THE PREPARATION OF THE CANADIAN GRADUATE STUDENT FOR COLLEGE TEACHING

by

DAVID JELLIFFE

B.A., University of British Columbia, 1968

A THESIS SUBMITTED IN PARTIAL FUFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS (EDUCATION)
in the
EDUCATIONAL FOUNDATIONS CENTER

SIMON FRASER UNIVERSITY

April, 1971

EXAMINING COMMITTEE APPROVAL

Name: David Jelliffe

Degree: Master of Arts (Education)

Title of Thesis: The preparation of Canadian graduate students for college teaching.

Examining Committee:

Chairman: T. Mallinson, Ph.D.

Senior Supervisor: R. J. C. Harper, Ph.D.

F. J. F. Fisher, Ph.D.

B. McDermott, Ph.D.

Date Approved: April 7/71

ACKNOWLEDGEMENTS

The author wishes to thank Dr. Robert Coles (Psychology) Simon Fraser University for his generous assistance and useful critism of my early attempts in constructing the questionnaire. Acknowledgement is also due to Dean Douglas T. Kenny (Arts) University of British Columbia for providing me with mature insights into the policies and politics of university departments. Without the astute guidance of these two men, it is unlikely that this study would have engendered as large a response as it did.

Thanks are due as well to the many professors and department heads at Simon Fraser University and the University of British Columbia who carefully examined and ammended the early drafts of the questionnaire.

I would like to thank Professor Fred Brown (Educational Foundations Centre) Simon Fraser University for his clear analysis of the potential learning experiences open to graduate students employed as T.A.s. His philosophical precision and practical suggestions have guided me through several conceptual dilemmas. Thanks are due

as well to John L. Jamieson (graduate student, Psychology) University of British Columbia for the many hours he spent with me in statistical analysis.

I would also like to thank Pierre Maynard of the Higher Education Section of the Education Division of the Dominion Bureau of Statistics, Ottawa for his prompt and consise replies to my inquires which must have seemed ambiguous and redundant.

Finally, I would like to thank my supervisory committee for their sustained interest and enthusiasm in this study. Particular acknowledgement is due Dr. Robert J.C. Harper who patiently and wisely guided me step by step through the final draft of this thesis.

What merit this study may have is largely due to the advice and assistance of these men; the presence of errors and flaws I must alone bear responsibility.

The Tables and Figures were drawn by my wife Rose who spent many thankless hours at her drafting board. My debt to her in this and in other matters is inestimable.

ABSTRACT

Undergraduate teaching in colleges and universities in North America has been periodically reviewed with concern over the past 40 years. The claim that teachers for these institutions are hired on the basis of their research credentials has been substantiated by a number of well documented studies. Wilson (1942), Riesman (1958), Caplow and Reece (1958), McGrath (1959), Berelson (1960), Marshall (1964), and Lee (1967) have all attested to the preference of hiring the Ph.D. holder for university teaching positions. Once appointed, the publishing scholar tends to be recognized more readily than the professor whose fundamental interest lies in teaching.

But the belief that scholarly and creative men in research are more often than not enlightened and stimulating teachers of undergraduates has not been thoroughly documented. Critics of this view claim there has been less provision made for the training of these men to teach than there has been for the training of them to do research. Thus the programs offered in graduate

schools, particularly in the U.S., from which the majority of college teachers are drawn, have recently come under close scrutiny. The focus of this scrutiny bears upon the charge that the graduate program does not prepare its students as teachers of undergraduates and in consequence the undergraduates needlessly suffer ineffective or indifferent teaching. Can these charges be made as well against the Canadian graduate school?

This thesis examines the various methods that Canadian graduate school programmes employ to provide their students opportunities, insights, or instruction in the arts of college-level instruction. An examination of hiring practices by college departments was also undertaken in order to bring into perspective the relationship of training new college teachers and their subsequent employment in undergraduate programmes at Canadian colleges and universities.

As the majority of Canadian undergraduates spend some time in courses of the Arts and Sciences, four disciplines in the Arts (English, History, Philosophy, and Psychology) and four disciplines in the pure Sciences (Biology, Chemistry, Mathematics, and Physics) were chosen for examination from 18 Canadian universities that offered graduate programmes in all eight of these disciplines. A 12-unit questionnaire was sent to the heads

of the eight departments at each of the 18 universities (N = 144) requesting information on 1) the number of full-time faculty hired during the last five years (1964-1969), the proportion hired directly from graduate school (own or others), and the number assigned teaching duties in the undergraduate programme; 2) an estimate on the number of graduates of that department that subsequently received teaching appointments at any university or college during the same time span; 3) the nature of the employment of the graduate student as a teaching assistant (T.A.), his duties, and the type of evaluation of his work by the department; 4) the department's attitude toward college teacher-preparation programmes for the graduate school.

The response after a second mailing of the questionnaire was 80% (116/144) of which two questionnaires were unusable. The response ratios were Biology 16/18, Chemistry 16/18, English 12/18, History 14/18, Mathematics 14/18, Philosophy 14/18, Physics 16/18, and Psychology 14/18 and were tested for normality of distribution.

To correlate the hiring data from this survey, a table of all the faculty positions listed for the 144 departments was compiled from the 1964 and 1969 editions of The Commonwealth Universities Yearbook. As there was no criterion against which the eight disciplines could

be evaluated between themselves other than size, the findings from this survey were derived from rank-order correlations.

During the past five years, it was reported that 1,747 full-time staff were hired by the respondents of this survey; of this number, over 90% were assigned to teaching duties at the undergraduate level. It was found that 45% (792/1,747) of all those hired came directly from graduate schools (novice teachers) and over 95% of these were assigned to teach in the undergraduate programmes. It is of interest to note that one sample selected across the eight disciplines revealed that approximately 60% of all successful Ph.D. and M.A. graduates went directly into college and university teaching positions. This finding suggests that the actual reported hiring of graduate students as full-time teachers (45% of all hired) may not be a current estimate of the actual number of graduates now working as full-time college teachers.

This survey also showed that expanding departments tend to hire a higher proportion of novice teachers (hired directly from graduate schools) than from other sources. Curiously, Mathematics Departments hired the greatest number of novice teachers but the fewest from its own graduate school, while Physics Departments that increased the least in staff appointments during the

previous five years showed a strong tendency to hire their novice teachers from their own graduate schools. For the remaining six Departments there was a high positive correlation (rho = .943, α = .01) between the growth of the Department and the trend to hire its own graduate students for teaching positions over novice teachers from other graduate schools.

All of the departments reported using the graduate students as T.A.s but no single discipline showed clearly that it provided "feedback" to the T.A. on his work while he was engaged in it. With the exception of four single university departments, there was reported no specific program of teaching-methodology offered in any graduate programme. However, a number of departments felt it might be worthwhile to include some such "methods" course in the future without subscribing to the view that such a course should originate from the Faculty of Education.

Based upon the findings from this survey the following recommendations are put forward: 1) a reassessment of the sequence of duties generally assigned to the T.A. that would provide him with the opportunity of developing a learning matrix on college teaching; 2) the development of a "generalist" seminar for all graduate students, but specific to each department, that would realign the

the basic discipline into perspective with the other disciplines as these relate to the education of the undergraduate; 3) the initiation of interdepartmental papers on the problems of teaching and the encouragement of university-wide colloquia on this subject.

While it is clear from a review of the literature that the reported concern over poor undergraduate teaching is not as great in Canada as it seems to be in the United States, much can still be done to improve both the quality of instruction and the ability of the instructor.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Chapter I

INTRODUCTION

> "It has become almost conventional to express astonishment and incredulity at the state of affairs which allows college teaching to remain the one profession which one may enter without any direct instruction in the performance of one's duties."
> (Prior; 1965, p. 39)

The subject of this thesis concerns the preparation of our future college and university professors for one of their primary functions -- student instruction. The significance of this question becomes evident when one examines the changing state of affairs of the North American society towards the university. It is clear that the academic community today, particularly in the U.S., is being subjected to a process of critical re-evaluation that has crystalized into challenges to the future execution of the university's traditional functions (eg. the generation, conservation, and transmission of knowledge).

Meeting these challenges as they arise was the subject of the Twenty Third National Conference on Higher

Education held in 1968. A selection of the conference papers, edited by G. Kerry Smith, has been published recently under the title Stress and Campus Response and bear witness to the urgency for self-appraisal within the North American academic community.

Central to the task of reappraisal is the role of the professor as teacher. For it is through his presence, his guidance, his classroom attitude that the student first comes to terms with the college or university experience. To state that poor teaching has encouraged a changing social situation to degenerate into confrontations and campus violence is to oversimplify the dynamics involved. But to argue that the college and university communities must alter their attitudes but keep their practices (eg. rewarding scholarship over teaching, or training graduates in the sole art of scholarship and research at the expense of learning how to teach) presupposes that these practices are not inherently bound up in the clamour for academic change. It is resonable to assume that the practices that supported and furthered the aims of higher education during the first half of this century may no longer be relevant in a society that views such practices as antithetical to its current needs. Martin (1968) proposes that a strategy for reform in higher education is called for at this time.

The most visible function of the college or university is that of teaching. Research is undertaken and duly reported in the journals but the interaction between the professors and the students tends neither to be noticed nor reported. To the large majority of students, the college experience is clearly bound up in the teaching-learning interaction and subsequent critical comment of that college experience is inevitably focused upon that interaction.

For the community that both supports the college financially and endures the students socially, the significance of the college lies in its ability to do something for the young men and women fortunate enough to attend. This ability devolves specifically upon individual teachers whether they are so named or not. The public expects them to be as professional about their jobs as it expects similar competence of the local doctors, lawyers, or plumbers. A recent editorial by Harold Greer (Vancouver Sun, June 16, 1970) suggests otherwise:

> "What the students and tax-payers have got, however, are thousands of academics who can't teach and don't want to, who are more interested in building graduate-course empires than working with undergraduates, and who would rather do research and take sabbaticals than figure out how to make English 10 or History 100 more interesting to the great unwashed (p. 4)".

It is not surprising, therefore, that public scrutiny of the college and university has initiated reappraisal

of their functions. To date, the reappraisals have taken the form of changing government funding policies towards the colleges and universities and spasmodic campus confrontations between students and faculty or administrators on matters dealing with educational relevance of the syllabus, admission policies, and student representation in university affairs.

One of the functions of the graduate schools in the United States has recently been reappraised by the prime funding agency of the U.S. government, The National Science Board. The focus of this reappraisal has been upon the redistribution of federal monies that go to support both scientific research and graduate education in the universities of the U.S. In 1966, for example, $ 1.67 billion was distributed as institutional grants; of this ammount, $ 1.2 billion (72%) went directly into scientific research. The effect of this disproportionate allocation of funds within any university, reports John Lear in an article for the Saturday Review, was twofold: it encouraged brilliant men to concentrate on research and dissociate themselves from students; and, it allowed the military to dominate large areas of university thinking through mission-oriented research projects. The consequences of this preferential funding have awakened the need for reappraisal. Lear (1969) writes:

> "At present, most of the money goes...to individual researchers...who build personal empires with so little sense of loyality to their institutions that the institutions have tended to disregard what should be a university's foremost concern--teaching (p. 79)".

If many college or university professors are indifferent toward their students, preferring instead the challenges and rewards of scholarly research, they will be predisposed to discharge their teaching responsibilities by narrowing the teaching subject to the domain of their own interest or speciality. This tendency, Martin (op. cit.) argues, is inevitably the result of the professor's training as a graduate student.

> "Such specialized subject matter can be taught to an undergraduate but at the sacrifice of comprehension by the student if the job is done at the level of sophistication sufficient to sustain the professor's interest (p. 61)".

Jencks and Riesman (1968) note that professors generally try to "remake the college where they teach in the image of the graduate school that trained them (p. 49)". It is of little wonder then that the complaints, of those students who seek no speciality but a general and broad educational base from which they can explore the personal and social problems that confront them, are often the most persistent in colleges that have converted "the typical liberal arts undergraduate major...(into)...a mini-Ph.D. program (p. 49)".

Impressing the graduate school rigor upon under-

graduate programs has led to the further complaint by students that the application, by professors, of criteria for measuring excellence are based upon a priori assumptions concerning the distribution of individual differences with little regard for individual efforts. The promotion of such standards, the students claim, inevitably institutionalizes their ideals, and regiments their learning experiences. No real evidence has been brought forth to support such rigor in the undergraduate program and yet such practices continue.

Finally, Jencks and Riesman (op. cit., p. 50) observe that the Ph.D. as a researcher often shows impressive technical competence to do impersonal, objective, and quantitative work. But, the authors continue,

> "judging the typical Ph.D. as a teacher...his professionalism as a scholar often alienates undergraduates...his lack of any specific training as a teacher or as a mentor of the young leads to unnecessarily poor performance in the classroom and to insensitivity in dealing with undergraduates (p.50)".

This brief outline has necessarily focussed upon the problem specific to university and college teaching at the undergraduate level. Of equal importance (although not touched upon here) are the academic concerns for a re-evaluation of the present funding arrangements that support the colleges and universities in North America; the changing role of the academic community with respect to national

affairs; and the stances the universities and colleges must take on such international issues as the social consequences of the techological revolution, the Indochina War, and environmental pollution. It is clear however, that with increasing undergraduate enrollments, the college and university must come to grips with their most visible function -- the instruction of young people. This thesis will therefore examine some methods by which Canadian college and university teachers have received their training as teachers.

With the noted exception of the Report of the Presidential Advisory Committee on Undergraduate Instruction in the Faculty of Arts and Science, University of Toronto, 1967, entitled Undergraduate Instruction in Arts and Science, extended study on the problem of teacher preparation for college and university levels in Canada has been slight. Chapter II of this thesis will present a general background to this problem drawing upon the evidence accumulated in the United States. Chapter III will examine what background material has been developed in Canada; the subsequent chapters will describe a study recently undertaken in Canada on the ways by which Canadian graduate schools have prepared their graduate students for their future roles as college and university teachers and will conclude with recommendations on what might be done to

improve the quality of preparation for college and university teaching.

A major limitation of this thesis is that it draws heavily upon background material that is of U.S. origin. There is some weight nevertheless to the contention that college students of both countries enjoy similar educational opportunities. Moreover, as recently as 1966, the report of the Commission to Study the Development of Graduate Programmes in Ontario Universities draws its recommendations almost entirely from examples found in higher education in the U.S. It is also of no small consequence that there is a fair degree of mobility of graduate students across the border of these two countries. Indeed, some have viewed the increasing influence of Americans on Canadian universities with dismay.[1]

[1] See particularly Struggle for Canadian Universities by R. Mathews and J. Steele, New Press: Toronto, 1969; but compare J.B. Brebner's essay for the Canadian Social Science Research Council in 1945 entitled Scholarship for Canada, in which a plea is made for the retention of native scholars trained in Canada.

Chapter II

THE U.S. STUDIES

Traditionally, the university has been the center of knowledge; since the 12th and 13th centuries, young men were examined upon the completion of a specified curriculum (a racecourse, fr. L. currere to run) and awarded "degrees" that attested to their skill at their chosen craft. They in turn either left the university to practice their "art" or stayed to transmit it to new students.

Since Colonial days, writes Knapp (1962), the college teacher has been called upon to perform three functions: the research function, the informational function, and the character-building function. By these, the teacher explores the unknown domains of knowledge, imparting his findings and his understanding of them to his students in a fashion sufficiently clear to be both morally elevating and lucid. The students in turn become knowledeable citizens of high moral calibre. Today, the character-building function has replaced the inculcation of religious

tone by that of guidance and counseling.

While Knapp's description of the college teacher may be applied to many men working with students today, can we attest to their ability to execute these functions as having arisen from their training? It is certain that the large majority of college teachers have spent at least some time in a graduate school as students. To what extent has this experience prepared them for the functions described by Knapp?

Herge (1965) charges that the graduate schools neglect the role of teaching .

> "Historically, the prime requisites for college teaching have been few; a scholarly mind, a desire to teach at the college level; an earned degree; and a respectable concentration of studies at an advanced level in the subject to be taught (p. 23)".

Herge suggests that the absence of any evidence of formal preparation for teaching is in large measure responsible for the prevailing and pervasive incompetence that characterizes the classroom work of college teachers in the United States.

Klapper (1949) states that there are two persistent and prevailing assumptions underlying college appointments: good teachers are born, not made, and sound knowledge of a subject is sufficient for the teaching of it

because the converse --he who doesn't know cannot teach-- is true. The illogical nature of this position is not offset in any way by the evidence, as Klapper is quick to observe:

> "Experience repeatedly refutes the comforting hope that he who knows can teach. After visiting three or four classes a day in respective institutions over a period of twelve weeks, it became apparent that born teachers are few...those who know and want to teach can be helped....(p.3)".

One way to handle the unpalatability of Klapper's contention calls for a distinction between the academic mind on the one hand as a mere repository of other people's knowledge and on the other as a creator of new knowledge. This tactic finds a leading protagonist in W.H. Cowley who seized no less an auspicious occasion than the Centennial Conference on College Teaching held in 1958 at the University of Minnesota to state categorically in his address "College and University Teaching: 1858-1958":

> "ever since the end of the nineteenth century the administrators and professional leaders of American higher education have almost universally agreed that one cannot be a good teacher unless he does research. This conception...enbodies the great truths that out-of-date facts and ideas foist out-moded people upon the society, that only growing minds can arouse and hold the interests of students, that creativity begets creativity (p. 118)".

Consequently, the argument runs: research-oriented teachers have by their training and experience sufficient

professional qualifications to instruct and inspire undergraduates. But to review this argument from a different aspect, namely that disciplinary training which embodies original research constitutes sufficient evidence for appointment to teaching positions, changes the focus of the meaning of teaching-competence. Taking Cowley's observation at its face value, that a teacher cannot be good unless he does research in his subject-field, the necessary association between good teaching and research can be established. Can the implied assertion be also accepted, that the demonstration of ability to do research in a subject-field is sufficient evidence of ability to teach that same field to undergraduates? The skills of a teacher may well be sharpened by his experiences as a researcher but these skills are essentially different than those of a researcher. For example, in teaching the focus is upon the predetermined modification of the learner's behavior, attitude, understanding, or outlook. In research, the focus is upon the exploration of the unknown as it relates to the known. Thus the development of skill of a researcher such as objectivity, precision of measurement, and the power of sustained analysis precludes the development of those attributes considered necessary for teaching (eg. sensitivity to the maturational needs of the learner, the

awareness that the rate of acquisition relates to interest as well as complexity of the subject material, the recognition that motivation to learn is as much a function of the teaching environment as it is a function of the learner, etc.[2].

The researcher-as-teacher argument has been challenged by Prior (op. cit.) who observes that while the opinion is widespread that the Ph.D. degree is required of the college teacher "it does not actually prepare for teaching (p. 37)". Prior further points out that the graduate school, because of its sponsorship of a doctorate directed toward research, has been blamed for the allegedly low level of undergraduate teaching due to the lack of interest by professors in this occupation and "indifference to good teaching as a basis for promotion on the part of university administrators (p. 37)".

McGrath (1959) summarizes the particular failings of the graduate schools to prepare their students for future teaching duties by noting that the graduate schools normally

[2] For an extended analysis of the attributes necessary for successful college teaching see the collected essays in The American College (Ed.) N. Sanford, Wiley: New York, 1962.

confine the range of learning of its students, thus preventing them from attaining a wider degree of education needed for the proper execution of their future teaching responsibilities. McGrath states:

> "With notable exceptions, the graduate experience does not cultivate the capacity for the interrelation of facts and theories which is indespensable in successful undergraduate teaching. By requiring students to devote almost their whole time to the deeper and deeper penetration of narrower and narrower areas of learning, they discourage, if not bar, the intellectually adventurous student from ranging widely in fields adjacent to his own (p.36)".

Riesman (1958), Wilson (1942), Berelson (1960), and Caplow and Reece (1958) all report that the Ph.D. is the preferred degree for the purposes of hiring new faculty both in colleges and universities. Yet the generation of "original" research by candidates for this degree and the acquisition of the processes that prepare the candidates for producing a thesis, all seemingly draw them further away from the preparation for the requirements they must meet in their appointments to the teaching faculties of colleges and universities. For example, consider the modern ring to the complaint of a graduate dean (Schilicter; 1933) on the specialisation in his discipline:

> "We not only have 'chemists', we have 'colloid chemists'. We not only have 'colloid chemists', we have 'inorganic colloid chemists'. We not only have 'inorganic colloid chemists', we have 'aerosol inorganic

> colloid chemists', (and even) 'high temperature aerosol chemists' and so on indifinitely until the scientist is fractionated to a single paragraph of his doctor's thesis (pp. 97-98)".

Can one expect without serious reservation that a "high temperature aerosol chemist" be motivated to arouse and inspire a large heterogenous class of undergraduates about to learn of the wonders and difficulties of Introductory Chemistry? Martin (op. cit.) has declared that professors in increasing numbers are bored and teach in a perfunctory fashion, "not because they don't know any better but because they aren't motivated enough to do better (pp. 60-61)".

The case for the primacy of the teaching function of the newly appointed Ph.D. was succinctly stated by the authors who called themselves the Committee of Fifteen (Barzun et al; 1955):

> "We finally argued that the ultimate choice between a life primarily devoted to scholarly teaching and a life primarily devoted to research depends upon temperament and inclination...the future researcher must, as a matter of fact, earn the right to devote himself primarily to his studies by being first, and sometimes for a long time, a college teacher (p. 15)".

Before considering further evidence of the function of the American graduate school that does relate to the preparation for college teaching, it should be appropriate here to sample some of the attitudes toward teaching

and research held by universities and colleges who hire and promote the young Ph.D.s.

From The Academic Marketplace, Caplow and Reece's (1958) sociological study of the university as an institution, the following reported comments summarize the dilemma many hiring institutions face.

> "We take a good look at their letters and then when they're down here we look at them and talk to them and then we take a good look into our crystal ball and pull out the best man. In other words, we're completely subjective about the whole thing."
>
> "It's usually fairly simple. You can tell from a ten-minute conversation if a man will be a good teacher. The thing that is perturbing is trying to forcast what their scientific career is going to be like on the basis of the same conversation." (both quoted from p. 106)
>
> "Our requirements are purely mathematical. No one gives a damn if you can teach."
>
> "He must have done well in his theory courses, and we try for and are interested first and foremost in, his potential for research. We assume that if he got through school, he'll have the ability to teach, unless we hear specifically to the contrary."
> (both quoted from p. 136)

Similarly, Wilson (op. cit.) has noted that many colleges and universities demand but little in the way of teaching and seldom reward even meritous acheivement in this field. While he has found that in many colleges and in the lower levels of leading universities the research

function has necessarily been replaced by the teaching function of the professors, "yet everywhere there is an attitude among the academic elite that dismisses meticulous attention to instruction as a deflection from the 'higher' purposes of scholarship and science (p. 188)".

