequent cumulative indexes.

(7) Among the 7,000 political science Ph.D.'s produced in the last 35 years there are more people with research skills than with good research ideas. The study of the invisible colleges mentioned above suggests that these groups are held together more by their members' relations to a few creative scholars than by lateral reciprocal connections. If, as I would argue, the posing of questions and the agenda for research needs more attention than its execution, those who have a special talent for identifying new research areas and fruitful ways of entering them should have their influence magnified in some fashion. It is a central problem for knowledge nurturance.

The terrain covered in this address has been extensive and rocky; there are no prophets on any mountain tops here. Rather, I think, we shall all have to grub amongst the data a little more.

Appendix on Master's Programs*

The most neglected aspect of graduate education is the training of candidates for the master's degrees, a neglect that is especially critical

⁸⁶ Diana Crane, "Social Structure in a Group of Scientists: A Test of the 'Invisible College' Hypothesis," *American Sociological Review*, 34 (1969), 335-52.

⁸⁷ D. Crane, "Scientists at Major and Minor Universities," p. 707.

* The data for this Appendix are derived from the same sources as those cited for the doctorates; see especially footnote 7.

because of the size, proliferation, and diversity of the programs. The resources devoted to master's programs are larger than those devoted to doctorates; more faculty members are involved in teaching terminal master's candidates; up until very recently more college students were taught by instructors with master's degrees than by those with doctorates; many high school students are affected by the content and quality of master's programs from which their teachers received their degrees; more master's degrees recipients than Ph.D.'s work for federal, state, and local government; a master's degree in political science qualifies a person for the National Register of Scientific manpower and 38 per cent of political scientists in the Register (1970) have the master's as their highest degree.

Programs. In political science, there are about 100 master's programs in institutions that offer the doctorate and another 100 programs in institutions that do not. The first group is likely to be in much closer touch with the main currents of the discipline and, generally speaking, is of much higher quality. (The master's degree in international relations is likely to be given by a department offering a political science doctorate, hence tends to be of higher quality; generally it represents an interdisciplinary specialization.)

The recently established master's programs in political science tend to be a first (and sometimes final, and sometimes reversible) step into graduate education by departments in undergraduate colleges. During the three year period 1967-69 at least 30 new programs of this kind were established, or about 10 a year. Many of these programs had small enrollments (eight of them had only one student enrolled each), and the completion rate is low (89 enrollees and 11 degrees conferred). Unless a special case can be established (the advantages of a regionalized or of a specialized program), new master's programs in nondoctorate departments should be discouraged.

Students. There are more students in political science master's programs than in similar programs for any other social science except psychology (a much larger discipline); more of them are part time and apparently more of them drop out. On the other hand, those students who enter these programs immediately or soon after leaving high school are more able than those entering master's programs of any other social science. Again we get more than our share of the best, but compared to those going into doctoral programs, master's candidates (that is, those students planning on a ter-

minimal master's degree) are markedly poorer (on GRE scores).

Careers. Since more than 90 per cent of the master's degree recipients do not join the APSA, and only a small fraction are recorded in the National Register (about 2,500—less than 10 per cent of the total) we know little about their careers. Of those in the Register, about two-thirds are in educational institutions, but a higher proportion of master's degree recipients than of doctorates work for government. Some years ago, a study showed that about half of the candidates for the master's degree planned to work for the Federal government, while only a quarter planned on college teaching; they may have escaped the Register questionnaire, or their intentions may have changed.

Policy. Eleven years ago Berelson (p. 228) said:

The Master's degree has lost status in the arts and sciences; has become largely a professional degree, especially in education; is no longer under the control of the top institutions; and cannot be recovered as the acceptable degree for college teachers.

Since that time there have been 21,289 master's degrees awarded in international relations and political science, many of whose recipients are teaching in four and two year colleges. Part of the reason for this has been the shortage of doctorates, but that shortage has now changed. Further, enrollment in master's programs has

levelled off, while doctorates have continued to increase, with the result that the proportion of doctorates to masters has been increasing slowly but consistently: in 1966 it was about 1 to 6 while four years later it was 1 to 4.5. We are now in a position to try to enforce Berelson's dictum that the master's degree is not "the acceptable degree for college teachers."

What, then, are master's programs good for? First, they serve to upgrade high school instruction and insofar as they are teaching degrees they should be so designed. Second, they permit special interdisciplinary teaching programs for international relations, public administration, urban studies, and so forth. These degrees are then certificates of specialized study, partly for practice, and partly for teaching in specialized programs, perhaps on the way to or in addition to a doctorate in a basic discipline. Third, they are excellent vehicles for teaching practitioners (professionals), upgrading skills, and, incidentally, are the basis for salary increases. Fourth, as reported above, without some special strength (as in the case of Swarthmore, for example), and special local reasons (as in the case of an urban college teaching urban politics), departments not offering the doctorate should not offer the master's degree in political science. Finally, in order to keep recipients of master's degrees in touch with the discipline, it might be useful to establish a special class of Association membership at reduced rates whose members would receive a book review journal and *PS*.