But in The Mobility of College Faculties, Marshall (1964) notes that comments from department heads in Economics reveal a changing attitude toward the qualifications of the newly appointed Ph.D.

> "I want a person who is willing to teach students in other than purely mathematical terms. The current craze for mathematics in graduate school is the bane of the undergraduate department...."
>
> "Unless the trend (of narrow specialisation) is halted the study of graduate economics will soon be confined to a small body of academic 'nuts' who cannot be hired to teach in an undergraduate liberal arts college." (both quoted from p. 80)

From the foregoing it seems evident that research ability overshadows teaching competence, with a few exceptions, as the initial weighting upon which hiring and promotion decisions are based. Riesman (1958) attributes these policies to the needs universities have for sustaining and inhancing their institutional images by salting their faculties with "big names". These men, in turn, bring with them large research monies or the potential to

attract extensive funding for the building of new research facilities. However, Cartter (1967) presents evidence for the rise in prestige of certain colleges (eg. Grinnel, Reed, Swarthmore) as being due to the continuance of a superior teaching program.

Berelson (op. cit.) conducted a detailed survey into all aspects of the graduate school and reported another view of hiring-promotion in colleges and universities:

> "The graduate school is increasingly producing for the university as employer --the research oriented university-- rather than the college. Hence its research-oriented program of training is increasingly appropriate. The tide in American higher education is probably running toward the universities, not toward the colleges (p. 224)".

Before closing this section on hiring practices it should be noted as well that there has been a general opinion held by academics for so long, almost to merit the stature of a paradigm, that a "good" researcher with drive and imagination and a lively interest in his work is invariably a "good" teacher to boot. Is it so unnatural then for universities to be on the look out for such people, or for the signs that the young Ph.D. will turn out to be such a person? Yet critics of this view despair the

inequitable treatment given the good teacher who cannot or does not publish.

D.W. Stuit's paper, read at the conference on The Appraisal of Teaching in Large Universities, held at the University of Michican in October 1958, summarizes the hiring-promotion argument by stating the case for both sides. On the one hand, Stuit shows that there is little correlation between the ratings of students of their instructors and the academic rank of these men, which is cited as evidence of the lack of a relationship between quality of teaching and quality of research. On the other hand, Stuit says:

> "The fact that many outstanding institutions known for the high scholarly productivity of their faculties also have the reputation of being outstanding in teaching is cited as evidence that quality of scholarship and teaching are related (p. 55)."

However, the extensive investigation by Austin and Lee (1967) was undertaken specifically to examine the kinds of information used to assess the emphasis effective teaching had upon the awarding of promotions. After surveying over 1,000 deans in colleges and universities, the authors report that

> "citing 'classroom teaching' as a 'major factor' in personnel decisions does not encourage improved teaching as long as teaching ability is more likely

> to be evaluated on the basis of scholarly research and publication rather than information more directly relevant to effective performance in the classroom (p. 307)".

These authors conclude that deans and chairmen are "overwhelmingly important" as the sources of information about teaching effectiveness but the authors note that other ways should be found by these men to evaluate classroom effectiveness of the teacher than the present method of evaluating the teacher's publishing record.

As college faculties themselves generally have tended to value research potential and scholarly publication over teaching competence as a basis for hiring and promotion, it is understandable that graduate schools from which new faculty are usually recruited have emphasized the development of competence for publishable research in graduate programs. However, graduate schools in the U.S. (particularly since World War I) <u>have</u> provided opportunities for their students to work in some kind of teaching-apprentice program --usually as an assistant to a regular member of the teaching faculty.

Since 1929, The Institute for Administrative Officers of Higher Institutions at the University of Chicago has conducted symposia and published papers on current

trends and proposed reforms in higher education. For example, Volume II, The Training of College Teachers (1930) and Volume X, The Preparation and In-Service Training of College Teachers (1938) witness the concern felt by many college and university presidents, deans, and professors toward the implementation and improvement of programs about teaching for the Ph.D. candidate. Such programs as seminars for credit in teaching methods and educational philosophy, interdisciplinary colloquia to examine new techniques and approaches for the classroom, and systematic guidance for the teaching assistant were either prescribed as necessary for inclusion or argued for their elaboration and extension in existing programs.

While it is clear that much valuable experience accrues to the graduate student who assists the professor in his research, the same cannot be said for the teaching experience. Unlike the professions of Law or Medicine in which a systematic program of guided apprenticeship is a regular part of the student's training, (articling for the former and interning for the latter), college teaching as a field of endeavor has never established minimum standards of acheivement against which the new practioner is measured before being certified.

A survey of the relevant literature on programs given by graduate schools to provide training and experience for graduate students in the arts of teaching has produced meager evidence of sustained success.

The study by Hollis (1945) for the Commission on Teacher Education entitled Toward Improving Ph.D. Programs was phrased in terms reminiscent of the earlier proposals made at the 1930 and 1938 (Chicago) Institute meetings. Hollis surveyed 204 prominent and influential American educators from universities, liberal arts colleges, teaching colleges, and junior colleges. These institutions ranged from some of the largest and most powerful universities to the smaller and experimental colleges. On the issue, Student Teaching and Professional Courses, the following sample of responses obtained by Hollis indicates a change in the climate of opinion toward teaching experience and instruction for graduate students:

> "Student teaching as a basic educative experience is important. Unfortunately, too much of this experience has been provided in situations quite different from those in which the student finds first employment."
>
> (A college president)

> "This project reduces the function of the graduate school to that of the teacher's college in which there is not, and cannot be, strictly cultural work proper to a graduate school."
>
> (A university dean of Arts and Science)

"Very important if conditions make it possible to do a good job. Such conditions do not now exist at this university --nor I suspect in many others. Professors as a rule are not interested in serving as critic teachers --many also lack sufficient breadth of experience."

(A graduate dean)

"We attach great importance to the use of part-time assistants who, through staff contacts, develop as persons and in the mastery of their fields of specialisation."

(A graduate dean)

"It is too often done by the student as an extra burden and without supervision; such learning as takes place is incidental."

(A graduate dean)

"I am very skeptical of apprentice training under the supervision of most graduate professors. I know very few who are themselves sufficiently good teachers to be valuable in that role."

(President of a liberal arts college)

"Many classes for adolescents are being taught by people who are on the way to getting degrees; they are learning by trial-and-error, hit-and-miss methods. Why can't the graduate schools take the training of college teachers as seriously as medical and dental schools do to the training of practioners?"

(A university dean of liberal arts)

The focus of these comments is not directed against the usefullness of an apprenticeship program in teaching per se but upon the difficulties of incorporating such a program meaningfully into the present doctoral curriculum. If the reputation of the graduate school depends upon the standards of excellence it develops in its students, then it is likely the standard of proficiency would

go to those graduate schools that produced the best scholars for the academic market which values scholarship over other qualifications.

The A.A.U.P. chapter of John Hopkins has expressed the conviction (in an A.A.U.P. Bulletin in 1932) that there is no such thing as good teaching in the abstract. The intellectual needs of students differ between courses and the course requirements generally influence the appropriateness of presentation. In consequence, "good" teaching is a matter of time and place that cannot be learned under a general regime of educational technique.

If the "high temperature aerosol chemist" (mentioned earlier) comes from a graduate program that has not offered him the opportunity to be a teaching-assistant, then the last three or four years of his learning experiences in graduate school have been associated with small-group sessions of highly motivated students all focussing upon a refined area in Chemistry. Can one expect him subsequently to step into the responsibility of an Introductory course as a member of faculty and handle the dynamics of teaching that involve the large lecture-theatre situation, the unmotivated student, the redundant questions, and the evaluation of student learning? His

appointment assumes that he will meet these responsibilities. On the other hand, assuming that during his graduate years the budding Ph.D. has had the opportunity to work as a teaching-assistant with a senior man, will this opportunity give him sufficient experience in teaching that can be subsequently transferred to the new setting of his own appointment? These are not easy questions to answer.

We may conclude that Hollis's summation of the comments cited above is appropriate:

> "There is...little evidence to suggest that... student teaching at this level is regarded as little more than a convenience to students and professors alike (p.145)".

An overview of the relationship of the graduate school to its candidates for advanced degrees will reveal the significance of further discussion about the need, extent, and applicability of an apprenticeship program to prepare candidates for teaching careers.

Fundamentally, the graduate school preserves and encourages the development of new knowledge; the methods by which knowledge can be examined, utilized, and extended are carefully "taught" to the student. Unlike the undergraduate college whose educative function broad-

ens the outlook of its students, the graduate school requires its students to channel their efforts into a specific domain. Because the graduate program requires sustained effort, financial assistance has generally been provided for the students so that they can spend full time on campus.

This financial help takes the form of fellowships, research assistantships, and teaching assistantships. Neither fellowships nor research assistantships demand as a rule duties, the performance of which, conflict with the student's basic interests or the school's primary function --research training. But what of the teaching assistantships?

In The Graduate Student as Teacher, Nowlis, Clark, and Rock (1968) have specified the duties of the teaching assistant (T.A.) as follows:

> 1) he is a teacher who has more or less complete responsibility of a small class (the case generally found only in modern language classes).
>
> 2) he meets once or twice weekly a discussion section that is subtended to a larger lecture. He may or may not attend that lecture, coordinate the activities of his section with those of the syllabus, readings, lecture, or laboratory. He may lecture in his section but rarely before the entire class. He is involved with the grading of papers and projects and with the construction, proctoring, grading, and discussion of exams. He may have office space for personal consultation with his students.

3) he is a laboratory assistant in a large science course who may or not be attuned to the weekly progress of the main lecture, discussion groups, or homework sections. He may or may not know a great deal about the equipment and may or may not be qualified to guide individual undergraduate projects.

4) he is an unseen person who grades papers and proctors exams and may have no contact with the undergraduates at all.

(pp. 2-3)

Using these catagories as a guide, Nowlis and his associates examined the opinions and attitudes of over 300 graduate students at the University of Rochester in 1965. These students provided information about their teaching experience which Nowlis et al summed up as follows:

> "One of the basic concerns...is that their departments with rare exceptions are not sufficiently concerned with helping them to be good teachers. They want better preparation, supervision, and evaluation but usually do not know where to direct, or how to express their requests or how to invite faculty to become more involved in this part of their graduate training (pp. 28-29)".

Nowlis et al consider these concerns, point by point, and have made a series of recommendations after confering with participating deans at a conference at the University of Rochester in 1967.[3]

[3] See the ten recommendations sanctioned by the members of the 1967 Rochester Conference included in Appendix E of this thesis.

Trow (1967) points out an obvious shortcomming of the graduate financial assistance program that usually reserves fellowships and research monies for the brighter students. Graduate students assigned T.A. responsibilities as a means to support themselves in graduate school

> "are too often poorly motivated and resentful... the more so as research assistantships and free fellowships increase in number (p. 166)".

These students being burdened by their own educational and research committments rarely get, Trow claims, good teaching experience.

It is curious that there have been no reports of assigning the "brighter" students T.A. responsibilities and the "less bright" but still eligible students to other categories of financial assistance. It would seem, therefore, that there is a considered bias on the part of the graduate school that allocates graduate funding preferentially for the training of non-teachers, particularly so in the face of mounting evidence of successful graduates of the graduate school entering the profession of college and university teaching.

Besides offering graduate students apprenticeship in teaching, via teaching assistantships, some graduate

departments provide seminars in the principles and philosophy underlying the teaching situation, King (1967) cites a program given by R.H. Bruce (Dean of Graduate Study at the University of Wyoming) that has been successfully conducted for the last 15 years. King describes this program as "usually one semester in length with weekly meetings and...lectures developed around the role of the college teacher (p.97)". However, a program of this nature appears to be the exception rather than the rule if one can interpret the literature on graduate school curricula properly.

For example, Koen and Ericksen (1967) report that only 35 of 136 departments and 10 professional schools surveyed offer formal courses in college teaching. Even though these courses offered three units of credit, Koen and Ericksen note that "attendance by teaching assistants tends to be quite low unless the course is required by the department (p. 25)". This rate of attendance, when not compulsory, the authors point out, is similar to the reception given courses in teaching methods of higher education which are offered by schools in education.

Before closing this section on the function of

the graduate school to prepare its students as teachers, the following, taken from The Graduate Student as Teacher (Nowlis et al; 1968), deserves extended quotation because Nowlis has captured the uncertainty that prevails in American graduate schools vis-a-vis the training of the teaching assistant.

> "Of all these problems and procedures, some chairmen are least knowledgeable about the training and supervision of graduate students in instruction. A casual delegation of these responsibilities to others leads sooner or later to some proliferation in errors of omission and comission: in the last minute assignment to the assistantships, in the use of too few assistants, in the use of a professor who likes to teach but who is indifferent to the problems of his teaching assistants, etc. Only a few chairmen felt that supervision was good in their departments; others felt that it depended upon the professor or that it was generally poor. It appears that the principle of academic freedom means, in part, the highest possible degree of non-interference with the teacher's activities in the course, including his work with his assistants, and thus also in some degree, implies laissez faire for the graduate student as teaching apprentice (p. 32)".

At best, it has been noted that the graduate school does provide teaching experience for its students; at worst this training is haphazard: its genesis is the provision of support funds for the graduate student unsupported from other sources. For the graduate student whose career may well lie in the teaching of undergraduates, such a system

of graduate school instruction relies on the student's natural ability, sensitivity to the learning needs of the undergraduate, and alertness. Incidental experiences as these, Priest (1967) claims "assumes there is no organizing body of knowledge on the subject worth including in the graduate school training program (pp. 286-287)".

Berelson (op. cit.) states:

> "The teaching assistantship has long been a sore point in higher education. It has always been a target for disaffection but even more so today because the whole enterprise is bigger, more visible, and hence more vunerable (p. 138)".

Berelson goes on to query why such a fuss is made over T.A. programs when so many graduate students complete their Ph.D. programs under graduate financing other than the teaching stipend and then go on to teach full-time in undergraduate colleges without any teaching experience whatsoever. His point is well taken. Why argue over what constitutes a sufficient or necessary teaching-apprenticeship when a large subpopulation of college teachers arrive at their faculty positions through programs that completely ignored the "need" for college-teaching preparation? For it is clear, as Wilson (op. cit.; p. 185) points out, that preoccupation with the development

of research method and practices under strict supervision and criticism contrasts sharply with a virtual total absense of direct guidance in the performance of teaching duties. Wilson adds that in those rare instances where courses in pedagogy have been mounted, "academicians" have raised objections, ironically enough on the grounds that such responsibilities cannot be vested in the so-called "educationists".[4]

An examination of the U.S. literature, while not exhaustive[5] has shown that during the last forty years the controversy over the need or viability of apprenticeship experience for college and university teachers is not being resolved. This does not mean that concern for improving the quality of college teaching has diminished although the implication seems to suggest that the graduate school is indeed not the place where innovations can be implemented.

[4] For a fuller discussion on the role of the graduate school as the means for preparing college teachers, see Graduate Study for Future College Teachers (Ed.) J. Axelrod; 1959.

[5] An additional bibliography of FURTHER READINGS has been added to cover the work of authors not quoted or refered to, but whose works have been influential in the preparation of this thesis.

Chapter III

THE CANADIAN STUDIES

Do Canadian graduate schools hold attitudes similar to those encountered in higher education in the United States and described in the preceeding Chapter? Do Canadian graduate schools, for example, emphasize research ability in the development of their Ph.D. candidates ignore the teaching requisites associated with this degree to the same extent as has been found in U.S. graduate schools?

A former president of the University of British Columbia has observed (MacKenzie; 1956) that prior to World War II there were no graduate study programmes in Canada of any great consequence outside those offered at McGill and Toronto (p. 181). Mackenzie cautions that the substantial development of graduate programmes (since World War II) has created "an academic conflict" in colleges and universities of Canada between the values of and attention given to the B.A. programme with respect

to these newer post-graduate programmes. This conflict surfaces, says MacKenzie, in the following questions:

> "Can the Bachelor's degree remain an end in itself for those who are not qualified nor disposed to seek further degrees?
> (or)
> Will it become a series of prerequisite studies designed primarily for those who are proceeding with post baccalaureate studies?"
>
> "Can we expect the senior and best qualified professors in the universities to continue teaching in the undergraduate programme?
> (or)
> Should we hand over the undergraduates to the care and attention of post graduate students who are proceeding with doctoral studies?"
>
> (p. 182)

MacKenzie holds that without the stimulus that goes with post graduate studies and from active programmes of research, no university can become great. But teaching is a demanding occupation and for its practitioners to continue to be effective, MacKenzie claims that the teacher must have the "opportunity to reinvigorate himself by active scholarship and where possible...(by)... original research (p. 183)". Is this then the foundation for the researcher-as-teacher argument that supports the narrow specialisation training programme of teachers who, following MacKenzie, seek the research outlet for reinvigoration of their energies that apparently have been drained

by the teaching tasks they have had to endure?

In view of the generally held working principle in Canadian society --everyone is entitled to as much education as his capacities and means will allow-- can Canadian colleges and universities ignore or remain indifferent to the needs of those students who show no promise of scholarly distinction? MacKenzie believes that the liberal education offered by Canadian universities and colleges should provide for "many kinds of distinction...not just brilliant scholarly distinction (p. 187)". Seen in this light, the focus of the researcher-as-teacher argument (outlined in Chapter II) appears to be particularly narrow: the success of his students may well be measured by the research-oriented teacher in terms of his own scholastic rigor.

Intellectual training can and should be measured against a standard of "excellence". But to define the form of "excellence" in terms of scholastic acheivement alone, presupposes that the refinement of personality attributes and value-systems, the deepening of social conscience or aesthetic judgement, and the transformation of other maturable characteristics of the young are not

inherent or derivable experiences from higher education.[6] Plainly stated, the research-oriented teacher who endeavors in the name of scholarship to create facsimilies of himself out of the students he teaches, employs the "excellence" criterion in its narrowest form.

Alternately, Frye (1960) argues that our democratic society has yielded its child-centered theory of education to an administration-centered theory, in which individual teachers are too often absorbed into the teachers conference. For the teacher to remain autonomous, Frye states, he must owe his main allegiance to his cultural rather than his social environment. "To subordinate teaching to scholarship is the only way of guaranteeing the independence of the teacher within the university, and of encouraging his independence outside of it (p. 35).

It is clear then that there is support to the view in Canada, that college and university teachers should have

6 See Learning and the Professors (Eds) O. Milton and E.J. Shoben, Jr., 1968; particularly the essays "The Impact of Higher Education on Student Attitudes, Values, and Critical Thinking Abilities" (Dressel & Lehmann, pp. 105-124) and "The Criterion Problem in Higher Education" (Hoyt, pp. 125-135) for a rigorous reevaluation of the scholastic acheivement criterion.

the ability and means to do periodic research or scholarly writing, if for no other reason than to remain fresh and alert as teachers. But becoming a teacher is another matter.

MacDonald (1961) notes that the college population in Canada has become considerably larger and more heterogeneous than it was a few decades earlier. In consequence, the college teacher

> "must be equipped to confront this complex situation which paradoxically has created the need for a more individualized type of teaching and at the same time for teaching procedures suitable for mass instruction (p. 179)".

In his survey of 166 college and university teachers selected from the humanities, social and physical sciences, and professional education of 14 colleges and universities in the Atlantic Provinces of Canada, MacDonald endeavored to discover the extent to which college teachers endorsed the following: the most important purpose of higher education, the best way to prepare for college or university teaching, the value of courses in professional education, factors determining rank promotion, and as well 34 aspects of the college or university teacher's work.

To the question "In your view, what is the best way to prepare for college or university teaching", MacDonald reports that over 75% of the teachers from all disciplines (except Education: 46%) "believe that the best preparation would be obtained at special summer sessions and/or inservice programs (p. 173)". Considering an alternative category "Inclusion of Professional Courses in Education in Graduate Programmes" was significantly rejected by teachers in the Humanities, Social and Physical Sciences, and supported (53%) only by those in Professional Education, MacDonald concludes that college teachers in general are antipathetic to the idea of a formal programme of courses in professional education to prepare the prospective college teacher. At the same time, MacDonald observes:

> "It cannot be denied that college teachers in general recognize the importance of a great many aspects of the college teacher's work which could be a part of the content of courses in professional education (pp. 176-177)".

But earlier, Thomson (1958) categorically states in an article for C.A.U.T. Bulletin:

> "The college or university teacher has had little or no instruction in the art of teaching and has probably never heard frank and informal criticism of even his earliest attempts to practice that art (p. 15)".

Writing in the same journal, Poole (1965), Rothrock (1966), Stensland (1966), and McCeary-Juhaz and Dennison (1967) have viewed some of the requisites that constitute the preparation for college teaching and improvement of college teachers via inservice training programmes. As none of these writers offer specific recommendations for changes in the existing programmes mounted for graduate students, their views are noted here as a general background of inquiry vis-a-vis the preparation of the college teacher in Canada.

For example, Poole (op. cit.) asserts that the M.A. credential is sufficient for the college teacher in that the additional time spent on the Ph.D. programme (at least in the Humanities) does not improve the candidates ability as a future teacher. Better for him to spend that additional time as a college teacher gaining experience in the classroom.

Rothrock (op. cit.) takes issue with Poole by arguing that as the M.A. credential requires but token evidence of research ability and little auxillary study in some adjacent cognate field, the M.A. degree does not provide a broad enough base in the discipline from which the holder can adequately communicate with undergraduates.

Stensland (op. cit.) observes that one "learns to be a good teacher as well as a good historian. The question is not whether one has to learn to teach but rather how well (p.60)". Stensland goes on to describe a weekly seminar held in 1965 on university teaching for the new College of Veterinary Medicine at the University of Saskatchewan and notes that five components are basic in any discussion on college teaching: the teacher, the learning process, the student, the learning goal, and the university environment. Besides analyzing their teaching in these terms, Stensland reports that the participants of these seminars were asked to evaluate the processes by which learning takes place rather than rely upon the end-of-term evaluation of the student's performance as a guide to evaluate the teaching that supposedly has engendered that performance. Stensland notes that seven factors --motivation, capacity and competence, previous experience, relevance, active participation, feedback, and satisfaction-- contribute to the ways by which students learn best, and suggests that teachers evaluate their own performance in these terms.

The 1964 Report of a President's Committee on

Academic Goals at the University of British Columbia (Guideposts to Innovation: 1964) recommended that as junior members of faculty and teaching assistants were expected to pick up their skills through innate ability of trial and error, faculties and departments should consider the value of establishing procedures to demonstrate teaching methods to junior personnel and of encouraging discussion of instructional techniques. McCreary-Juhaz and Dennison (op. cit.) report one such programme undertaken at that university in 1966. The programme consisted of seven, 2-hour long, evening discussion groups meeting weekly with guest speakers. While the authors reported that faculty members attendance ranged from 50 to over 300 members on a single evening depending upon the topic, no note was made of the number of junior faculty members present. As well, the authors reported that the participants and organizers both observed that there should have been more involvement of the teaching assistants at these sessions. It is difficult to determine how effective such an inservice programme was in view of the seeming disinterest of those particular groups for which the programme was designed.

Additional although isolated reports in Canadian journals and newspapers provide some further insights into the current problems of undergraduate teaching. A recent newspaper article (Graham, Vancouver Sun, Aug. 15, 1970), for example, notes that the Arts I programme inaugurated at the University of British Columbia, now entering its fourth, has proved to be quite successful. Rather than having first-year students choose five subjects this programme offers the student a choice of one of three "themes", such as social change, man and the environment, or society and personality and assigns teachers from various disciplines in the Arts Faculty to work full time with the theme topic. The teacher so assigned then integrates his approach to the "theme" topic with those of other faculty, thus providing the student with a broad educational base for his future university work. Upon the successful completion of this programme, it has been found that the student can transfer into the more traditional upper-level programmes offered by the seperate disciplines. However, one of the founders of the Arts I programme, Ian Ross, observes that

> "a major problem with being a faculty member (assigned to)...the experimental programme is that much time

is needed for teaching (which)...cuts into the time normally set aside for research (p. 69)".

A university programme for undergraduates (such as Arts I) seems to have recast the professor's function by emphasizing teaching at the expense of research. In view of the still prevalent contention among academics --that the way to career rewards, promotions, tenure, and acclaim-- lies across the fields of research alone, the assignment in an experimental teaching programme might well cause concern for the ambitious academic. Be that as it may, recent developments in Canada with respect to college and university teaching indicate that these institutions are grappling with the problem of undergraduate instruction.

For example, it was reported in University Affairs (9, #2, 1967, p. 8), the journal for the Association of Universities and Colleges of Canada, that the following three resolutions were adopted by that organisation at its annual general meeting:

8) Experimental Teaching. That the AUCC encourage its members to undertake experimental teaching and curriculum projects that complement traditional undergraduate programmes.

9) Senior Staff in Undergraduate Teaching. That the AUCC urge its members to entrust the teaching of students in the first and second years to the most highly qualified and experienced members of the faculty.

10) That the AUCC invite government and other fund granting agencies to give support to proposals for experiment and innovation by universities in methods of instruction.

Following upon these recommendations, although not necessarily springing from them, further evidence of concern for undergraduate teaching can be noted.

The University of British Columbia has established in 1968 a Master Teacher Award, with a cash value of $5,000., to be given annually to the teacher(s) judged best by students, faculty, and departments (UBC Reports, Dec. 1968, p. 5).

Queens University has set up a committee on teaching and learning to concentrate on the work of the faculties of Arts and Science (University Affairs, Dec. 1968, p. 5).

McGill University has established a Centre for Learning and Development, providing it with a $60,000. budget and a $100,000. fund to support experiments in learning and teaching methods (University Affairs, Oct.

1969, p. 17).

An article in University Affairs (Sept. 1968, pp. 12-13) entitled "How Universities tell high school students 'where it's at'" describes the ways some 17 universities go into high schools to provide information about university life, etc. A programme of this nature may well prove fruitful if the dialogue between high school and university extends to teaching practices and expectations of learning performance of the high school student, in view of the earlier Report of the Manitoba Royal Commission on Adult Education 1947, which Innis (1951) reprints as an Appendix in his book Bias of Communication. Of interest here is the Commission's observation that

> "a careful study of the failure...and...success rate in the first year of university work brings out sharply the contrast between university teaching and highschool teaching (p. 207)".

Little evidence, however, has been noted in the Canadian literature directly related to the preparation of college and university teachers as a function of the graduate school.[7] Before examining a study recently

7 See "The Preparation of College Teachers: Towards a Rationale for Instruction" by D.C. Smith (Can. Educ. Res. Digest, Sept. 1968, 230-244) for an extended analysis of the training of teachers who will receive appointments at Junior Colleges (two-year colleges).

undertaken by the author on the ways Canadian graduate schools currently provide teaching experience or training for their students and on the hiring frequencies by Canadian universities of novice teachers (new staff appointed directly from graduate school), an overview of the state of affairs in Canadian college and university teaching will place that study in perspective.

In his essay for the Commonwealth Universities Yearbook 1969, "The Universities of Canada", E.F. Sheffield reports (pp. 1043-1046) the following:

1) more college teachers with doctorates are being hired than formerly;

2) the trend of Canadian-born college teachers receiving training abroad before returning to Canada for university appointments is lessening due to recent developments of new graduate departments in universities across Canada coupled with a strong increase in graduate enrollment;

3) "a university teacher (in Canada) is almost certain not to have had any training in pedagogy... (being)...trained as a scholar and research worker he is expected to perform as such in addition to being an instructor (p. 1045)";

4) "an internal problem in the Canadian university is expressed as the neglect of teaching", (for research is demanding and many professors seem to prefer it over instructing undergraduates), "to the extent that leaves the undergraduate untaught, there is a problem (p. 1046)".

From Sheffield's assessment, the problems of adequate undergraduate instruction and the lack of specific programmes mounted by Canadian graduate schools for the instruction in teaching of the potential college or university teacher are clearly similar to those problems noted in higher education in the United States that have been reviewed in Chapter II. Research from the U.S. has shown that academic employers in higher education today all generally agree in attitude toward:

1) hiring and promotion decisions anchored in scholastic rather than pedagogic performance;

2) decrying the quality of college teaching on campuses undergoing sharp numerical increases in undergraduate enrollment;

3) the appropriateness of the graduate school program as a vehicle to implement the ways and means of college teaching as instruction for the doctoral candidate.

Chapter IV

A STUDY OF CANADIAN GRADUATE SCHOOLS ON COLLEGE TEACHER PREPARATION.

Introduction.

With the attainment of the advanced degree, many graduate students who receive college teaching appointments acquire what preparation for teaching they possess from their formal and informal experiences in the graduate programme. However, this is not always the case: the college teacher may have received training for (or experiences in) the duties and responsibilities of this profession from sources other than the graduate school. For example, in a study by Stecklein and Eckert (1958) of the faculties of thirty-two private liberal arts colleges, state colleges, junior colleges, and of the three campuses of the University of Minnesota, it was found that quite a few college teachers had earlier been teachers in elementary and secondary schools. Upon the subsequent acquisition of advanced degrees, these teachers were offered appointments to college faculties.

Notwithstanding this exception, preparation for college teaching shall here mean the extent of teaching experience and formal preparation toward that end as offered in Canadian graduate schools.

As the range of undergraduate programmes, to which new college teachers are invariably assigned, extends over a great subject-disciplines --being anchored by the applied at one end and the pure (traditional) at the other-- some distinctions should be noted between the teaching of applied and traditional subjects. For it is evident that the graduate programmes that prepare men in these disciplines will reflect if not manifest similar distinctions. The purpose of this study, in consequence, is to investigate the current practices employed in graduate schools pertinent to college-teacher preparation. Current hiring practices of new teaching staff for Canadian universities will also be examined with particular attention to the hiring of novice staff, i.e. men hired directly from the graduate schools.

To examine an appropriate sample of the ways graduate students in Canadian graduate schools receive training or experience as college teachers, the disciplines selected should be those that the future undergraduates would most likely choose. By such a selection

procedure, it can be assumed that the survey will examine the largest single subpopulation of potential teachers. Thus the following distinctions between applied and traditional subject-disciplines are viewed from the differential effects they have upon the teaching of them.

Students in the applied disciplines (eg. Engineering, Agriculture, Education, and Business Administration) acquire background and technique to enable them to enter a profession whereas students in the traditional disciplines (eg. Philosophy, Mathematics, History, and Literature) may or may not utilize their training in such a direct and practical way. If we can say that the traditional disciplines <u>educate</u> the man and the applied disciplines <u>prepare</u> the man (for specific career roles), then we can argue a case for the differences in the teaching of these disciplines.[8]

Further, students undertaking an applied or professional programme must have met and maintained certain standards of scholastic ability in order to complete their studies. This is not the usual case of students in the

[8] See particularly the collected essays in <u>Psychological Concepts in Education</u> (Eds) Komisar, B.P. and Macmillan, C.B.J. (1967) for a rigorous analysis of the kinds of teaching, kinds of learning, etc.

general or pass programmes. We can argue that the onus of success falls upon the student in the former programmes whereas the student of equal scholastic ability in the latter programmes, may not have to meet and sustain similar standards. This distinction is made here not to suggest a difference in the quality of teaching between the two programmes but rather to intimate that the motivational levels driving the two groups of students can differentially influence the way they perceive and in turn, react to the performance of their teachers.

Nearly all students are required to take some traditional subjects, in the early part of their undergraduate career, before entering the particular discipline or "major" of their choice. Thus teaching at the freshman and sophomore levels differ from the teaching at higher levels (particularly in the courses offered in Arts and Science) in terms of the homogeneity and size of these introductory courses compared to the smaller, advanced, and specialized courses.

For the purposes of this study, only the traditional Arts and Science disciplines will be considered. Most undergraduates in Canadian colleges and universities spend, in the early part of their academic careers, some time in acquaintance with several courses in Arts and

Science. As noted earlier (Committee of Fifteen), inital appointments for the new Ph.D. are limited at a university to the teaching (in Arts and Science) of the undergraduates. Thus an examination of actual graduate programmes in Arts and Sciences as they relate to the preparation of the doctoral candidate for college teaching, sampled from a number of appropriate graduate schools, should have the greatest generality on the question of college teacher preparation in the large. There is as well the practical consideration that the faculties of Arts and Science offer the largest number of courses and require annually the largest number of new teachers.

It is beyond the scope of this thesis to show that effective teaching of a particular discipline (or subject area) depends as much upon the nature of that discipline as it does upon the inherent problems associated with the proper acquisition of its content and technique. Indeed, until the publications of The Mission of the University (Ortega y Gasset, 1944), The Idea of the University (Karl Jaspers, 1946), and the resurgence of interest in Cardinal Newman's famous treatise on The Idea of a University Defined and Illustrated (1859), there has been little significant or systematic modern-day analysis of the potential intellectual experiences open to young

people at institutions of higher education. The foundations for these experiences have since been attributed to the kind, quality, and form of university teaching (eg. Barzun's Teacher in America (1944) and Gilbert Highet's The Art of Teaching (1950)). Thus the comment by W.C. Devane in his essay for The Contemporary University, U.S.A. (Ed., R.S. Morrison, 1966) "faculty neglect of its teaching duties may well be the cause in part of the present student unrest (p. 7)".bears directly upon not only the need to teach but the ability to teach as well.

The position of the teacher, between the discipline and the student, needless to say is genuine; the effectiveness of the teacher's performance in terms of the individual development of the student, depends initially upon the teacher's ability to communicate. While effective communication will not be defined here[9], the assumption implicit to this investigation embodies the belief that men associated for some time (as teachers)

9 Since the publication of Bias of Communication by Harold Innis (1951) and the subsequent exhaustive analysis by McLuhan into the meaning and relevance of modern communicating systems, communication as a field of study has expanded rapidly. Clearly, the study of the teacher as communicator needs further investigation.

with a discipline will have encountered ways and means of effectively communicating it. This study therefore is to determine how a new teacher (the doctoral candidate) is prepared as a teacher.

Assuming that the graduate in Canadian universities receives some experience in the classroom, tutorial, or laboratory as a teaching assistant (T.A.) to what extent has this experience been evaluated for him so that he can profit from his time spent as a T.A. In other words, does the T.A. receive feedback upon his efforts from those he assists?

Procedure.

In order to define an adequate representation of current practices of college-teacher preparation in Canada, 49 universities and colleges were initially selected from the 1968-1969 bulletin of the Department of Manpower, Ottawa, entitled Career Outlook: University Graduates. This bulletin listed all Canadian universities mounting graduate programmes, the disciplines so represented, and the level of the terminal degree.

Each of the 49 universities was tested against two criteria: a full undergraduate programme in Arts and Science, and a graduate school that offered the doctoral programme in at least eight of these traditional disciplines.

Table I shows the final selection of 18 universities to be surveyed, the 8 graduate departments in each (Biology, Chemistry, English, History, Mathematics, Philosophy, Physics, and Psychology), and the highest degree offered. These universities were distributed among the provinces of Canada as follows: Alberta (1), British Columbia (2), Manitoba (1), Nova Scotia (1), Ontario (9), Quebec (3), and Saskatchewan (1). Of the 18, two were French-speaking and one was bilingual.

As the number of Ph.D. degrees awarded by the 18 target universities during the last five years (1964-1969) closely approximates the total number of Ph.D. degrees awarded by all Canadian universities for the same time period (Fig. 1), the 18 target universities can be considered collectively as a very good index to the graduate programmes now offered at all Canadian universities. These 18 universities awarded during the five year period, 551, 673, 762, 972, and 1041 Ph.D. degrees whereas the total number of Ph.D. degrees awarded during the same period by all Canadian universities was 569, 697, 788, 1006, and 1108.[10] Thus 97% of all Ph.D. degrees awarded

[10] Data from Dominion Bureau of Statistics, Ottawa, contained in mimeograph lists entitled "Earned Doctorates Granted by Canadian Universities".

dept. / univ.	BIOL	CHEM	ENGL	HIST	MATH	PHIL	PHYS	PSYC	univ. PhD. TOTALS
Edmonton	D	D	D	D	D	D	D	D	8
Laval	D	D	D	D	D	D	D	D	8
Ottawa	D	D	D	D	D	D	D	D	8
Queens	D	D	D	D	D	D	D	D	8
Simon F.	D	D	D	D	D	D	D	D	8
Toronto	D	D	D	D	D	D	D	D	8
Univ. B.C.	D	D	D	D	D	D	D	D	8
West. Ont.	D	D	D	D	D	D	D	D	8
Manitoba	D	D	D	D	D	M	D	D	7
McGill	D	D	D	D	D	M	D	D	7
McMaster	D	D	D	D	D	M	D	D	7
Montreal	D	D	-	D	D	D	D	D	7
Saskatoon	D	D	D	D	D	M	D	D	7
Waterloo	D	D	M	M	D	D	D	D	6
Carleton	D	D	M	M	D	M	D	D	5
Dalhousie	D	D	D	M	M	M	D	D	5
Windsor	D	D	M	M	D	M	D	D	5
York	M	D	D	B	M	D	D	D	5
dept. TOTALS	17	18	14	13	16	11	18	18	125

TABLE I. Final selection of 18 universities and their highest graduate degree offered in 8 subject-disciplines. (Data from Career Outlook: University Graduates 1968-1969, Dept. Manpower & Immigration, Ottawa, 1969, 57-65)

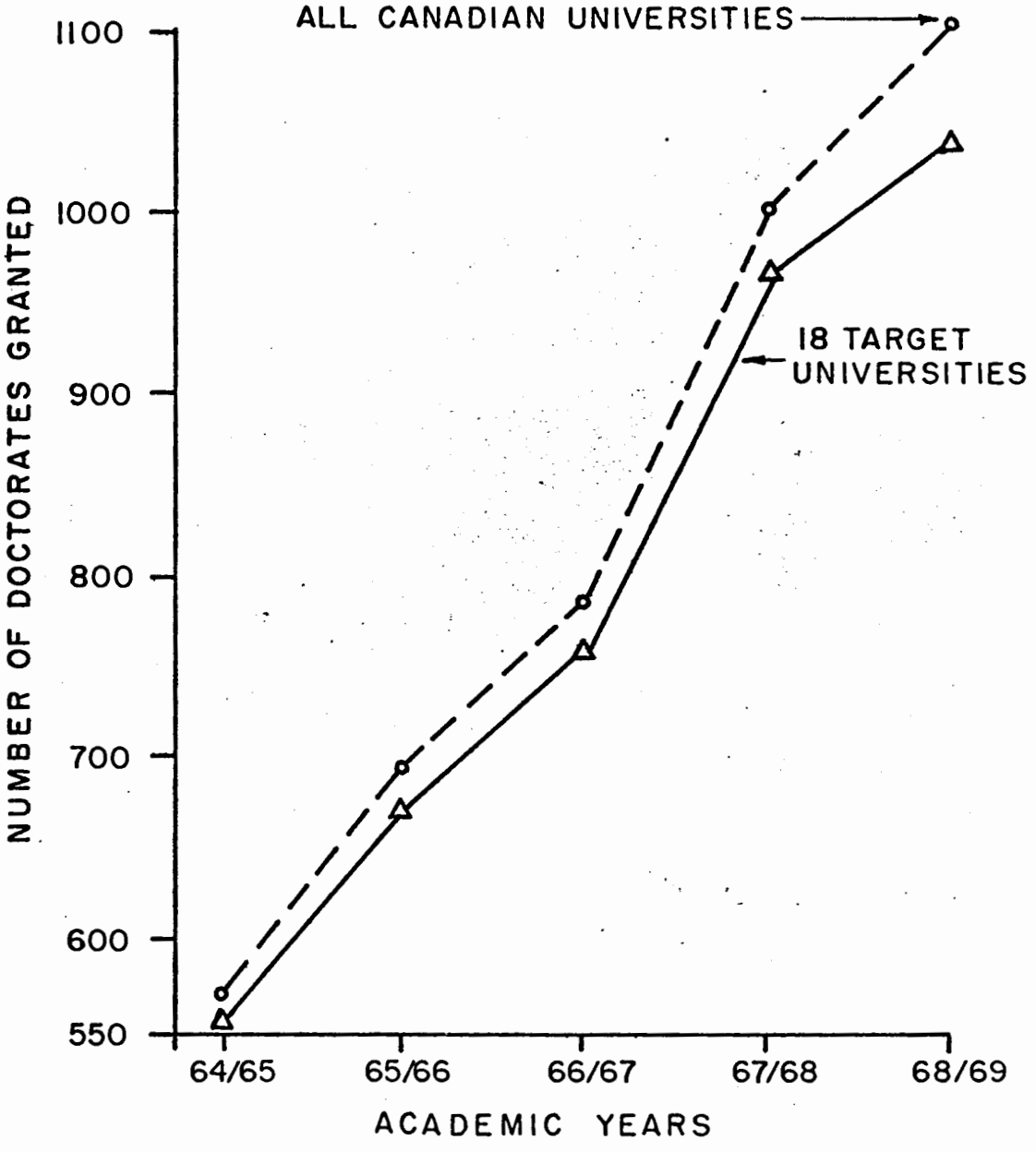

Figure 1: NUMBER OF Ph.D. DEGREES AWARDED BY ALL CANADIAN UNIVERSITIES AND BY 18 TARGET UNIVERSITIES OVER THE 5-YEAR ACADEMIC PERIOD 1964-1965 TO 1968-1969.
(DATA FROM DOMINION BUREAU OF STATISTICS, OTTAWA.)

during the academic years '64-'65 to '67-'68 was accounted for by the target universities and 94% of all Ph.D. degrees awarded during the academic year '68-'69. Clearly, 97% representation of a population is not the population represented exactly yet employing data from 18 universities and asserting their close approximation of the entire population of all Canadian universities, at least with respect to graduate studies, can hardly be considered provocative.

This is not the case for the inclusion of 8 specific areas of graduate study as being approximate of all graduate studies in the faculties of Arts and Science. For example, the disciplines of Anthropology, Botany, Economics, Geography, Political Science, and Sociology were not included in this survey. Consequently, data obtained from the disciplines that were surveyed can only be considered representative of the larger population of all Arts and Science graduate programmes.

To examine the graduate school as a training ground for college and university teachers, this survey approached two aspects of college teaching: the training of teachers and the hiring (by undergraduate divisions) of the novice teacher. Thus the first five questions of the survey instrument dealt with appointment practices of

the 8 disciplines at the 18 universities. The remaining questions explored the following: Does the graduate student, during his period of doctoral study, receive any preparation or training that will provide him with experience in college teaching? What is the form of this preparation or training? What is the attitude of the graduate department toward the relevance of offering some kind of programme in college-teaching preparation to its doctoral candidates? What estimate would you make concerning your successful graduates having gone on to university or college teaching appointments?

To answer these questions, a survey questionnaire consisting of 12 questions was mailed to the heads of departments of the eight disciplines in the 18 universities. It seemed reasonable to assume that the head of the department would be cognisant of hiring practices in its undergraduate division and as well would not only be in touch with the function of the graduate programme but with the spirit of that programme's development.

The 12-unit questionnaire was developed from an earlier series of pilot questions that were tested for reliability (eg. obtaining the precise data asked for) and consistency (eg. questions falling in a common domain should elicit responses from the same domain) by being

submitted to a number of heads of departments at Simon Fraser University and the University of British Columbia. Applicability of individual questions was tested as well between disciplines. While it is evident that a graduate programme in any discipline aims at the common objective to all disciplines (the preparation of competent men), each discipline varies from the others in the way it achieves this aim. In order then to validate the questionnaire that would quantitatively describe common practices to all disciplines but qualitatively reveal the attitudes unique to teaching, the investigator conducted a series of personal interviews with heads of departments in Biology, Chemistry, English, Mathematics, Philosophy, and Psychology at the aforementioned universities.

Each department head was asked to examine closely the questionnaire and covering letter in terms of his own discipline with the end in view of pointing out ambiguities, irrelevances, possible negative implications, etc. that may occur to him as a representative of his discipline and as a head of a department. The final questionnaire was the result of modifications recommended by these men (see Appendix A).

The questionnaires were mailed directly to the

heads of the eight selected departments in 18 target universities (N = 144). The names of these men were ascertained from current calendars of the 18 universities. Accompanying the questionnaire was a covering letter (see Appendix A) and a self-addressed stamped return envelope. The questionnaires were discretely coded to identify the department and university returning them as no provision for self-identification was included in the body of the questionnaire. The reason for omitting instructions that would explicitly identify the respondent was to encourage both frank replies and the return of the questionnaire. In spite of this omission, a number of department heads returned signed questionnaires. It was felt, nonetheless, that some departments may not wish to have their particular attitudes or departmental policies interpreted out of context and publicized so all heads of departments were assured that the publication of reported data would be tabular and discussed in summary form only.

A second letter enclosing a copy of the original questionnaire was prepared (see Appendix A) six weeks following the first mailing and sent to all department heads who had not responded to the initial mailing. A third mailing was considered but rejected.

Limitations.

The length of the survey instrument (ten specific questions, two optional questions) was considered optimum for maximizing the probability that it would be completed and returned. But due to this size restriction, additional or complementary data could not be solicited. It is difficult to assess the effect the request for more information would have had upon the outcome of this survey. To the extent thay any information in an exploratory investigation can be useful, the decision to maximize the frequency of returns at the expense of more data can be considered a limitation of procedure.

Another limitation of this investigation is the way the reported data can be interpreted. To cite the correspondence of certain aspects of the data to any analytic discussion on teaching would suggest implicitly an a priori association. In the case of this investigation, no empirical evidence has been shown other than the growth of the graduate schools in Canada in the recent past. The conclusions thus drawn from the data should be considered tentative due to the roughness of the exploratory instrument.

The ways by which graduate departments prepare

their students for possible teaching appointments in colleges and universities were assumed to be specific to the department and discipline in question with one exception: feedback. If a graduate department does not specifically inform its graduate student-T.A. about his efforts and progress as an assistant teacher (while he is making that effort), then this investigator holds that that department is not preparing the graduate student to be a college teacher. But to ask directly: "Does your department provide your T.A.'s with periodic feedback upon the performance of their duties as T.A.s ?" leads the respondent to consider the implications embedded in one form of reply over another.

The investigation of Nowlis et al (op. cit.) specifically underlines the tendency of university respondents to answer direct questions of procedure in a way that does not always accord with the reality of the situation. Nowlis reports "as we examined the uses of graduate students in various departments at the University of Rochester and in other universities, we were impressed with the repeated observations that our reporters did not agree with one another (p. 34)". He goes on to cite graduate students in some departments claiming full and unsupervised freedom in the way they undertook their teaching

duties, but the department heads responsible for the same graduate students report just as emphatically that the department exercised close supervision over its T.A.s. In other departments, "the faculty members said that they gave full independence to their graduate student instructors; the instructors in question often said their every move was prescribed (p. 34)".

To avoid compiling data that could have been influenced by the demand characteristics of a "do-you-provide-feedback" question, Q. 10 of this survey examined the extent of feedback provided by the department for the T.A. in an oblique way: "Does your Department review or evaluate the work of the graduate student as a Teaching Assistant? If so, how does your department do this?"

By constructing Q. 10 (the feedback question) in this manner, it was felt that the margin of error derived from an interpretive analysis of Q. 10 would still be less than the error of compiling erroneous information. Taking this view places a constraint upon the data and should be considered as a limitation to this investigation. (See Appendix C for a proposed method of analysis by which "feedback" could be deduced, given the reliability of the existing data.)

Results.

The response to the initial mailing of the 12-unit questionnaire to the heads of eight departments in 18 Canadian universities (N = 144) was just over 50% (73/144). The total number of responses received following a second mailing was 116 (81%). The data, based upon 116 replies, represents information and opinion from the eight sampled disciplines in the following proportions: Chemistry 16/18, Biology 16/18, Physics 16/18, Mathematics 14/18, History 14/18, Philosophy 14/18, Psychology 14/18, and English 12/18.

Table II illustrates the response distribution of questionnaires from department heads of eight disciplines in 18 universities. With the exception of the English departments (12/18), all disciplines returned either 14 or 16 questionnaires each.

Does the frequency of response from the English departments (12 of 18 universities) differ significantly in number than the frequency of responses from the other seven disciplines? How confident can we be in 67% of a discipline's representation if we intend to use it for comparison with either 78% or 89% representations of the other disciplines?

dept / univ	BIOL	CHEM	ENGL	HIST	MATH	PHIL	PHYS	PSYC	univ TOTALS
Dalhousie	X	X	X	X	X	X	X	X	8
McMaster	X	X	X	X	X	X	X	X	8
Saskatoon	X	X	X	X	X	X	X	X	8
Simon F.	X	X	X	X	X	X	X	X	8
Edmonton	X	X	X	X	X	X	X	-	7
McGill	X	X	X	X	X	-	X	X	7
Univ. B.C.	X	X	X	-	X	X	X	X	7
Waterloo	X	X	-	X	X	X	X	X	7
Windsor	X	X	X	X	X	-	X	X	7
Carleton	X	X	X	-	X	-	X	X	6
Ottawa	X	X	-	X	X	X	-	X	6
Queens	-	X	X	X	-	X	X	X	6
West. Ont.	X	X	-	-	X	X	X	X	6
York	X	X	-	X	X	X	-	X	6
Laval	X	X	-	X	-	X	X	-	5
Manitoba	X	-	X	X	-	X	X	-	5
Montreal	X	X	-	X	-	-	X	X	5
Toronto	-	-	X	-	X	X	X	-	4
dept TOTALS	16	16	12	14	14	14	16	14	116

TABLE II. Number of departments and universities returning questionnaire.

The binomial distribution is the underlying model for the analysis of this graduate school survey but the model does not provide the expected value of the random variable (i.e. the expected probability of getting a certain number of responses from any discipline). Receiving 116 of 144 possible replies (.8056) we can estimate to be the expected and normal probability value if it can be reasonably shown that obtaining as few as 12 responses from one discipline does not differ significantly from the average of the distribution of response frequencies of the other seven disciplines.

The null hypothesis to be tested states there is no difference between the expected number of responses (received from seven disciplines) and the actual occurrence of receiving as few as 12 responses from the eighth discipline.

The distribution of four disciplines representing 14 universities each and three disciplines representing 16 universities each, has an estimated return-frequency probability of .825 (104/126), an expected mean of 14.86, and a standard deviation of 1.61. Testing the occurence of 12 responses against these parameters yielded a Z-score of 1.78 that has a tabular probability value of .0750 (two-tailed).

By rejecting the null hypothesis, it can be argued that the frequency of the replies from the English department of 12 universities was not from the same population of reply frequencies obtained by the other seven disciplines. That is, one would be wrong about one out of twelve times in not including the sample from the English departments with the other seven samples.

However, the danger of committing a Type II error becomes quite clear when closer analysis of the universities that did not receive representation by the English department includes both the French-speaking universities from Quebec (Table II).[11] Could we have expected these two universities to provide detailed information about hiring practices and graduate school policies in the department of English when it can be shown (Table III) that one of these universities increased faculty positions (in the English department) over a five year period by 3 (from six to nine) and the other university decreased faculty positions by 2 (from nine to seven)? Compared with the average number of 36 faculty positions in the

[11] This discussion in no way impugns the excellent and deserved reputations of Laval and the Université de Montréal but considers only the reality of academic growth of a particular discipline (English) in French-speaking universities.

departments of English at the remaining 16 universities at the end of the same five year period, it would have been justified to have excluded the English departments of these two particular universities from the survey for clearly the growth of these two departments was atypical both with respect to English departments generally and with other departments reported upon in these two universities (see Table III). Had this been done, the response ratio of the remaining English departments would have been 12/16; the % return (75%) would have been in line (statistically) with the rest of the distribution of %-returns (eg. three returning 87% and four returning 78%).

Therefore, we accept the null hypothesis and consider the numerical representation of the English departments as reliable as the representations from any of the other disciplines.

In order to extrapolate beyond the information reported in this survey, Table III was compiled as a base referent for this investigation in the following way. The latest edition of Commonwealth Universities Yearbook 1969 (CUY) was examined with reference to the number of full-time faculty positions listed for each of the eight disciplines at each of the 18 universities. The number of positions were entered into line 1. Then

DISCIPLINES	YEAR	UNIV. CARLTON	DALHOUSIE	EDMONTON	LAVAL	MANITOBA	Mc GILL	McMASTER	MONTREAL	OTTAWA	QUEENS	SASKATEWAN	SIMON FRASER	TORONTO	BRITISH COLUMBIA	WATERLOO	WESTERN ONTARIO	WINDSOR	YORK	1969 TOTAL
BIOLOGY	1969	19	21	19	20	13	14	15	13	16	18	20	27	39	38	17	18	13	19	359
	1964	7	8	10	14	5	7	9	11	11	12	12	na	27	32	6	8	8	inc.	
CHEMISTRY	1969	16	14	31	27	24	27	26	24	16	25	27	25	27	55	29	23	13	16	445
	1964	8	10	27	19	13	21	17	15	9	12	14	na	28	40	13	17	10	inc.	
ENGLISH	1969	32	23	47	7	29	44	23	9	26	32	23	48	36	91	25	45	19	33	592
	1964	12	8	29	9	18	33	11	6	8	18	12	na	21	59	10	19	10	inc.	
HISTORY	1969	24	13	25	20	17	17	18	11	17	24	16	25	45	29	12	28	14	26	381
	1964	9	5	14	12	8	8	10	8	7	8	9	na	14	14	5	10	8	inc.	
MATHEMATICS	1969	28	14	43	30	24	50	23	36	16	30	17	30	54	68	18	17	15	19	532
	1964	11	7	32	26	18	37	11	14	10	18	11	na	34	46	22	14	14	inc.	
PHILOSOPHY	1969	10	7	16	24	10	15	12	20	30	14	12	11	23	14	16	25	14	18	291
	1964	6	3	7	18	5	9	6	17	12	8	8	na	18	7	5	12	13	inc.	
PHYSICS	1969	14	18	30	32	27	27	24	26	11	28	24	19	48	57	35	22	11	17	470
	1964	10	10	23	19	14	19	15	11	7	12	12	na	34	48	17	16	10	inc.	
PSYCHOLOGY	1969	19	18	22	15	16	17	18	26	18	22	8	15	25	29	40	30	18	48	404
	1964	7	5	14	inc.	9	12	8	19	14	10	5	na	22	15	8	14	7	inc.	

DISCIPLINES	NUMBER OF UNIVERSITIES REPORTED 1969	NUMBER OF UNIVERSITIES REPORTED 1964	AVERAGE NUMBER POSITIONS 1969	AVERAGE NUMBER POSITIONS 1964	PERCENT INCREASE
BIOLOGY	18	16	19	11+	87 %
CHEMISTRY	18	15	24	15	81 %
ENGLISH	18	15	32	18	104 %
HISTORY	18	16	21	9	122 %
MATHEMATICS	18	15	29	20	63 %
PHILOSOPHY	18	16	16	9+	86%
PHYSICS	18	16	26	17	65%
PSYCHOLOGY	18	15	22	11	117 %

TABLE III NUMBER OF FACULTY POSITIONS IN 8 DISCIPLINES AND 18 UNIVERSITIES FOR THE REPORTED YEARS 1964 & 1969. (FROM COMMONWEALTH UNIVERSITIES YEARBOOK) (INSERT) AVERAGE NUMBER OF FACULTY POSITIONS IN 8 DISCIPLINES FOR 1964 & 1969, PERCENT INCREASE COMPUTED BY $\frac{\sum (N_{69} - N_{64})/N_{64}}{NCOL_{64}}$

the edition of the CUY, five years earlier (1964), was selected and the same enumeration of faculty positions by discipline and by university was undertaken and the results entered into line 2. To calculate the % increase per discipline, line 2 was subtracted from line 1 (ie. the 1969 reported number of faculty positions minus the 1964 reported number of faculty positions) and the resulting positive difference was then divided by the 1964 number of faculty positions. The average % increase was obtained by dividing by the number of contributing universities. It should be noted that the CUY 1964 reported faculty positions for York University were incomplete; also, there were no faculty positions reported for Simon Fraser University. Consequently the maximum N represented by this portion of the table was 16 rather than 18. Also, several particular departments such as as English department cited earlier showed a reported decrease in the number of faculty positions between 1964 and 1969. If this occurred, that particular department was excluded as well from the computation of the % increase index. All 18 universities and all disciplines contributed to the summation of all faculty positions reported in the CUY 1969.

The development of this table, using the reported

number of faculty positions (as compiled and published in the editions of the CUY) was considered to be more reliable than compiling the table from data obtained directly from the calendars of the 18 universities. The reason for prefering this secondary source over the primary source was twofold: 1) any bias in the reported data would be systematized by the compilation methods of the CUY editors; 2) the control for accuracy of the reported data extracted from a current or five year old university calendar would have been virtually impossible, not only within the five year span but between universities as well. That is to say, inaccuracies inherent in the yearly production of a university calendar cannot a priori be assigned as random; in consequence, little confidence can be shown in the compilation of a table that was constructed from data drawn from sources that have unassigned error factors.

It should be noted too that the number of faculty positions reported in the CUYs are not for the actual calendar year of the publication but for the period two years earlier. This does not alter the real five year increment between the data reported in 1964 (based upon 1962 reports) and data reported in 1969 (based upon 1967 reports). In fact, the reported data two years out of phase may well be considered more complete due to the

additional time available for its compilation. Therefore, the development of Table III from the reported number of full time faculty positions as enumerated by the CUY is considered justified.

A summary by discipline, of the reported data from the survey questionnaire (Questions 1-5) is set out in Table IV.

Question 1: "How many new faculty members were appointed in your department (the promotional-tenure stream) during the last five years (1964-1969)?"

Question 2: "Of these, how many came directly from graduate schools, ie. their first full-time faculty position?"

Question 3: "Of these, how many were graduates of your own Doctoral or M.A. programme?" (Percentages of new faculty hired directly from ones own graduate school or from other graduate schools are also included in Table IV).

Question 4: "Of <u>all</u> new appointments, how many were assigned teaching duties in the undergraduate programme?"

Question 5: "Of those coming directly from graduate school (yours or others) how many appointees were assigned teaching duties in the undergraduate programme?"

	BIOL	CHEM	ENGL	HIST	MATH	PHIL	PHYS	PSYC	Grand totals
No. univ. reporting	16	16	8*	14	14	14	15*	14	111
TOTAL hired	169	194	155	198	348	159	239	285	1747
$\bar{x}$ hired	10	12	19	14	25	11	16	20	
(from) Grad. Schools	65	58	79	104	175	86	99	126	792
$\bar{x}$ Grad.	4	3	10	7	12	6	6+	9	
(from) Own School	7	4	12	18	15	16	33	30	135
$\bar{x}$ Own	0·5	0·3	1·5	1·3	1·0	1·1	2·2	2·1	
RATIOS									
Grad./Tot.	·39	·30	·51	·53	·50	·54	·41	·44	
Own/Grad.	·11	·09	·15	·17	·08	·19	·33	·24	
% Assigned Teaching duties									
(of the) TOTAL	99%	99%	100%	98%	97%	98%	97%	91%	
(of the) Grad.	100%	100%	100%	100%	98%	100%	100%	99%	

TABLE IV. Number of new faculty reported hired in 8 disciplines during period 1964-1969 (See Q. 1-5 in text).

*Departments reporting difficulty answering Q. 1-5. 4 of 12 English departments and 1 of 16 Physics departments did not answer this section of the questionaire.

It can be easily seen (Table IV) that well over 90% of all reported hirings for all departments in all universities were assigned teaching duties in the undergraduate programme. Moreover, 6 of the 8 disciplines reported that all (100%) of those hired from graduate schools were assigned to teach undergraduates. The other two disciplines reported over 97% hired from graduate schools were assigned to teach undergraduates.

Question 6: "From 1964 to 1969, how many of your successful Doctorate or M.A. candidates would you estimate have received appointments at universities (yours or others)?"

Departments answering Q. 6 varied considerably in their estimation of the number or percentage of former graduate students now employed at universities. A summary of replies to this question by departments and the reporting of point estimates would not sufficiently describe the different variations between and within departments. Two factors seem to have influenced the variation of the replies from the department heads within any single discipline: the request for an estimated number (but often reported in the form of a percentage) and the often-stated remark appended by the department head to the effect that he was unable to say how confident he was

with his estimate. The variation of the 106 responses to Q. 6 fell into four categories: "no idea", "0", numerical notation, or percentage notation. Figure 2 shows the distribution of these response categories among the 8 disciplines.

Setting forth the results to Q. 6 requires a discrete selection of the data. The category "no idea" provides no information at all. But the category in which a number is given (say "9") tells very little about the proportion of successful doctorate of M.A. candidates from that department who have gone on to university appointments. For example, the "9" response would mean 100% if there had been 9 Ph.D. graduates during the past 5 years but would mean only 25 % if there had been 30 Ph.D.s and 6 M.A.s who subsequently had received university positions. In view of the ambiguity of interpretation of numerical responses, the response categories "0" and "percentage notation" were used to describe the population of responses to Q. 6. This means that of the 106 useable responses received for Q. 6, only 38 (36%) are actually examined here. Consequently, interpretation of the data elicited by Q. 6 is severely limited even though a case could be made for the random assignment of responses to the "percentage" category as being a legitimate sample for the

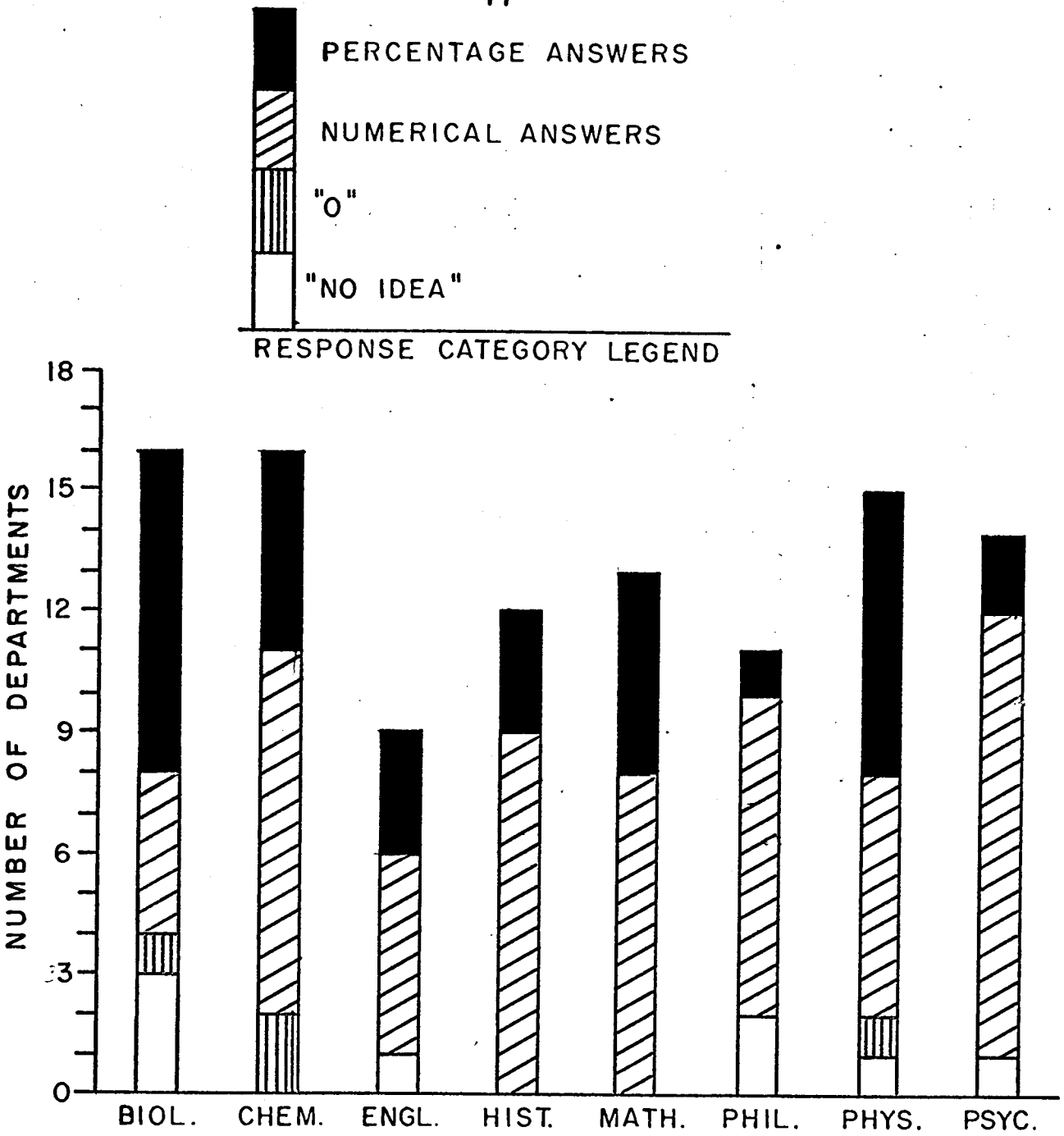

Figure 2: ANSWER DISTRIBUTION TO QUESTION 6 BY 106 RESPONDENTS IN 8 DISCIPLINES, RESPONSE CATEGORIES RANGE FROM "NO IDEA", "0", A NUMBER, OR A PERCENTAGE.

total Q. 6 population of responses.

Figure 3 shows both the range of "percentage" response and the average % responses for the eight disciplines surveyed. The insert tabulates the actual "percentage" responses but not the "0" responses (see Fig. 2). Calculation of the range of all percentages reported (0%-- 100%) and the mean percentage (62%) are also included in Figure 3.

Question 7: "In what ways does your Department specifically provide teaching experience (or training) for your graduate students?" The one answer to Q. 7 most subscribed to (and common to all eight disciplines) was "Teaching Assistant". A general analysis of the meaning of "Teaching Assistant" would place the T.A.s in Physics, Chemistry, Psychology, and Biology as lab instructors and demonstrators; the T.A.s in Mathematics and Physics as leaders in problem-clinics; the T.A.s in History, Biology, and Physics as "occasional lecturer" in large undergraduate courses but "limited to a few senior graduate students"; the T.A.s in English, Philosophy, and Mathematics as a section leader "who supervises and teaches his own section of a large undergraduate course throughout the term"; the T.A.s in Philosophy, Psychology, Mathematics, History, English, and Biology as tutorial

	PERCENTAGES REPORTED
BIOL.	20%, 25%, 25%, 50%, 50%, 90%, 90%, 100%
CHEM.	20%, 20%, 25%, 50%, 75%
ENGL.	90%, 90%, 100%
HIST.	90%, 100%, 100%
MATH.	95%, 95%, 100%, 100%, 100%
PHIL.	80%
PHYS.	25%, 50%, 50%, 50%, 55%, 75%, 80%
PSYC.	60%, 70%

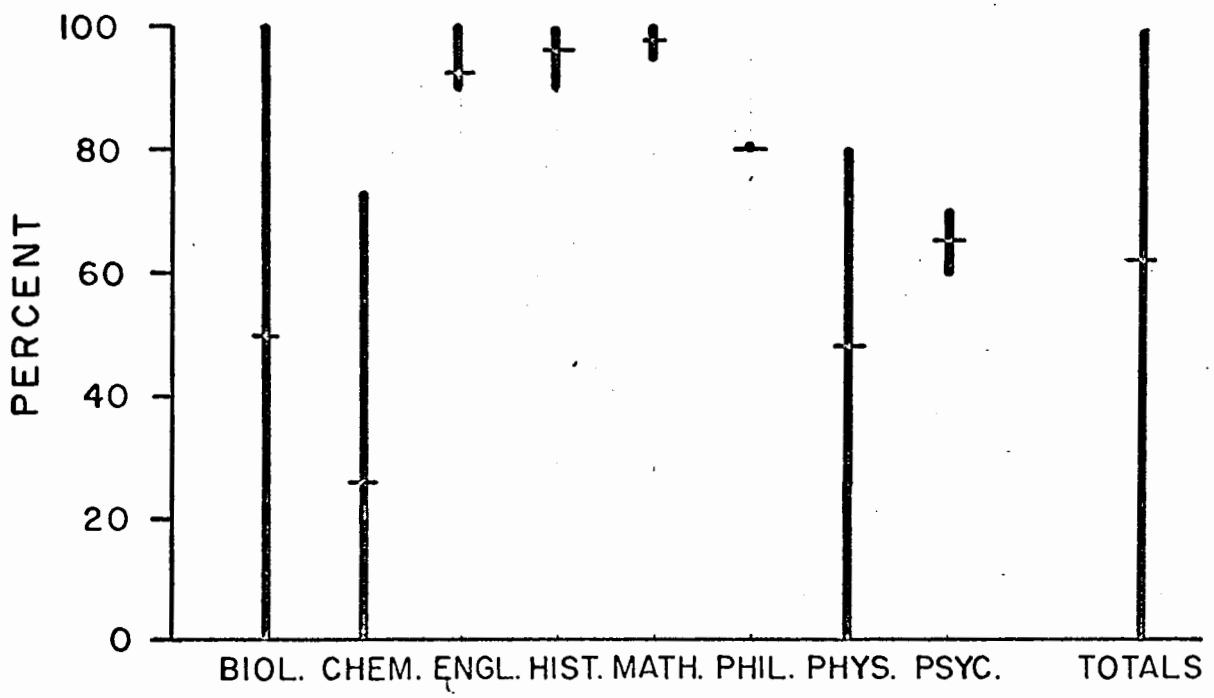

Figure 3: RANGE AND AVERAGE OF 8 DISCIPLINES ANSWERING QUESTION 6 DENOTED AS PERCENTAGES. (INSERT) FREQUENCIES OF PERCENTAGE-RESPONSES BY DISCIPLINES. "0" SCORES ILLUSTRATED BUT NOT RECORDED. (see figure 2)

leaders and markers. Table V shows the main divisions of the meaning "Teaching Assistant" and the various disciplines that include these divisions in their responses to Q. 7.

Several department heads interpreted "teaching experience or training" to mean as well the preparation and presentation of graduate seminars, research seminars, or departmental seminars in the graduate students' area of interest. Disciplines that subscribed to the graduate's own seminar work as "teaching experience" were History, Chemistry, Biology, and Physics.

Finally, one Psychology department in an Ontario university states it offers a "teaching seminar" for its graduate student T.A.s; and, several departments at both French-speaking universities offer their graduate students courses in methodology and pedagogy as these relate to the subject discipline.

Question 8: "From 1964-1969, how many of your students in the Doctorate or M.A. programmes have had some experience as Teaching Assistants with the undergraduates?" With the exception of a very few single departments, associated collectively neither with any one discipline or university, the range of responses to Q. 8 was 80% - 100%. Four departments even stated explicitly that

T.A. Categories	Disciplines employing the T.A. category
Lab. Instructors and Demonstrators	Biol., Chem., Phys., Psyc.
Leaders in Problem-clinics	Math., Phys.
"Occasional" Lecturer	Biol., Hist., Phys.
Section Leader	Engl., Math., Phil.
Tutorial Leader and / or Marker	Biol., Engl., Hist., Math., Phil., Psyc.
Graduate student's own seminars	Biol., Chem., Hist., Phys.

TABLE V. Main divisions assigned to the meaning of the term 'Teaching Assistant' by 1 to 8 reporting disciplines.

all their graduate students were expected to serve at one time or another as a T.A. as part of their overall graduate programme.

Question 9: "What are the general duties of graduate students in your department as Teaching Assistants? (check x) relevant categories: Seminar (turorial) leader ... Laboratory instructor ... Demonstrator ... Project Advisor ... Assistant Lecturer ... Alternate Lecturer ... Other (please specify) ..." The response categories check by department heads match quite closely the written responses to Q. 7 (see Table V). From Q. 8 a separate enumeration of the categories "Assistant Lecturer" and "Alternate Lecturer" are set forth in Table VI together with the number of departments per discipline that checked neither of these categories.

Question 10: (the feedback question) "Does your Department review or evaluate the work of the graduate student as a Teaching Assistant? ... If so, how does your Department do this? ....." The range of responses to Q. 10 included in the yes category: "informally", "semi-annual staff meetings", "grape-vine assessment", "student evaluation forms", "periodic consultation with course supervisor", and "nothing formal

Discipline	LECTURER		
	Assistant	Alternate	Neither
Biology	1	5	9
Chemistry	2	2	10
English	1	4	7
History	0	2	12
Mathematics	3	4	8
Philosophy	1	3	9
Physics	1	3	11
Psychology	6	8	3

TABLE VI. Number of departments in 8 disciplines that checked 'lecturing category (Q. 9).

unless complaints become pressing". Table VII presents the frequency of "yes" responses to Q. 10 and the percentage of each of the disciplines in this category.

The remaining two questions were considered optional.

Question 11: "What specific recommendations would you make pertaining to the preparation of the graduate student who will most likely face future teaching responsibilities at a university?"

Question 12: "have you a further comment you feel is pertinent to this investigation (eg. research/ teaching loads in your Department; aims of your graduate programme; relevance of teaching experience for your graduates; etc)?"

Both Q. 11 and Q. 12 were included to sample the current attitudes of department heads on the issue of teacher-preparation as a function of the graduate school programme. (See Appendix B for a representative selection of responses to Q. 11 and Q. 12). Table VIII shows the distribution between disciplines of those answering either Q. 11 or Q. 12 or both.

Compilation Method.

Transforming the raw data to discipline averages,

Discipline	Univ. Reporting	Freq. of Yes-response	% Yes
Biology	15	9	60%
Chemistry	16	10	63%
English	12	9	75%
History	14	8	57%
Mathematics	14	5	36%
Philosophy	14	9	64%
Physics	15	11	73%
Psychology	14	10	71%

TABLE VII. Frequency of positive responses to Q. 10 and percentage of discipline represented.

Discipline	Univ. Reporting	Number answering Q. 11 and / or Q. 12	% Representation
Biology	15	12	80%
Chemistry	16	11	70%
English	12	9	75%
History	14	9	64%
Mathematics	14	9	64%
Philosophy	14	11	79%
Physics	15	9	60%
Psychology	14	13	93%
Total		83/ 114	72%

TABLE VIII. Number of departments answering either Q. 11 or Q. 12 or both and the representation per discipline.

ratios, and totals; the development of the base-index growth table (Table III); and the computation of the E-scores (see Appendix C) involve a high probability for unassigned error to influence the reported results: error in transcribing numbers and error in the actual computations. To control for these types of errors that plague investigations dependent upon a survey instrument, the author wrote several computer programs that were run on the IBM/360 at the University of British Columbia. The first program checked the accuracy of the transcribed data by having the numbers punched onto IBM cards twice (each time by a different operator), the data cards then read into two adjacent matrices, and checked against each other cell by cell under the immediate print regime for non-matches. Once the data on the cards were known to be a true transcription, several programs were developed for the appropriate transformations. (See Appendix D for these Fortran algorithms).

Discussion.

Considering the growth of Canadian universities over the last five years (total undergraduate enrollments increased 53% between 1964 and 1969 from

220,277 to 337,607) as indicative of the increasing interest Canadians have shown in the acquisition of higher education, what has been done to accommodate them? For one thing, new colleges, junior colleges, and even several universities have been opened. For another, existing universities and colleges have increased the number of full-time faculty positions that lead to tenure. For example, between 1965 and 1969, the total number of teachers in colleges and universities in Canada increased 60% from 11,662 to 18,665.[12] (These statistics were obtained directly from the Higher Education Section, Education Division of the Dominion Bureau of Statistics, Ottawa).

A part of the investigation of this paper searched for and focused upon the extent of specific increases of teaching staff in eight disciplines in the Arts and Science Faculties at 18 universities. By so doing, a practical case can be developed for the serious examination of the teaching credentials of the new college teacher, if it can be shown that a substantial number of

12 Cf. Table III in which the average percent increase in teaching staff of the 8 selected disciplines was 91%. Note that Table III covers a 5-year span while the cited figures here cover a 4-year period.

them have been hired directly from graduate schools and the market for more teachers still expands. A second part of this paper has examined particular ways graduate students are afforded teaching experience.

The development of Table III that shows the specific growth-ratios of the eight disciplines in the 18 universities thus provides a base index against which the hiring data culled by questions 1-5 can be related. In Table III, all disciplines showed substantial increases in the number of faculty positions over the five year span. However, the range between disciplines as expressed by the % increases provides no useful information about either the representativeness of these eight disciplines to those not selected from the Arts and Science Faculties or about the growth rates of the selected disciplines. What is needed is some assurance that irrespective of the size or % increase of any discipline, the proportional rankings between them remains reasonably constant over time. With this assurance, further analysis of the data can be examined against its "corelatability" with the discipline's growth.

The statistical analyses used here were based upon Spearman's rho statistic. Guilford (1942) points

out the utility of this statistic as appropriate for product-moment correlations when the N size is small. Moreover, the data in this survey are enumerative (nominal scale) rather than metric (interval scale) which precludes their use in the computation of the Pearson's product-moment coefficient in that frequency data violates the "continuity" assumption (Guilford, op. cit., p. 304). Therefore the rank-order statistic (rho) was used, basing the ranks upon mean scores. It has been noted elsewhere (Hays, 1963, pp. 200-201) that the use of the sample mean (average) is the best estimator of the population mean. In analysing the statistical characteristics of this survey, the entire population (18 Canadian universities approximating all Canadian universities with respect to the production of the Ph.D) has been subdivided into 8 sample groups (the 8 disciplines). There is strong evidence for the claim that the mean of these samples is a better estimator than the median (see Bradley, 1968, pp. 20-22) if the criterion of normality of distribution is met.

Briefly, the question to be answered is this: are the 8 disciplines truly representative (as samples) of all the disciplines that contribute to the production of the Ph.D.? It was argued earlier (pp. 54-55) that

the selection of the universities was based upon the stipulation of a full undergraduate programme in Arts and Science and upon the evidence of graduate programmes leading to the Ph.D. Eight disciplines met the graduate programme criterion at all 18 universities and 125 of 144 departments were reported to be at the Ph.D. level (Table I). By asserting the stringency of the Ph.D.-programme criterion, the assumption of normality of distribution of the 8 disciplines among the 18 universities is considered demonstrated.

By examining the time periods 1964 and 1969, the hypothesis is made that there is zero correlation in the rankings between the eight disciplines with respect to the average number of faculty positions for those two years (ie. $\bar{x}$ no. pos. 1964 by $\bar{x}$ no. pos. 1969). Using Spearman's rho to approximate the coefficient of correlation (r) for a small sample, the rho coefficient obtained was .857. Consequently, the assurance that the ranking between the disciplines on the size variable is reasonably strong (α=.01).

As Table III was compiled from the listings of positions of full-time faculty in the eight disciplines of 18 universities from the two end-points of a five year span, the number of positions can be considered (at the

two end-points) as the minimum and maximum available faculty positions for that time period. However, the reported number of hirings from these same university departments over a five year span (questions 1-5) does not include the same stability: Table III shows the exact number for the two reported years but Table IV reports the transaction of hiring during the five year span and nothing about turn-over of personnel. Therefore, to test for correlation of rank between the disciplines on the size variable (indexed by the average number of positions 1969) and the average number of reported faculty hired, the null hypothesis states zero correlation between the rankings of the disciplines with respect to size and the ranking of the disciplines with respect to the frequency of hiring. In effect, the alternate hypothesis would hold that a significant correlation between hiring-frequency and discipline size would be due to the former maintaining the latter. The rho coefficient was .738 ($.05 > \alpha > .01$). The null hypothesis is rejected in favor of the alternate hypothesis: there is a fairly strong association between the growth of a discipline and the hiring frequency in that discipline that increases staff rather than replaces it.

To illustrate the analyses of the relationships between the hiring practices of the eight disciplines and the associations that can be shown vis a vis the hiring of novice teachers (eg. those hired directly from graduate school to full-time staff position), Table IX was compiled giving the rank orderings of size ($r1 < r2 < r3 < \ldots < r8$) in the reported categories.

1. The correlation between the mean number of novice teachers hired (ie. from graduate schools) and the mean number of all hirings is significant. ($\bar{x}$ hired by $\bar{x}$ Grad; $\alpha = .01$, rho = .833).
2. The correlation between the frequency of hiring novice teachers from one's own graduate school and the proportion of hiring from one's own graduate school to all graduate schools is significant. ($\bar{x}$ Own by Own/Grad; $\alpha = .01$ rho = .833).
3. It is of interest to note that Philosophy hires the greatest proportion of novice staff to all staff (Grad/Tot) yet ranks third lowest (after Chemisty and Biology) in hiring novice staff generally ($\bar{x}$ Grad). This means that Philosophy (with the least number of

	(from TABLE III)						
	$\bar{x}$ # fac. pos. 1969	% increase (5-year)	$\bar{x}$ hired	$\bar{x}$ Grad.	$\bar{x}$ Own	Own/Grad.	Grad/Tot.
BIOL.	19	87	10·5	4·3	·5	·108	·385
(rank)	(2)	(5)	(1)	(2)	(2)	(3)	(2)
CHEM.	24	81	12·1	3·6	·3	·086	·300
(rank)	(5)	(3)	(3)	(1)	(1)	(2)	(1)
ENGL.	32	104	19·4	9·9	1·5	·152	·510
(rank)	(8)	(6)	(6)	(7)	(6)	(4)	(6)
HIST.	21	122	14·1	7·4	1·3	·173	·525
(rank)	(3)	(8)	(4)	(5)	(5)	(5)	(7)
MATH.	29	63	24·9	12·5	1·0	·085	·503
(rank)	(7)	(1)	(8)	(8)	(3)	(1)	(5)
PHIL.	16	86	11·4	6·1	1·1	·186	·541
(rank)	(1)	(4)	(2)	(3)	(4)	(6)	(8)
PHYS.	26	65	15·9	6·6	2·2	·333	·414
(rank)	(6)	(2)	(5)	(4)	(8)	(8)	(3)
PSYC.	22	117	20·4	9·0	2·1	·238	·442
(rank)	(4)	(7)	(7)	(6)	(7)	(7)	(4)

TABLE IX. The rank ordering of 8 disciplines in selected categories of hiring practices.

faculty positions to fill - see Table III) does not hire new staff as regularly as the other seven disciplines do; but, when it does hire new staff to fill faculty positions, it hires proportionately more novice staff than it does from other sources.

4. Excluding the ranks of Philosophy and rerank the other seven disciplines for association between the mean number of novice staff hired and the proportion of novice staff hired to the total of all staff hired, the correlation is significant. ($\bar{x}$ Grad by Grad/Tot; $\alpha < .05$, rho = .750).

5. Of all the disciplines, Mathematics seems to run counter to the tendency shown in the hiring proportion of new staff from one's own graduate school to new staff from all graduate schools (Own/Grad) exemplified by the seven disciplines: that is, Mathematics hires the largest number of novice teachers from graduate schools ($\bar{x}$ Grad) but proportionately the least number from its own graduate school (Own/Grad).

6. Excluding the ranking of Mathematics and re-

ranking the other seven disciplines for association between the mean hiring of all novice teachers and the mean hiring of novice teachers from one's own graduate school, the correlation is significant. ($\bar{x}$ Grad by $\bar{x}$ Own; $\alpha < .05$, rho = .750).

7. It is of interest to note that Physics hired the largest <u>proportion</u> of its novice teachers from its own graduate school, yet (from Table III) Physics showed the least % increase of faculty positions over the five year period (after Mathematics).

8. Excluding the ranking of Physics and reranking the other seven disciplines for an association between the % increase and the <u>proportion</u> of novice teachers hired from one's own graduate school to all graduate schools, the correlation is significant. (% increase by Own/Grad; $\alpha = .05$, rho = .714).

9. Finally, excluding <u>both</u> Mathematics and Physics and then rank-ordering the remaining six disciplines for association between the mean number hired from graduate schools (novice teachers) and the mean number hired from one's

own graduate school, the correlation is significant. ($\bar{x}$ Grad by $\bar{x}$ Own; $\alpha = .01$, rho = .943).

Thus the evidence derived from the hiring data reported in this survey supports the following assertions:

a) as a discipline hires more teaching staff, it tends to hire more novice teachers (eg. fresh degree-holders from graduate schools);

b) during the last five years (1964-1969) 1,747 full-time staff were hired as reported by 111 departments in this survey; of all those hired, 45% (792/1747) were hired directly from graduate schools;

c) the hiring practices of Mathematics and Physics seem to be unique to those disciplines --Mathematics hires the most novice teachers (of all the disciplines) but the fewest from its own graduate schools; whereas Physics, when it does hire novice teachers, selects them from its own graduate programme more often than does any other discipline;

d) as the remaining six disciplines (Biology, Chemistry, English, History, Philosophy, Psychology) hire more novice teachers these disciplines tend to select their staff proportionately more often from their own graduate programme than from other graduate schools;

e) seven of the eight disciplines surveyed reorted that 97% or more the the newly hired staff were assigned teaching duties in the undergraduate programme; the eighth discipline (Psychology) reported 91% of newly hired staff assigned teaching duties in the undergraduate programme;

f) seven of eight disciplines surveyed reported that all (100%) of the newly hired novice teachers (ie. staff hired direcly from graduate school) were assigned teaching duties in the undergraduate programme; the eighth discipline (Mathematics) reported 98% of newly hired novice teachers were assigned teaching duties in the undergraduate programme.

From the replies to this survey on the specific preparations of graduate students for teaching, several factors have become apparent. The most prominent of these challenges the thesis that graduate students should receive college-teacher preparation at all! This view is indirectly supported by the evidence derived from Q. 6 ("From 1964 to 1969, how many of your Doctorate or M.A. candidates would you estimate have received appointments at universities?"), in which it was found that Biology, Chemistry and Physics responded in a fashion similar to

each other but differently than the other five disciplines (see Fig. 3). While there is nothing unusual about this finding as it would be expected for the Ph.D.s in these three disciplines to find employment in the applied branches of their fields, there are, nevertheless, further considerations to be explored.

Some department heads in Chemistry estimated that 70% of their former grads were now employed at universities; similarly, in Physics, some department heads set their estimates at 80%; and in Biology, the estimates were set at 90%. These were the upper end of the range of estimates that were represented at the lower end by 20%, 25%, and 20% (respectively) of their graduates now employed at universities.

Yet overall, these three disciplines characterize themselves as developers of the future scientist rather than as developers of the future scientist/teacher. The hiring data also bear out this characterisation for it can be shown (Table IV) that the ratios of hiring new faculty from graduate schools to the total hiring of new faculty (Grad/Tot) for the disciplines of Chemistry, Physics, and Biology are significantly different from the ratios of hiring new faculty from graduate schools to the total hiring of new faculty for the other five

disciplines. (Wilcoxon's Rank-Sum Test, $\alpha = .025$)

This characterisation is further substantiated by the form and content of the replies given by heads of departments of Chemistry, Physics, and Biology to the questions 11 and 12. (see Appendix B.) These questions asked "What specific recommendations would you make pertaining to the preparation of the graduate student who will most likely face future teaching responsibilities at a university" and "Have you a further comment you feel is pertinent to this investigation?" The replies to these questions can be summarized as follows:

Biology: The emphasis upon developing research abilities of the graduate student that include the preparation and presentation of research seminars seems to be one of the ways this discipline considers as useful in the preparation of the college teacher. The theory of teaching or the so-called "methodology" of teaching seems not to be explicitly necessary (according to these respondents) for the preparation of their graduate students for teaching duties. (10 of 16 respondents).

Chemistry: The range of comments in this discipline extends from "supervised tutorial and lab-demonstration experiences" to "in-service training upon faculty appointment". Incentives for conscientious T.A.s

have been proposed. Pedagogical experience has been disclaimed either as being impractical in terms of the time allotment for the graduate's programme or on grounds of non-applicability to the teaching of science. (12 of 16 respondents).

Physics: Emphasis seems to be divided between the development of the graduate student as an effective communicator (via department seminars and conferences) and the belief that tutorial supervision and lab demonstration duties under direction are sufficient preparation for future college teaching responsibilities. (9 of 16 respondents).

A summary of replies from the other five disciplines to Q. 11 and 12 are as follows:

History: Knowing his own subject well but not losing sight of the larger aspects of the entire discipline field. Comments also include the need for in-service training of faculty and graduate students in the "arts" of teaching. (9 of 14 respondents).

Mathematics: A thorough knowledge of his field coupled with tutorial experience tempered by advice from senior faculty. No mention of pedagogical experience or training <u>per se</u> other than a disclaimer of its relevance to the graduate programme of this discipline. (9 of 14 respondents).

Philosophy: Recognition of the need for some supervised training in the teaching of undergraduate courses is clearly stated. As well, the need for sufficient mastery of the discipline is either explicitly stated or strongly implied. Several methods are outlined by which graduate students can be introduced into the responsibilities of classroom duties. (10 of 14 respondents).

English: Comments from this discipline tend toward the consideration of future plans for the development of teaching experiences for the graduate students than toward a description of <u>current</u> practices that afford teaching experiences for them. (8 of 12 respondents).

Psychology: The current use of the T.A. under supervision seems to be adequate for the development of the graduate student as a future college teacher. Modelling behavior (upon a senior faculty member), reward schedules, and experience acquired at different universities are all suggested methods for preparing the graduate student for teaching. (13 of 16 respondents).

Common to all eight disciplines however, is the assertion that the present employment of the T.A. (irrespective of the discipline) is sufficient preparatory experience for the graduate student for his future

teaching duties. Can this assertion be accepted summarily?

On the one hand there is evidence suggesting a fairly wide range between the proportions of each discipline that review or evaluate the work of the T.A. (presumably for the T.A.'s benefit or edification). Table VII illustrates the frequency of positive responses to Q. 10 (the feedback question). At one end of the range, 5 of 14 Mathematics departments (36%) responded positively to Q. 10 ("Does your Department review or evaluate the work of the graduate student as a T.A.?"). At the other end of the range, 9 of 12 English departments (75%) and 11 of 15 Physics departments (73%) responded positively. By restating the above evidence in its complement form --the range of responses to Q. 10 was bounded at one end by 27% of one discipline answering "no evaluation or review of the T.A.'s work" and at the other end of this response range, 64% of one discipline responded "no evaluation or review of the T.A.'s work"-- the sufficiency of the T.A.'s experience as an apprentice teacher can be seriously questioned.

On the other hand, university departments responding to Q. 9 ("What are the general duties of gradu-

ate students in your department as T.A.s? Check the relevant categories:...." reported the employment of their T.A.s as markers as follows: Biology 1 of 15 (departments reporting on this employment category), Chemistry 1 of 16, English 1 of 12, History 4 of 14, Mathematics 4 of 14, Philosophy 2 of 14, Physics 2 of 15, and Psychology 3 of 14.

Thus the employment of the T.A. as a marker ("an unseen person who grades papers and proctors exams and may have no contact with the undergraduates at all" Nowlis et al, op. cit., p. 2; italics mine) was reported by 16% (18/114) of the university departments answering Q. 9. Were this the only experience the graduate student had had in "teacher-preparation" prior to his receiving an appointment to full-time faculty status, the case in arguing for "teacher-preparation" by the department from which the student came would indeed be slim. At the other extreme, departments employing the T.A. as a lecturer (Table VI), that is, either as an assistant lecturer or as an alternate lecturer, represented 39% (45/114) of all the university departments answering Q. 9.

Here, however, a case can certainly be made for those departments that provide this opportunity (ie. lectur-

ing in an undergraduate course) to their graduate students inasmuch as the lecturing experience for the graduate student does approximate the challenges the graduate student would face upon his appointment to full-time faculty. The preparation, organisation, and delivery of material in the undergraduate-lecture setting has been the traditional and most often employed method of instruction in higher education since the Middle Ages.

Providing the graduate student with opportunities to lecture to a large undergraduate class is undoubtedly useful experience for him. If nothing else, this experience will sensitize him to some of the basic dynamics of public speaking (ie. volume, pace, rhythm, posture, etc.). But to argue that these lecturing opportunities can be considered <u>preparatory</u> training for college teaching or apprenticeship experience in college teaching , without critical and systematic supervision of his work from experienced faculty, suggests that the novice lecturer is able to discriminate between what is competent in his performance and what is not and alter his behavior accordingly if he is to benefit from his lecturing experiences. For some graduate students, this may indeed be the case. For others who wish to focus their best efforts upon their own studies, indifferent

or no supervision of their performance as lecturers will not prepare them for the full-time teaching (lecturing) responsibilities they will later face as college teachers.

The following responses to Q. 10 have been taken from the departments that have employed the T.A. as a lecturer: ("Does your department review or evaluate the work of the graduate student as a T.A.? If so, how does your department do this?").

> "Yes. As a committee of the whole, considering the whole academic man, the chief reporter in each case is the faculty member who has supervised."
> (History)

> "Yes. Reports from supervisory staff members."
> (English)

> "Yes. Undergraduates are interviewed in groups of four. The T.A.s are a frequent topic."
> (Physics)

> "Yes. Observation by the professors and evaluation of performance at staff meetings. Award of prizes for outstanding assistants."
> (Chemistry)

> "No. We would like to do it but have not found a valid method."
> (Chemistry)

> "Yes. One professor sits in on each instructor at least once during the year and later discuses his teaching with him."
> (Philosophy)

> "Yes. Student evaluation." (Psychology)

"Yes.. When making awards, previous performance is reviewed."
(Philosophy)

"Yes. Each responsible staff member reports on this aspect. Those in introductory psych hold weekly meetings for evaluation."
(Psychology)

"Yes. We look into the matter only if necessary as indicated by student feedback."
(Mathematics)

"Yes. Student evaluation, visits by professors, regular consultation."
(Mathematics)

As supervision of the T.A. as lecturer ranges from "at least once a year" to "weekly meetings for evaluation", little can be said beyond individual cases about the usefulness of the lecturing experience for teacher-preparation.

Several disciplines cited the graduate's own tutorial and seminar presentations as being useful teaching experiences (Table V). This may well be true for the fortunate student assigned to a small advanced course upon his appointment as a full-time college teacher. Were he instead assigned a large introductory course or a section of a large introductory course, one would be hard pressed to sustain the argument for learning-transfer developed in a small, intense, and knowledgeable setting to the larger and less rigorous one that is typified by the introductory course.

Chapter V

CONCLUSIONS AND RECOMMENDATIONS

The T.A. experience has been cited by over 90% of all the department heads responding to this survey to be adequate preparation for future teaching duties for the college or university fledging teacher. The evidence gathered by this survey supports the assertion that the majority of graduate departments in Arts and Science at 18 leading Canadian universities do employ their students variously and on occasion as assistant lecturers, alternate lecturers, demonstrators, tutorial leaders, or markers.

However, if the evidence of employment of graduate students as T.A.s is to be used to support the assertion that these graduate students receive instruction or preparation in the technique and responsibility of college teaching, then examples of "feedback" (eg. critical evaluation by competent superiors of the T.A.'s work while he is so engaged) would have to be shown as well. This survey has been unable to establish any relationship

other than casual between the nature of the T.A.'s work and the useful evaluation of that work by the reporting departments. Thus, there is little support to the assertion that employment of the graduate student as a T.A. in fact prepares the student as a college or university teacher.

It has been noted (pp. 63-64) that a survey instrument may not be the best tool for determining "feedback" practices due to the demand characteristics of survey questions dealing with departmental policies and practices. Nonetheless, an attempt has been made (see Appendix C) to synthesize the available evidence gathered by this survey of 8 departments in 18 universities so that the extent of "feedback" currently employed by these departments could be validated.

Another section of this survey has examined the actual hiring practices of the 8 selected disciplines at 18 Canadian universities over a five year preiod with respect to the ratio of new appointments drawn directly from graduate schools to those drawn from other sources. The relevance of the finding that novice teachers have been hired in ratios ranging from 3 novices to 10 non-novice teachers to 1 novice to 2 non-novice teachers

(average novices hired to all hired was 45%)[13] underlines the assertion made by critics of higher education in Canada today: undergraduates are often taught by inexperienced teachers. This survey did not investigate the quality of teaching of undergraduates by newly hired teachers. A search was made to see whether there was any evidence to support the view that college teachers do receive some preparation for teaching during the time they spend in graduate schools.

There is virtually no evidence of any systematic graduate school programme or seminar in English-speaking universities that deals explicitly with college teaching and its related philosophies. Although several departments in the French-speaking universities have cited courses in pedagogy as being requisite for their graduate students (while only a single department in an English-speaking university has made the same claim) one cannot help but wonder whether the inclusion of such a

[13] The underlying assumption that the non-novice teacher has had college teaching experience has not been investigated by this survey. The assumption that appointees from sources other than the graduate school have probably had some experience in guidance, instructing, or in the related arts of administration need not be invalid although more research in this area is obviously indicated. This survey only adjures the qualifications to teach of the recent ex-student.

seminar is rooted in practical or historical policies. It is clear that in the aggregate, the pedagogical seminar for graduate students in Canadian universities is the exception rather than the rule.

It should be noted however that several department heads have expressed interest in developing a pedagogical seminar for their students but some report that they are unable to mount such a programme with their present resources while others declare that they are skeptical of the usefulness of any seminar on teaching that could be mounted by the Faculty of Education. Research from the U.S. has strongly supported the divisions of interests and supposed interests between the Faculties of Education and those of the Faculties of Arts and Science. Whether fiefdom or suspicion (of competence) underlies this division between faculties is difficult to say yet one notes the lack of continuing inter-faculty programmes particularly in Canadian universities. Still, the realities of Canadian graduate programmes are shown by one current finding that 60% of all successful graduates (across the eight disciplines) go on to teaching appointments at the college level --a fact that should illumine the need for reappraisal of a teaching seminar in the graduate school.

It has been noted that a number of department heads have observed (see Appendix B) that the time needed to meet research or scholastic requirements cannot be shortened to accomodate teaching or pedagogical seminars. Whatever attitudes these men may have with respect to "teacher" instruction appear to be subordinated to the general concern with the priorities of the discipline and the attendant development of competence of the graduate student in his specialisation rather than upon the development of pedagogical techniques for graduate students. The graduate department rightly holds that the mastery of the discipline should come before everything else if the degree is to have any meaning. Thus is posed the dilemma of the new PH.D. hired to teach.

Before presenting several recommendations for preparing the graduate student as a future college teacher --recommendations that have been based upon an interpretation of the data reported by respondents to this survey[14]-- and important caveat on apprenticeship training should be entered here.

[14] The author acknowledges the several detailed and appropriate suggestions given him by respondents to this survey. These heads of departments found time to add their additional views on the survey topic in a comprehensive and personal fashion that has persuaded the author to rethink some aspects of his analysis.

Employing the graduate student as a T.A. and using this employment as a means to train him for college teaching duties clearly implies the underlying model of apprenticeship training. However, a major restriction should be noted concerning the analogy of apprenticeship training in, say, Law or Medicine to apprenticeship training in the graduate school for future college teachers. In Law or Medicine, apprenticeship training inculcates the principle of learning by example: this can be said for the training of future college teachers. In Law or Medicine however, learning by example also refers to the development of diagnostic and remedial skills as these relate to some earlier established referent. Thus apprenticeship training in these professions sensitizes the student to cue-recognition within a problem situation --his ability as a professional is judged by his selection of the appropriate remedy.

In teaching, unfortunately, there are no appropriate "remedies" that can be systematically learned and practiced. Rather, the apprentice-teacher develops a creative <u>attitude</u> towards the learning-teaching situation. This attitude is as much a mark of his professional response towards the demands of teaching as it is a mark of his ability to recognize problem situations and seek ways to solve them. Only by observing others in the

process of this kind of problem-solving and being observed himself as a problem solver can the apprenticeship model be properly applied to the training of graduate students in the profession of college teaching.

The following analysis of the ways a graduate department can provide a learning environment in college teaching for its graduate students is based upon the generally held notion that college teachers can be instructed in their professional duties by means of an apprentice-master interaction.[15] The apprentice undertakes a given task and is observed critically by an experienced senior. In effect, the neophyte to college teaching learns about the domain of his teaching tasks by actually doing them; he sharpens his technical ability by trial and error under the supervision of systematic feedback given by competent observers and teachers. Considering the variety of learning situations in both undergraduate and graduate programmes with which departments

15 It is clear that the argument supporting T.A. experience as being sufficient evidence of college teacher training implies that the apprenticeship model is central in the use of the graduate student as a T.A. Stipend considerations and staffing assignments to equalize work-loads are irrelevant here because these factors are at best peripheral to the <u>training</u> of college teachers.

must grapple, this analysis is set forth as a descriptive guide rather than a format of prescriptive steps.

Undergraduate instruction involves two different but related tasks: efficient transmission of content and sensitivity to the acquisition rates of the undergraduate learners. Knowing the material is a necessary condition for the first task. Being aware of the learner's ability in terms of acquisition, motivation, and response application is probably also a necessary condition for the second task.[16]

As instruction means primarily a building up of knowledge, how to transmit knowledge may be the first step in the training of the new graduate student T.A. The lecture situation provides the best setting for the T,A. to master the techniques of organizing a set <u>amount</u> of information. The <u>rate</u> of presentation (eg. speed, pace, emphasis, example, reiteration, etc.) depends upon feed-

16 These assertions admit a "deterministic" bias that the author cannot avoid without an extended discussion into the nature of teaching and learning. This bias, moreover, seems inevitable for anyone who examines sequential activity (eg. apprenticeship training) to understand its inherent order. For a fuller discussion on "determinism" and "free will" in education, see the essays in <u>The Concept of Education</u> (Ed) R.S. Peters (1967).

back. Thus a T.A. who lectures should be heard by the regular professor of that course who would subsequently provide constructive comments upon the T.A.s performance. In fact, it may be proper for the T.A. to consult the professor about the presentation just prior to its delivery so that a basis for subsequent discussion would be established.

Utilizing the T.A. for occasional lectures (under supervision) accomplishes several things. Primarily it allows the T.A. to find out whether he is "cut out" for university teaching. If, for example, the T.A. feels he is unable to meet the demands as a lecturer notwithstanding the assistance of a regular lecturer helping him, the department may then advise him on career opportunities other than university teaching and guide him accordingly.

But allowing and encouraging the T.A. to lecture in a large undergraduate course provides an important initiation into one of the hard, if undesirable facets of teaching at the post-secondary level. In this context, communication is principally a one-way proposition with minimal feed-back from the students. Consequently, the T.A. lecturer is impelled to focus on the development of clarity in his discourse on the discipline without sacrifice of intellectual standards.

It should be noted that the graduate student T.A. has recently completed his undergraduate studies in which his learning tasks have been built around the understanding and sequence of the concepts in his discipline. His subsequent graduate work will necessarily demand of him both a greater sensitivity to the relationships between concepts of his discipline and the development of his skills to analyze conceptual material. In effect, the emphasis of graduate work leads the student further away from the broad and general understanding of the discipline that marks undergraduate education. Providing the T.A. with undergraduate lecturing experience at the beginning of his graduate course of studies should permit him to realign the different foci of undergraduate needs and graduate development as these both pertain to the role of the college teacher. Too often, the undergraduates claim a junior instructor has been too knowledgeable and has overwhelmed them with learning demands. In fact the reason for this claim bears less on knowledge-competence than on the teacher's failure to recognize that the undergraduate learning situation is far removed from the most recent milieu of the fresh Ph.D.

The case for supervised lecturing experience for the graduate student does not include the contention that

undergoing this experience is sufficient preparation for the future college teacher. It does argue the case that systematic exposure to the methods a department uses in teaching undergraduates --in terms of depth and extent of the discipline's content-- can create a teaching model that will be useful to the graduate student when he subsequently receives a full teaching appointment. The teaching-learning interaction at the graduate school level, with its attendant research committments, may provide a teaching model, but if it does, it must surely by its very nature have little transference to the undergraduate setting.

The use of the graduate student as a small group or tutorial leader has been reported by six of the eight surveyed disciplines as a popular means for departments to employ graduate students (Table V). Supervision of the graduate as a tutorial leader through the occasional presence in the tutorial group of a senior man may serve a useful function, provided that the latter takes his responsibilities seriously. Unfortunately, as the results of this study indicate, the best the T.A. may expect are infrequent visits. Such visits under these circumstances are more likely to produce an unsettling effect on both the T.A. and the students than a contribution to the growth

of the T.A.

Heads of departments have reported in this survey that undergraduate reports on their (unsupervised) tutorial often uncovers ineffective graduate student T.A.s. However, the utilization of the tutorial as a teaching mode cannot be based upon the minimum tolerance levels of the undergraduates toward their graduate student leader. One of the prices of unsupervised instruction is that the negative report has a greater effect than the positive report. Furthermore, students tend to complain as a means to express their own uncertainties about their own performance. The same can be said as well for end-of-term student assessments.[17]

How might the tutorial system be utilized in such a way that the interests of the T.A., his students, and the department are simultaneously maximized?

One approach might be to place the graduate student as an observer in an undergraduate tutorial that is

[17] Whatever the value of end-of-term assessments is for the students, departments should be wary of these assessments as being methods of feedback upon the T.A.'s performance. The T.A. cannot improve upon his stewardship of a group that has now disbanded, yet unless the T.A. has the opportunity to do so, the assessment of his efforts should not be considered as a basis of learning for the T.A. His teaching competence is the result of one-trial learning.

regularly conducted by a member of the teaching staff: the interaction between the teacher and the undergraduates can be observed without influencing it. Several such observation made by the T.A. coupled with post-tutorial discussions with the regular tutorial leader would be one way for the graduate student to develop his awareness of the individual learning needs of the undergraduates.

Another way in which the tutorial situation can be employed as a teaching form for the graduate student would call for the senior man in the department to conduct several seminars on the dynamics of small group interactions as these relate to the learning of the discipline. All graduate students assigned as T.A.s for the first time would be required to attend these seminars. A base would be established that would permit the new T.A. to evaluate his own performance. In these seminars the T.A. might very well contribute his own experiences as a group leader for analysis and discussion.

Departments having access to audio-visual equipment should certainly consider the advantages of the video-taped tutorials in terms of feedback for the T.A. For example, taping a series of tutorials that were conducted by an experienced teacher and then playing back

these tapes during a seminar for graduate student T.A.s would initially show what a well run tutorial looks like. Additional points for scrutiny might include the study of the ways the tutorial leader uses to encourage student participation in this setting and the resultant effects of such encouragement. The utilization of video-taped material for analytical purposes in a seminar extends beyond the consideration of the model to an examination of trial efforts of the inexperienced T.A. In this respect, taping a tutorial conducted by a beginner should not be reviewed by other T.A.s but only by the seminar leader and the T.A. observed.

It is obvious that the scope of video recordings of the early attempts of a T.A. at leading a tutorial group are limited; as an instructional aid the video "replay" may well prove its worth. Thus video-taped material used as an example (model) or as a discrimatory instrument (evaluation) only approximates the examination of the "live" tutorial: graduate departments should consider this mode of instruction useful if tentative. By and large, the purpose of feedback is to inform the novice T.A. on his progress as a tutorial leader. In any case, knowing what he is doing --whether "right" or not-- should develop a learning-sequence foundation about teaching for

the graduate student T.A. Therefore, audio-visual aids in this context may play a larger role in teacher-instruction than has been heretofore recognized.

Before closing this section on the ways a graduate student can be trained in the fundamentals of college teaching by assigning him to apprentice-teaching duties, employing the graduate student as a marker of essays, projects, exams, etc. should be more fully explored. Nowlis et al (op. cit) describes him as "an unseen person who grades papers...and may have no contact with the undergraduates at all (p. 3)". If this is the case of the graduate student solely employed by Canadian university departments, little can be said to support the view that this kind of employment prepares the graduate student as a future college teacher. Nevertheless, the employment of the graduate student as a marker can be incorporated into an apprenticeship programme on teaching as the following discussion will illustrate.

Generally speaking, the marker measures the response capacities of the undergraduate learners against some predetermined criterion set out for him by a regular member of the teaching staff. If the graduate student marker has had no teaching experience with the undergraduates, no opportunity (as it were) for acquiring firsthand

experience about the way undergraduates learn or about the conditions under which they learn, then what learning about teaching the graduate student does acquire from his marking duties will necessarily follow from how his marking assessments are received by the undergraduates and by the instructor for whom he marks.

The marker is often selected from the new graduate students entering graduate school; this assignment seemingly carries the least responsibility with respect to the other assignments given T.A.s. The duties of the marker are essentially ancillary to those of the instructor. While some departments insist that their markers attend the lectures from which examination questions are drawn, we suspect that this practice is more observed in the breach.

Rather than assigning new graduate students to marking duties, consider the appointment of those graduate students who have already had some lecturing and tutorial experience. These graduate students would be able to draw upon earlier apprentice experiences vis-a-vis course-content standards established by the department and by personal experiences with the learning and response capacities of the undergraduates.

This proposal does not claim that the "experienced" T.A. would necessarily be a better marker than

the novice T.A. The suggestion here is that there would be a greater probability of more thoughtful work from the former than could be expected from the latter.

Another consideration for the appointment of experienced T.A.s to marking duties bears upon the demands of time that are made upon the graduate student nearing the end of his own programme. To earn his stipend the graduate student must spend time in work not related to his own course of studies. One can reasonably assume that the marker spends the least amount of time at this duty than at any of the other duties associated with being a teaching assistant. Marking does not depend upon being at a certain place at a specified time nor with making oneself available to undergraduates on a regular basis. Thus the marker can usually fit his duties more readily into the time allotments of his own programme than can any of the other T.A.s.

In summary, what has been suggested here is the establishment of a milieu for learning about teaching for the graduate student. An opportunity to lecture under supervision sets the stage of learning about teaching on the demands of the content of the discipline as it relates to the general education of the undergraduate. Once the graduate student T.A. has a clear idea of what

the department expects of the undergraduates, he can move on to the more intimate setting of the tutorial or demonstration lab. In this setting, the graduate student T.A. becomes familar with the individual needs of the undergraduates as these pertain to learning rates and response capabilities. Opportunities to observe senior men conducting small group sessions, either directly or by video-tape, coupled with discussions of these observations with other T.A.s sensitize the graduate student to the different aspects of the teaching-learning interaction. Finally, the assignment of the T.A. marking duties provides him with an opportunity to put his reflections about teaching into perspective as these may relate to evaluating the abilities of undergraduate learners.

Some departments have more graduate students than T.A. positions and may still wish to provide some instruction or insight on college teaching to the graduate students not employed as T.A.s. The following outline for a "generalist" seminar may be usefully employed.

The generalist seminar, mounted and conducted by the individual departments, should provide the new graduate student a means of transition between the broad

undergraduate educational experiences he has just left and the finer and necessarily more specialized educational experiences upon which he is about to embark. A seminar of this nature would provide a vantage point from which the student could both review his past work and forsee the future challenges as these are set by the discipline itself. Under the auspices of such a seminar, the discipline's attitude toward undergraduate education is made known.

The following recommendations pertaining to the generalist seminar are set forth in point form:

1) Seminars given by all faculty in the graduate division of the department under the chairmanship of the department head. Participation of men outside the department but not outside the discipline should be encouraged.

2) The seminar should last at least one term and probably no more than two terms and should be required of all new graduate students.

3) Seminar discussion topics might include:

a: the historical and contemporary correlation of the discipline with adjacent disciplines;

b: the direction in which the discipline seems to be moving;

c: the relevance of the discipline to the whole education of the undergraduate;

d: the unique problems in the instruction of the discipline at the undergraduate level, communication problems within the discipline (conferences and journals) and communication problems between disciplines.

From a practical aspect, senior men in the department or in the discipline have spent some time reflecting upon the nature of the discipline. They should have had time to think about the problems associated with undergraduate instruction, interdisciplinary discourse, and communication of the uniqueness of the discipline to both students in higher education and the lay population at large. Consequently, a generalist seminar for the new graduate student would provide for these senior men an opportunity and platform to order their thoughts. Certainly, the new graduate student could benefit from these mature offerings if the student were sensitized to the idea that he will sooner or later take up the cause of higher education in his discipline. Within the framework of a generalist seminar the department's attitude toward undergraduate instruction can be made clear to

those graduate students who will be expected to shoulder some of the instructional duties of the discipline as T.A.s.

In conclusion, the issue of teaching-apprenticeships is fundamentally a university question. Unless the general climate is favourable, individual departments are likely to assign a low priority to this matter. The literature has reported several attempts by Canadian universities (notably Queens, Saskatchewan, and U.B.C.) to initiate interdepartmental programmes on the subject of college teaching. Seminars at the professorial level on the problems of college teaching and learning, methods to analyze these problems, and the investigation of experimental teaching programmes have all been undertaken with some degree of success.

It is submitted that interdepartmental programmes on college teaching be considered as an important resource for the university. Under the guidance of a non-partisan committee, colloquia could be scheduled for the dissemination of new teaching methods along with a re-examination of old attitudes.

The value of a university-sponsored forum on college teaching and learning is three-fold: it would reduce the suspicion that a single department or Faculty

seeks self-aggrandisement by prescribing arbitrary methods or attitudes related to college teaching to the rest of the academic family; it would provide an opportunity for various departments to consider first-hand evidence on the new ways other departments have taken to meet the challenge of instructing undergraduates; it would create a base for an in-service programme for the newly hired teacher --a base incidentally that would orient the new teacher to the philosophy or tradition of higher education held by that particular university.

The preparation of college teachers in the arts of teaching is a complex problem; particularly so if that preparation is expected to take place in the graduate school. This thesis has examined several ways by which a representative cross-section of disciplines in the Arts and Science Faculties in 18 major Canadian universities have attended to this problem. Several recommendations have evolved from this study that may provide useful insights into the ways the graduate school can meet the challenge of college teacher instruction. It is obvious that further research is required in this field in view of the changing attitudes toward higher education that has been recently noted among many young people.

BIBLIOGRAPHY

Astin, A.W. and Lee, C.B.T. "Current Practices in the Evaluation and Training of College Teachers" in Lee, C.B.T. (Ed) Improving College Teaching, Amer. Council on Educ.: Washington, D.C., 1967, 296-311.

Axelrod, J.K. (Ed) Graduate Study for Future College Teachers. Amer. Council on Educ.:Washington, D.C. 1959.

Barzun, J. Teacher in America. Little, Brown & Co. 1944.

Berelson, B. Graduate Education in the United States. McGraw-Hill: New York, 1960.

Bradley, J.V. Distribution-Free Statistical Tests. Prentice-Hall: Englewood Cliffs, New Jersey, 1968.

Brebner, J.B. Scholarship for Canada: The Function of Graduate Studies. Canadian Social Science Research Council: Ottawa, 1945.

Caplow, T. and Reece, J. The Academic Marketplace. Doubleday & Co.: New York, 1958.

Career Outlook: University Graduates. Bulletin of Department of Manpower: Ottawa, 1969.

Cartter, A.M. "University Teaching and Excellence" in Lee, C.B.T. (Ed) Improving College Teaching, Amer. Council on Educ.: Washington, D.C., 1967, 149-163.

Commission to Study the Development of Graduate Programmes in Ontario Universities, submitted to the Committee on University Affairs and the Committee of Presidents of Provincially Assisted Universities, Toronto, 1966.

Committee of Fifteen (J. Barzun et al) The Graduate School Today and Tomorrow: Reflections for the Profession's Consideration. Fund for the Advancement of Education: Washington, D.C. 1955.

Cowley, W.H. "College and University Teaching, 1858-1958" in Cooper, R.M. (Ed) The Two Ends of the Log. Univ. of Minn. Press: Minneapolis, 1958, 61-64.

Devane, W.C. "The College of Liberal Arts" in Morrison, R.S. (Ed) The Contemporary University, U.S.A. Houghton, Mifflin Co.: Boston, 1966, 1-18.

Erye, N. "The Critical Discipline" in Stanley, G. and Sylvestre, G. (Eds) Canadian Universities Today, Univ. of Toronto Press: Toronto, 1961, 30-37.

Gasset y Ortega The Mission of the University. K. Paul: London, 1946.

Graham, M. "U.B.C. Arts Course Starts a Trend" The Sun, Vancouver, B.C., Aug. 15, 1970.

Gray, W.S. The Preparation and In-Service Training of College Teachers. Vol. X Univ. of Chicago Press: Chicago, Ill., 1938.

Gray, W.S. The Training of College Teachers. Vol. II Univ. of Chicago Press: Chicago, Ill., 1930.

Greer, H. "Snobbery Rampant in Universities", The Sun, Vancouver, B.C., June 16, 1970.

Guilford, J.P. Fundamental Statistics in Psychology and Education. McGraw-Hill: New York, 1956.

Hays, W.L. Statistics for Psychologists. Holt, Rinehart, & Winston: New York, 1963.

Herge, H.C. The College Teacher. The Center for Applied Research in Education: New York, 1965.

Highet, G. The Art of Teaching. Knopf: New York, 1950.

Hollis, E.V. Toward Improving Ph.D. Programs. Amer. Council on Educ.: Washington, D.C., 1945.

Innis, H.A. The Bias of Communication. Univ. of Toronto Press: Toronto, 1951.

Jaspers, K. The Idea of the University. Beacon Press: Boston, 1959.

Jencks, C. and Riesman, D. "Where Graduate Schools Fail", The Atlantic, Feb. 1968, 49-55.

King, J.E. "The Needs for In-Service Programs" in Lee, C.B.T. (Ed) Improving College Teaching. Amer. Council on Educ.: Washington, D.C. 1967, 96-98.

Klapper, P. "The Professional Preparation of the College Teacher", J. Gen. Educ., 3, 1949, 228-244.

Knapp, R. "Changing Functions of the College Professor" in Sanford, N. (Ed) The American College, John Wiley & Sons: New York, 1962, 290-311.

Koen, F. and Ericksen, S.C. An Analysis of the Specific Features which Characterize the More Successful Programs for the Recruitment and Training of College Teachers. The Center for Research on Learning and Teaching: Ann Arbor, Michican, 1967.

Komisar, B.P. and Macmillan, C.B.J. (Eds) Psychological Concepts in Education. Rand McNally & Co.: Chicago, 1967.

Lear, J. "New Deal in Graduate Education", Saturday Review, May 17, 1969, 78-79.

Lee, C.B.T. (Ed) Improving College Teaching. Amer. Council on Educ.: Washington, D.C., 1967.

McCreary-Jahaz, A. and Dennison, J.D. "A Program on University Teaching for University Teachers", C.A.U.T. Bull., Oct. 1967, 79-82.

MacDonald, R. The Opinions of College and University Teachers in the Atlantic Region of Canada regarding the Preparation of College and University Teachers. Doctoral Thesis, Cornell Univ., 1961.

McGrath, E.J. The Graduate School and the Decline of Liberal Education. Institute of Higher Education: Teachers College, Columbia Univ., 1959.

MacKenzie, N.A.M. "The Work of the Universities" in Katz, J. (Ed) Canadian Education Today, McGraw-Hill Co.: Toronto, 1956.

Macpherson, C.B. (chairman) Undergraduate Instruction in Arts and Science. Report to the President of the University of Toronto. Univ. of Toronto Press: Toronto, 1967.

Marshall, H.D. The Mobility of College Faculties. Pageant Press: New York, 1964.

Martin, W.B. Alternative to Irrelevance. Abingdon Press: Nashville, Tenn., 1968.

Mathews, R. and Steele, J. Struggle for Canadian Universities. New Press: Toronto, 1969.

Milton, O. and Shoben, E.J. Jr. (Eds) Learning and the Professors. Ohio Univ. Press: Athens, Ohio, 1968.

Newman, J.H. (Cardinal) The Idea of a University Defined and Illustrated. Longmans Green: London, 1907.

Nowlis, V., Clark, K.E., and Rock, M. The Graduate Student as Teacher. Amer. Council on Educ.: Washington, D.C. 1968.

Peters, R.S. (Ed) The Concept of Education. Routledge & Kegan Paul: London, 1967.

Poole, C.F. "The Ph.D. as Qualification for University Teachers" C.A.U.T. Bull., Dec. 1965, 61-64.

Priest, B.J. "Classrooms: Castles or Learning Laboratories" in Lee, C.B.T. (Ed) Improving College Teaching. Amer. Council on Educ.: Washington, D.C., 1967, 286-288.

Prior, E.M. "The Doctor of Philosophy Degree" in Walters, E. (Ed) Graduate Education Today. Council on Education: Washington, D.C., 1965, 30-61.

Riesman, D. Constraint and Variety in American Education. Doubleday & Co.: Garden City, New York, 1958.

Rothrock, G.A. "The Ph.D.: Academic License or Status Symbol", C.A.U.T. Bull., April 1966, 43-45.

Sandford, N. (Ed) The American College. John Wiley & Sons: New York, 1962.

Report of a Preseident's Committee on Academic Goals at the University of British Columbia, Guideposts to Innovation. Univ. of British Columbia, 1964.

Resolutions adopted at AUCC annual meeting. University Affairs, 9, #2, 1967, 7-9.

Schlicter, C.S. "Polymaths, Technicans, Specialists, and Genius", Sigma Xi Quarterly, Sept. 1933, 90-100.

Sheffield, E.F. "The Universities of Canada" in Commonwealth Universities Yearbook 1969. The Association of Commonwealth Universities: London, 1969, 1031-1047.

Smith, D.C. "The Preparation of College Teachers Towards a Rationale for Instruction". Can. Educ. Res. Digest, Sept. 1968, 230-244.

Smith, G.K. Stress and Campus Response. Jossey-Bass: San Francisco, 1968.

Stecklein, J.E. and Eckert, R.E. An Exploratory Study of Factors Influencing the Choice of College Teaching as a Career. Conducted under a Grant from the Cooperative Research Program. U.S. Office of Education: Washington, D.C., 1958.

Stensland, P.G. "The University Teacher" C.A.U.T. Bull., Oct, 1966, 59-65.

Stuit, D.W. "Needed Research on the Evaluation of Instructional Effectiveness" in The Appraisal of Teaching in Large Universities. A report of a conference held at Univ. of Mich., Oct. 13-14, 1958; Univ. of Mich. Press: Ann Arbor, Mich., 1959, 50-60.

Trow, M. "Undergraduate Teaching at Large State Universities" in Lee, C.B.T. (Ed) Improving College Teaching. Amer. Council on Educ.: Washington, D.C. 1967, 164-180.

Thomson, D.C. "The College Teaching Problem", C.A.U.T. Bull. April 1958, 12-19.

Wilson, L. The Academic Man. Octagon Books: New York, 1942.

FURTHER READINGS

Albright, A.D. and Barrows, J.E. (Eds) Preparing College Teachers. Univ. Kentucky: Southern Region Educational Board, 1959.

Brown, M. "Knowing and Learning" Harvard Educational Review, Winter, 1961, 1-20.

Butz, O. The Unsilent Generation. Rinehart & Co.: New York, 1958.

Cole, L. The Background for College Teaching. Holt, Rinehart & Winston: New York, 1940.

Conant, J.B. The Education of American Teachers. McGraw-Hill: New York, 1963.

Cornelius, B.A. "The Need of Training in Teaching of Philosophy" Journ. of Higher Educ., May, 1951.

Dressel, P.L. and Mayhew, L.B. General Education--Explorations in Evaluation. Amer. Council on Educ.: Washington, D.C., 1954.

Estrin, H.A., Goode, D.M. (Eds) College and University Teaching. Wm. Brown Co.: Dubuque, Iowa, 1964.

Flower, G.E. "College Teaching too is Important" Headmaster, Spring, 1969, 15-17.

Gardner, E.F. Tomorrow's Graduate School. Syracuse Univ. Press: Syracuse, New York, 1958.

Goode, D.M. These Books were Stimulating(One Hundred Books on College and University Teaching). Oregon State College: Corvallis, Oregon, 1958.

Gottlieb, D. "Teachers and Researchers in American Universities", J. Higher Educ., Nov., 1961, 2-4.

Hall, D.T. "Identity Changes during Transition from Student to Professor", School Review, Dec. 1968, 445-469..

Jacob, P.E. Changing Values in College. Harper: New York, 1957.

McClelland, D.C., Atkinson, J.W., Clark, R.A. and Lowell, E.L. The Achievement Motive. Appleton-Century: New York, 1953.

McKeachie, W.J. Teaching Tips. (A guide book for the beginning College Teacher.) Geo. Wahr Pub. Co.: Ann Arbor, Mich., 1951.

McKeachie, W.J. "Research on Teaching at the College and University Level" in Gage, N.L. (Ed) Handbook of Research on Teaching. Rand McNally: Chicago, 1963.

Mead, M. The School in American Culture. Harvard Univ. Press: Cambridge, Mass., 1951.

Medlyn, W.J. Potential Doctorate Productivity in Selected Colleges and Universities - 1965. Amer. Assoc. of Colleges for Teach. Educ.: Washington, D.C. 1966.

Mooney, R. "Evaluating Graduate Education", Harvard Educational Review, 25:2, 1955, 85-94.

Morsh, J.E. and Wilder, E.W. "Identifying the Effective Instructor" (A review of the quantitative studies 1900-1952). Res. Bull. AFPTRC-TR-54-44, Air Force Personnel and Training Research Center, 1954.

Neering, R. "Interaction: New Goal for University Teaching", UBC Alumni Chronicle, Spring 1969, 4-8.

Pullias, E.V., Lockhart, A., Bond, M.H., Clifton, M., and Miller, D.M. Toward Excellence in College Teaching. Wm. Brown Co.: Dubuque, Iowa, 1963.

Samples, M.K. "College Teaching: An Escape from Teaching?" Todays Educ. April, 1969, 40.

Report of the Committee (Leeds Univ.) on University Teaching Methods. H.M. Stationary Office: London 1964.

Scheffler, I. Conditions of Knowledge. Scott, Foreman: Glenview, Ill., 1965.

Skinner, B.F. "Why Teachers Fail" Saturday Review, Oct. 16, 1965.

Skinner, B.F. The Technology of Teaching. Appleton-Crofts-Century: New York, 1968.

Stokes, A.W. "Preparation of College Biology Teachers: the Professional Societies Responsibility", Amer. Biol. Teach., Dec. 1968, 823-826.

Werdell, P. Course and Teacher Evaluation: A Student's Confidential Guide. U.S. National Student Association: Washington, D.C., 1966.

A P P E N D I X A

Copy of letter sent to 144 heads of departments during the week of June 18, 1969.

Copy of letter sent to 71 heads of departments who had not returned the original questionnaire by July 17, 1969.

Copy of the 12 unit questionnaire sent to 144 heads of departments.

SIMON FRASER UNIVERSITY

BEHAVIORAL SCIENCE FOUNDATIONS
Professor and Director,
Robert J. C. Harper, Ph.D.

BURNABY 2, BRITISH COLUMBIA
Telephone 291-3111 Area code 604

I have taken the liberty of writing to you because the information I have at hand indicated that you are or recently have been the Head of your department.

My current research at the Behavioural Science Foundations at Simon Fraser has brought me to writing you in that the compilation of certain research data can be obtained only from you. I would be most grateful if you would complete and return the enclosed brief questionnaire at your earliest convenience.

My research interest is to determine the extent of current university-teacher training in Canada; subsequently, based upon replies from this questionnaire and quantifiable data from other sources, to describe more clearly specific problems related to university teaching. In sum, competent men in a discipline may need more experience -- than their discipline affords -- to teach that discipline.

I have written to selected departments in major Canadian universities and will, upon the completion of the analysis of the data, send to you a summary of my findings.

Thank you for your time and consideration in this matter.

Yours sincerely,

D. Jelliffe

DJ/mm

SIMON FRASER UNIVERSITY

BEHAVIORAL SCIENCE FOUNDATIONS
Professor and Director,
Robert J. C. Harper, Ph.D.

BURNABY 2, BRITISH COLUMBIA
Telephone 291-3111 Area code 604

Dear

Recently I mailed a questionnaire to the Heads of eight Departments (four in Arts, four in Science) at eighteen leading Canadian Universities. While the response to the questionnaire has been statistically promising, I find that your discipline has been under-represented. I have thus enclosed the questionnaire again for your consideration.

As I mentioned in my first letter to you, this research is a preliminary investigation into the extent of current university-teacher training in Canada. Specifically, I would like to know how various disciplines prepare their graduate students for future university-teaching responsbilities.

I will be collating and analyzing the data from the questionnaires by the end of this month and will publish my findings in summary form only. I hope you will be able to return your questionnaire by then so that my report will be based upon a just sample of the major disciplines.

Yours sincerely,

D. Jelliffe

DJ/mm
Enclosure

RESEARCH QUESTIONNAIRE

(All data contained herein are confidential and will be reported in summary form only.)

1. How many new faculty members were appointed in your Department (the promotional-tenure stream) during the last 5 years (1964-1969)? .....

2. Of these, how many came directly from graduate schools, i.e. their first full-time faculty position? .....

3. Of these, how many were graduates from your own Doctoral or M.A. programme? .....

4. Of all new appointments, how many were assigned teaching duties in the undergraduate programme? .....

5. Of those coming directly from graduate schools (yours or others), how many appointees were assigned teaching duties in the undergraduate programme? .....

6. From 1964-1969, how many of your successful Doctorate or M.A. candidates would you estimate have received appointments at universities (yours or others)? .....

7. In what ways does your Department specifically provide teaching experience (or training) for your graduate students?

.....

.....

.....

8. From 1964-1969, how many of your students in the Doctorate or M.A. programme have had some experience as Teaching Assistants with the undergraduates? .....

9. What are the general duties of graduate students in your Department as Teaching Assistants? (Check (x) relevant categories):
Seminar (tutorial) leader ..... Lab. instructor .....
Demonstrator ..... Project advisor .....
Assistant lecturer ..... Alternate lecturer .....
Other (please specify) .....

10. Does your Department review or evaluate the work of the graduate student as a Teaching Assistant? .....
If so, how does your Department do this? .....
.....

11. What specific recommendations would you make pertaining to the preparation of the graduate student who will most likely face future teaching responsibilities at a university?
.....
.....
.....

12. Have you a further comment you feel is pertinent to this investigation (e.g. research/teaching loads in your Department; aims of <u>your</u> graduate programme; relevance of teaching experience for <u>your</u> graduates; etc.)? .....
.....
.....
.....
.....

An enclosed envelope has been provided for your convience in returning this questionnaire.

A P P E N D I X B

Question 11: "What specific recommendations would you make pertaining to the preparation of the graduate student who will most likely face future teaching responsibilities at a university?"

and/or

Question 12: "Have you any further comment you feel is pertinent to this investigation?"

Comments to Questions 11 and 12 from heads of Biology Departments.

"The most useful experience for a graduate student intending to take up a university teaching post is obtained by the student presenting as many research seminars as possible during his/her graduate years." "In our department we do not ask our young and research-active members to teach more than one full course per year (i.e. three hours of lectures plus one or two four-hour labs per week.) This light teaching load is to allow them to spend two to three days per week in developing their research programmes. Out of our present staff of 22 scientists, 20 members are actively engaged in research and direct the work of one or more graduate students."

"For the exchange of ideas at a university, knowledge of the subject and enthusiasm for it, are more important than teaching methodology."

"More training in teaching through pedagogic exercises followed by criticisms of teaching techniques; also seminars." "The teaching load of our professors is too high (six lectures a week or 12 hours of lab a week)."

"All should have teaching experience; more emphasis on the theory of teaching would be desirable but impractical during the work associated with a research degree."

"The main emphasis of graduate work in this department is,

and has to remain, on research, but this includes training the student to communicate and explain his results and ideas in formal presentations. This involves similar preparation to formal lecturing."

"I am fairly happy with our system but it would be improved (for this purpose) if graduate students had to give more lectures to undergraduates." "We try to turn out teachers without at the same time appearing to slough off our own teaching duties and exposing undergraduates to too much inexpertise. It is not an easy balance to strike, but we do come to know very well who can teach and who can't, and this helps with references."

"(1) tutorial experience is excellent; (2) seminar type classes; (3) exposure to disciplines related to the student's major field."

"To demonstrate and lead discussion groups in labs. At least two years experience in a research position before being permitted to supervise graduate students."

"Have third year graduates assist in teaching beginning students good habits of experiment and good habits of working."

"He should be required to give a minimum number of seminars to entire department (i.e. staff and graduate students). He whould have lab demonstratorships--give lab briefings, set and correct quizzes and exams." "Teaching load (demonstrative) of three hours per week as we must assume all may enter teaching profession. We assume that a graduate student should end his training with the necessary found-

ation to be both teaching and research though we realize all will not have both gifts."

Comments to Questions 11 and 12 from heads of Chemistry Departments.

"Take his teaching duties seriously and know his material fully." "We are finding that some of our graduate students are not taking their demonstrating assignments seriously. We wonder if a modest financial reward for the best two or three demonstrators would be worth while to produce better performance."

"Training both in the Department and in the Faculty of Education could be most helpful. We do not have enough time or competence to undertake this at present."

"A professor at the age of 40 should have worked as a graduate student,a research fellow or a professor in at least three universities."

"Each student should have at least two semesters experience in lab demonstrations and/or tutoring/lecture repetitions, problem solving, etc. In experimental fields such as Chemistry, some experience in developing lab experiments or lecture demonstrations. This work should be evaluated by both undergraduates and senior staff members."

"Serve as teaching assistant. More important, a brief course in teaching techniques when he takes up faculty position."

"Observation by the professors and evaluation of performance

at staff meetings. Award of prizes for outstanding assistants."

"I comment on their performance in demonstrating duties."

"He should have some teaching assistantship training and present some lectures." "There is not enough time in the present time requirement for a Ph.D. to allow for formal courses in teacher training. If there was not this drive to get a Ph.D. as quickly as possible, maybe teacher training could be important for a few of our graduates. However, many of them learn what is <u>good</u> and what is <u>bad</u> in teaching by observation of their own professors."

"All should act as teaching assistants or demonstrators under close supervision of senior professors." "Everyone must take his turn in teaching students in his area at all levels from freshmen to Ph.D. candidates. All staff members supervise laboratories. No graduate students are 'in charge' of any course or tutorial--all should be under supervision of senior and experienced professors."

"I do not support the view that pedagogical training as such is required for science teachers. Those who make application for university posts in Chemistry (in my experience) are interested in passing on their ideas to others and are conscientious in carrying through their undergraduate teaching duties. Admittedly, they are not accomplished teachers in the first year but by the second year, they are better than passable and thereafter are excellent instructors. Their only fault in latter years is to demand too much work and too high a standard from their students who do not have the same love

for the subject as they themselves possess."

"Experience in organized tutorial programmes would be helpful." "The laboratory instruction given by graduate students is valuable to them as possible future instructors--but also as practicing chemists."

"Should take one to two years post doctoral experience...preferably as a teaching post-doc."

Comments to Questions 11 and 12 from heads of Mathematics Departments.

"Each should be associated with a specific experienced faculty member to be guided and advised during his duties (i.e. apprenticeship)."

"To use him occasionally as substitute lecturer or let him teach courses with smaller groups and conduct seminars."

"That he be well trained in his subject and he set a good example." "Teaching experience is most valuable and I would say essential except in special cases."

"I don't believe that you can teach people how to teach in a formal way. If teaching is not done as well as it can be, I think it is largely because of the difficulty of measuring good teaching and of providing incentives that would induce professors to spend more of their time on the teaching part of their work."

"Recommend tutorial teaching experience." "Teaching experience desirable and relevant."

"That he should have a broad knowledge of his discipline as well as a specific knowledge of his field of specialisation."

"A graduate student can and should teach one course during his latter years." "We have had some success in giving courses later than first year to our graduate students."

"A thorough understanding of the subject matter; experience in the creation of mathematics; broad training."

"Expose him to all phases of academic work, require him to give talks on 'elementary' subjects, participate in tutorial work." "A department of modest size (<30) with approximately the same number of graduate students can implement the ideas listed above without any formal system."

Comments to Questions 11 and 12 from heads of Philosophy Departments.

"There is no substitute for experience in the classroom, but experienced criticism helps too."

"Work hard." "Reduced teaching loads for T.A.'s would help."

"They should have supervised experience in tutoring, marking, and the giving of special lectures to advanced students." "This department feels that teaching is an important aspect of a depart-

ment's work and therefore stresses this to the graduate students. Good teaching is believed to rest on continued and sustained philosophical scholarship."

"We propose to introduce the graduate student gradually into teaching responsibilities; e.g. Year I: tutorial leader, mark assignments; Year II: less of duties in Year I and invite students to give a block of lectures on specified topics; Year III: assign undergraduate class or part to student." "We are concerned not to overburden the student with departmental duties...we would like to get a higher rate of completers in the four year period."

"Leader duties includes discussion, marking of term essay, and final examination: if student reaction indicates his leadership is not up to standard; two faculty members will audit one of his groups (necessary only once with excellent results)." "Teaching loads of graduate students vary from two to four classroom hours per week, but ideally we prefer to keep them at the two-three hour level. Since the course the graduate students work in is at the introductory level we consider the experience essential to their teaching experience."

"Teaching loads should be reduced (nine hours) (faculty??). Probs and tactics of university teaching should be investigated, discussed etc. by all faculty members."

"A thorough competence in his discipline -- so far as this can be attained during graduate studies." "Some teacher training for

prospective university teachers might be a good thing--I wouldn't have much confidence in my ability to conduct it, but then I don't have much confidence in professional teacher-teachers either."

"Lecturing (say ten hours) with professors present to evaluate. Teaching "methods" course conducted by the department."

"Video tape lecturer, discuss teaching with senior members."

"First year: general marking duties, evaluation of papers, etc. Second year: discussion section associated with faculty-taught lecture; third year: one independent course, supervised, 20 students maximum."

Comments to Questions 11 and 12 from heads of English Departments.

"He should be given teaching experience with adequate supervision and counselling." "We have tended to stress scholarship rather than teaching in our program. We are trying to improve the teaching aspect of our graduate training."

"We intend to put each teaching Fellow under the supervision of a full-time staff member."

"Each student attached to member of department -- also a 'master tutor' for advice." "Perhaps a summer course in commando training could be useful..."

"They should spend a long time talking to university pro-

fessors." "It seems to be a rather brief questionnaire to account for such a complex problem. But it may offer a beginning. It is not clear what is being examined."

"Not in favor of specific training program at this time."

"Give him a chance to teach without interference. Orientation and discussion programs are needed here, including frequent briefing and easy opportunity to discuss problems."

"Some teaching experience as an assistant or conference leader at the undergraduate level."

"We should have taught to find out what it is like to talk or teach in public."

Comments to Questions 11 and 12 from heads of Physics Departments.

"We regard tutorial supervision/laboratory demonstrating an essential part of the graduate student's training, but feel that more than four to six hours per week would interfere with his research. As preparation for a university career, tutorial supervision is perhaps the more useful."

"That demonstrating, marking and tutorials should be part of their post-graduate training. Some minor lecturing duties would be very advantageous."

"In the normal course of graduate work, the student should be

given opportunity to give seminar papers, conference papers, etc. No specific teaching training seems to be necessary for science students." "Aim of graduate studies is to produce research physicists capable of independent thought, and able to communicate the results of their work adequately in either oral or written form. Teaching experience is not very relevant but prospective staff members are always carefully considered from the point of view of their ability to communicate."

"Each graduate student should have been exposed to teaching experience both as a teaching assistant and by giving seminars to department. Both these requirements subject to critical evaluation by faculty."

"Graduate students do demonstrating because (a) the department needs demonstrators, and (b) the student needs financial support -- training the student as teachers is a factor that is not usually considered."

"Let him give some undergraduate lectures under supervision during his last year of the Ph.D. programme." "Graduate program is at the moment definitely oriented towards research and does not involve any appreciable teaching training. It easily could and perhaps should."

"Provide opportunities to practice teaching skills as laboratory instructor, tutorial leader, and alternate lecturer."

"More experience in what amounts to public speaking."

"All graduate students could do some teaching progressing from Lab Demonstrator to Assistant Lecturer."

Comments to Questions 11 and 12 from heads of History Departments.

"Graduate students should have some experience in the classroom under supervision. Also desirable that they have given some thought to the general problems connected with undergraduate teaching, the role of the professor, how independent thought is stimulated, etc." "It is to be hoped that graduate students writing research papers do not lose touch with the general discourse of ideas so that they can still cope with general questions in the classroom."

"Learn history (i.e. learn his subject)."

"Diriger des exercices methedologiques ou des travaux pratiques sous le controle d'un professeur d'expérience. Remplacer de temps à autre ce professeur dvans un cours magistral."

"In general, asssistantships should be available only to Ph.D. Candidates and particularly when they are preparing for their general examination. After that, they should be absent doing research."

"More classroom experience under perceptive direction is necessary."

"Compulsory service as teaching assistants with in-service

training by members of the department."

"View all his work as apprenticeship...give him supervised responsibility for a segment of the department's work." "On a number of occasions at this university, both the faculty association and the faculties have attempted to organize seminars, classes, or demonstrations for faculty who wish to work up their own skills in teaching--there has been very little response."

"I would recommend that graduates be allowed and advised to attend the lectures of certain selected people on the campus in their own and also in other departments in order to learn by example. Recommend that tutorial groups be visited by at least two members of the department and that graduate students be offered an individual criticism of their work. That regular sessions of graduate students be held collectively to discuss problems, methods, and new ideas. That all lectures in the department and all groups be open to graduate students at any time with the sole exception of seminar groups." "If money could be provided, I would prefer to have all undergraduate teaching done by qualified full-time teachers. I would then allow the graduate students to do occasional lecturing and teaching; offering supervision, advice, and criticism of their work. Should there be among the graduate students some with teaching experience, or with special gifts and aptitudes, I might think it advisable to give them additional responsibilities. I object to the system under which large classes of freshmen are taught by cheap, inexperienced, and semi-qualified labour."

"We are aware that we should be doing much more to train our graduate students as teachers. Specific changes would include guidance and assessment of Teaching Assistants in their tasks, involvement of Teaching Assistants in the planning of first year courses, a well planned program in which graduate students would be invited to deliver "guest lectures" in regular courses with evaluation of their performance." "We are planning to establish a departmental committee on the Improvement of Instruction. Its purpose and scope would include utilization of teaching assistants, improvement of teaching strategies in undergraduate courses, training of graduate students as educators, and assistants for newly appointed lecturers. It is obvious that more sophisticated students coming out of the high schools, rising enrollments and increased costs are all factors demanding more effective and imaginative utilization of available resources."

Comments to Questions 11 and 12 from heads of Psychology Departments.

"Should have supervised teaching experience and faculty should serve as models of the importance of good teaching."

"As far as I can see students benefit greatly in serving as teaching assistants. This is an important part of their training."

"Obtain as much practice as possible while in graduate school. Attach yourself to a recognized good teacher for purposes of learning techniques."

"Emphasis on teaching can be given lip service but it only becomes meaningful when it is used as a criterion for determining salary promotion, etc."

"Obtain a Ph.D. first--be given relevant teaching experience in his last (thesis) year." "Graduate students should spend more time doing what they should be doing--learning content and methods."

"Practice under supervision using V.T.R." "Teaching is the best way to learn the subject-matter but not always the best teaching!"

"They are requested to concentrate on academic task and some teaching (i.e. no other work). We encourage them to study in some other university at least for one year."

"Greater use of all methods of giving feedback to teachers including tape recording, auditing, student evaluation."

"Graduated experience up to complete responsibility for a section of a course under supervision of the responsible faculty member." "Ours is solely experimental program. We should expect a high proportion of potential faculty. Our teaching loads are one and one-half to two courses--graduate supervision is additional. We have only one faculty member involved in Introductory augmented by TV and 20-25 graduate students per year."

"Some preparation should be exercised."

"The current programme would appear to be adequate although it is of course continually under review."

"He should be given some degree of independence in handling a class so that he gains confidence and enjoys the rewards of teaching (i.e. student response and respect, etc.)." "Students do NOT act as clerical assistants or essay readers. This is too time consuming and not productive enough. The five hours expected of them is spent in student-contact or preparation for such contacts. All students are also research apprentices (not assistants) and work as collaborators with their advisors."

"They should be given supervised training in teaching."

A P P E N D I X C

The E - Score

A proposed method of analysis by which "feedback" may be deduced given the reliability of the existing data.

The development of an Evaluation score (E-score) is set forth here as one possible method by which "feedback" to the T.A. can be indexed. With the data from this survey E-scores will be calculated but should not be considered as definitive assessments of the disciplines from which they were taken.

The E-score was developed in the following way: the questionnaires were grouped by discipline and reread as a group to permit the investigator to establish the range of practices common to that group. Then Q. 7 ("In what ways does your department specifically provide teaching experience or training for your graduate students?") and Q. 10 ("Does your department review or evaluate the work of the graduate student as a T.A.? If so, how does your department do this?") were jointly examined and rated. The rating criterion was based upon whether there was any evidence of the department's "feeding back" information to the graduate student concerning his on-going efforts as a T.A. If an interpretation of the evidence (from responses to Q. 7 and Q. 10) included confirmation of feedback practices on teaching --even in the broadest sense-- the department was assigned the score value of 1.0. On the other hand, if the evidence could not be interpreted in the broadest sense to include feedback practices

yet could have been were the survey instruments differently applied, the department was assigned the score value of .25. All other cases were assigned the score value of 0.0.

The rationale underlying these score assignments follows from the assumptions inherent to apprenticeship-training: the novice gains specific experience from the example of and corrections by a competent practitioner. The feedback principle becomes necessarily the behavioral operative in any regime that develops and conditions a particular response system. For the novice, awareness of feedback is a sufficient condition; for the practitioner it is a necessary condition to the competent execution of his duties. For the case at hand, in assigning numerical values to statements refering to actual departmental practices (from which we have estimated the existence of feedback for the T.A.) the base dichotomy was: is there or is there not clear indication that the department provided feedback to the T.A.?

If there was we assign a mark; if there was not we assign no mark. Yet the boundary between assigning mark and no mark is unclear for two reasons: the accuracy of the departmental statement and the accuracy of the interpretation of that statement. Thus two mutually exclusive conditions prevail in all cases that are not clearly

of the classes mark and no mark. These conditions in combination lead to four alternative conclusions: the department reported inaccurately upon feedback procedures but was judged as having reported accurately; the department reported inaccurately and was judged as reporting inaccurately; the department reported accurately but was judged as reporting inaccurately; the department reported accurately and was judged as reporting accurately. Hence the assignment of a score of .25 to the joint probability of two mutually exclusive events.

After assigning one of three scores (1.0, .25, 0.0) to each questionnaire, an average score (the E-score) was computed for the discipline. As the within-group variance was controlled (or at least accounted for) by the assignment of scores in context with the range of each group's response, between-group variance could best be indexed by the E-scores. It should be clear that the E-score represents only an estimated parameter (on college teacher apprenticeship-training) between disciplines on the feedback dimension.

The E-score assignments were as follows: Biology .333, Chemistry .344, English .646, History .339, Mathematics .179, Philosophy .536, Physics .483, Psychology .446.

It is noted here that a serious problem arises if one is to consider accepting the E-score as anything more that a statistical exercise. The problem goes to the root of research design that employs a survey instrument as a means to evaluate the presence or even the existence of a well defined variable. In the case here, the variable "feedback" has been assessed in two different ways. In Q. 7 ("In what ways does your department specifically provide teaching experience or training for your graduate students?") the <u>assumption</u> implicit here is that the department head will include in his response undeniable evidence of "feedback". In Q. 10 ("Does your department review or evaluate the work of the graduate student as a T.A.? If so, how does your department do this?") the assumption is also that the department head will respond with evidence that can clearly be described as "feedback". Therefore, in a rigorous way one should be able to assert that Q. 7 and Q. 10 validate each other. But this is certainly <u>not</u> the case here for several reasons.

There was, for example, no pretesting of these two questions for evidence of a high correlation that could be theoretically argued as being a sound example of validation. Even under the cloest interpretation of

these two questions, the response categories are too broad to allow for a clear assertion that the response overlap of both questions would fall within the same domain. Finally, post-facto analysis is suspect for reasons other than methodological: the researcher may "search" for cooberating evidence that he was unable to assess directly and lay bear his bias to the careful reader.

It has thus been shown that there is neither a methodological nor theoretical basis of validity for the E-score. In consequence the assignment of numbers to each of the 116 questionnaires and subdividing them into 8 discipline categories for correlational purposes with other data taken from the same groups is disqualified.

What should not be disqualified however is an attempt to explore new ways to solicit information by a survey instrument. It was noted earlier that a "feedback" question can touch upon the sensitivities of respondents to a degree that one suspects the reliability of any response. What is clearly indicated here are several tested questions that will not only describe the same underlying variable but will validate the response pattern of any individual respondent. Careful

researchers have tried various ways to validate their survey instruments. The post-facto analysis here that demonstrates the E-score is an attempt to demonstrate a method by which validation of the existence of the "feedback" variable can be undertaken.

A P P E N D I X D

Fortran Programs and Printouts for:

Increases in Faculty positions over five years, eight departments.

Summary of hiring practices: eight departments by 18 universities.

Program summarizing evaluation data.

```
************************************ C SC 210 ************************************

$COMPILE  JELLIFFE   INCREASES IN FACULTY POSITIONS: OVER 5 YRS, 8 DEPTS

**********************************************************************************

      DIMENSION N(19,16)
      DIMENSION NN(9)
      DATA M /2*0/
      DATA NN /'BIOL','CHEM','ENGL','HIST','MATH','PHIL','PHYS','PSYC',
     1'ALL 8'/
      READ,((N(I,J), J=1,16), I=1,19)
      PRINT 49,(NN(II),II=1,8)
   49 FORMAT ('1',5X,A6,7(9X,A6)/)
      PRINT 50, ((N(I,J),J=1,16),I=1,19)
   50 FORMAT (8(I5,I5,2X))
      PRINT 100
  100 FORMAT (///62X,'5 YEAR',6X,'NUMBER OF',6X,'COLLEGES',8X,'AVER #',
     19X,'AVER #'/39X,'INCREASE',5X,'POSITIONS',6X,'REPORTING',6X,
     1'POSITIONS',6X,'POSITIONS'/55X,'NOW',26X,'1964',11X,'1969'/)
      M=1000
      MGROW=0
      MSUM=0
      II=1
      DO 5 J=1,16,2
      NCOL=19
      IGROW=0
      JGROW=0
      NGROW=0
      NSUM=0
      DO 6 I=1,19
      IF (N(I,J) .LT. 0) GO TO 9
      IGROW=IGROW+N(I,J)
      NGROW=NGROW+((N(I,J+1)-N(I,J))*M)/N(I,J)
      GO TO 10
    9 NCOL=NCOL-1
   10 NSUM=NSUM+N(I,J+1)
    6 CONTINUE
      JGROW=NSUM/13
      NGROW=NGROW/(NCOL*10)
      MGROW=MGROW+NGROW
      MSUM=MSUM+NSUM
      IGROW=IGROW/NCOL
      PRINT 15, NN(II),NGROW,NSUM,NCOL,IGROW,JGROW
   15 FORMAT (30X,A6,5X,I5,' %',9X,I3,11X,I3,12X,I3,12X,I3)
      II=II+1
    5 CONTINUE
      MGROW=MGROW/8
      PRINT 25, NN(II),MGROW,MSUM
   25 FORMAT (30X,A6,5X,I5,' %',6X,I6)
      STOP
      END

$DATA
```

030

BIOL		CHEM		ENGL		HIST		MATH		PHIL		PHYS		PSYC	
10	19	27	31	29	47	14	25	32	43	7	16	23	30	14	22
7	19	8	15	12	32	9	24	11	29	6	10	10	14	7	19
8	21	10	14	9	23	5	13	7	14	3	7	10	18	5	18
14	20	19	27	-1	7	12	20	26	30	18	24	19	32	-1	15
5	13	5	24	18	29	8	17	18	24	5	10	14	27	7	15
7	14	21	27	33	44	8	17	37	50	9	15	17	27	12	17
9	15	17	26	11	23	10	18	11	23	6	12	15	24	8	19
11	13	15	24	6	9	8	11	14	35	17	20	11	26	10	26
11	15	9	16	8	26	7	17	10	16	12	30	7	11	14	13
12	18	12	25	12	32	8	24	13	30	9	14	12	29	10	22
12	20	14	27	12	23	9	16	11	17	8	12	12	24	5	8
-1	27	-1	25	-1	49	-1	25	-1	30	-1	11	-1	19	-1	15
27	39	-1	28	21	36	14	45	34	54	18	23	34	48	22	25
32	38	40	55	59	91	14	29	45	69	7	14	48	57	15	29
6	17	13	29	10	25	5	12	-1	18	5	16	17	35	8	40
8	18	17	21	19	45	10	28	14	17	12	25	16	22	14	30
8	13	10	13	10	19	8	14	14	15	13	14	10	11	7	18
-2	19	-1	16	-6	33	-5	26	-4	19	-5	18	-1	17	-2	48

	5 YEAR INCREASE	NUMBER OF POSITIONS NOW	COLLEGES REPORTING	AVER # POSITIONS 1964	AVER # POSITIONS 1969
BIOL	87 %	359	16	11	19
CHEM	81 %	445	15	15	24
ENGL	104 %	592	15	13	32
HIST	122 %	331	16	9	21
MATH	63 %	532	15	22	29
PHIL	35 %	291	16	9	[illegible]
PHYS	65 %	470	16	17	26
PSYC	117 %	404	15	11	22
ALL 8	90 %	3475			

COMPILE TIME= 0.65 SEC,EXECUTION TIME= 0.62 SEC,OBJECT CODE= 2298 BYTES,ARRAY AREA= [illegible] BYTES,UNUSED= 57964 BYTES

TOTAL CPU TIME USED: 1.37 SECONDS

```
********************************** C SC 210 **********************************

$COMPILE  JELLIFF    SUMMARY OF HIRING PRACTICES 1 8 DEPTS X 18 UNIVS

******************************************************************************

      DIMENSION N(19,24)
      DIMENSION NN(9)
      DATA N /456*0/
      DATA NN /'BIOL','CHEM','ENGL','HIST','MATH','PHIL','PHYS','PSYC',
     1'ALLR'/
      READ,((N(I,J), J=1,24), I=1,18)
      PRINT 5,(NN(II),II=1,8)
    5 FORMAT (' '/////5X,8(A4,11X)/)
      PRINT 15,((N(I,J), J=1,24), I=1,18)
   15 FORMAT (8(3I4,1X),5X))
      WRITE (6,16)
   16 FORMAT (///45X,'N U M B E R',6X,'H I R E D'//50X,'FROM',//31X,
     1'COLLEGES',6X,'GRADUATE',5X,'OWN',5X,'ELSE',6X,'DEPTS',5X,
     1'GRADS',7X,'OWN  GRADS'/32X,'REPORTING',5X,'SCHOOL',4X,'SCHOOL',
     1'2X,'WHERE',6X,'TOTAL',5X,'HIRED',6X,'TO ALL GRADS'/)
      II=1
      XRATIO=0.0
      YRATIO=0.0
      ORATIO=0.0
      GRATIO=0.0
      ITOT=0
      IGRAD=0
      IOWN=0
      IELSE=0
      DO 10 J=1,24,3
      NELSE=0
      NOWN=0
      NGRAD=0
      NTOT=0
      NCOL=18
      DO 20 I=1,18
      IF (N(I,J) .LT. 0) GO TO 19
      NTOT=NTOT+N(I,J)
      NGRAD=NGRAD+N(I,J+1)
      NOWN=NOWN+N(I,J+2)
      NELSE=NELSE+(N(I,J)-N(I,J+1))
      GO TO 20
   19 NCOL=NCOL-1
   20 CONTINUE
      ORATIO=FLOAT(NOWN)/FLOAT(NGRAD)
      GRATIO=FLOAT(NGRAD)/FLOAT(NTOT)
      ITOT=ITOT+NTOT
      IGRAD=IGRAD+NGRAD
      IOWN=IOWN+NOWN
      IELSE=IELSE+NELSE
      XRATIO=XRATIO+GRATIO
      YRATIO=YRATIO+ORATIO
      PRINT 35,NN(II),NCOL,NGRAD,NOWN,NELSE,NTOT,GRATIO,ORATIO
   35 FORMAT (25X,A4,I9,I13,2I9,I9,F11.2,F15.3)
      II=II+1
   10 CONTINUE
      XRATIO=XRATIO/8.
      YRATIO=YRATIO/8.
      PRINT 45,NN(II),IGRAD,IOWN,IELSE,ITOT,XRATIO,YRATIO
   45 FORMAT (/25X,A4,6X,'***',I13,2I9,I9,F11.2,F15.3)
      STOP
      END
```

$DATA

BIOL			CHEM			ENGL			HIST			MATH			PHIL			PHYS			PSYC		
11	4	1	13	5	0	-1	0	0	13	6	0	29	10	2	13	6	2	9	6	2	-1	0	0
15	5	0	5	0	0	19	12	0	-1	0	0	27	14	0	-1	0	0	-1	0	0	12	0	0
15	9	1	6	4	0	9	2	0	6	3	0	35	6	0	4	4	0	10	6	2	14	9	0
7	0	0	9	0	0	-1	0	0	12	9	3	-1	0	0	6	4	4	15	4	4	-1	0	0
-1	0	0	-1	0	0	24	13	2	20	9	3	-1	0	0	15	14	0	15	3	2	-1	0	0
14	5	0	16	10	0	32	22	0	12	8	4	22	8	1	-1	0	0	24	15	6	13	10	0
9	4	1	8	0	0	15	3	2	8	3	0	13	2	0	6	5	0	15	9	5	11	5	0
7	4	3	12	10	3	-1	0	0	9	2	1	-1	0	0	-1	0	0	10	7	2	41	14	14
5	3	0	10	6	0	-1	0	0	10	4	1	16	12	2	20	4	4	7	5	0	15	9	9
-1	0	0	14	0	1	15	9	2	15	9	1	-1	0	0	7	3	1	-1	0	0	15	0	0
8	5	0	16	5	0	-1	0	0	12	7	0	24	12	5	5	5	0	15	7	[illegible]	14	9	2
28	19	1	26	7	0	-1	0	0	21	14	3	32	21	0	14	8	0	19	10	0	15	7	0
-1	0	0	-1	0	0	28	16	5	-1	0	0	45	24	0	25	13	5	29	11	4	-1	0	0
9	2	0	13	1	1	-1	0	0	-1	0	0	41	12	0	10	7	0	25	10	4	20	9	0
12	4	0	18	5	0	-1	0	0	10	7	0	10	6	0	14	4	0	20	4	1	[illegible]	12	2
7	0	0	6	4	0	-1	0	0	-1	0	0	19	10	3	9	4	0	11	2	1	[illegible]	11	1
6	2	0	5	0	0	11	2	1	10	7	2	19	10	2	-1	0	0	5	0	0	[illegible]	7	1
16	0	0	17	1	0	-1	0	0	39	19	0	17	8	0	11	5	0	-1	0	0	42	15	2

N U M B E R   H I R E D

FROM

	COLLEGES REPORTING	GRADUATE SCHOOL	OWN SCHOOL	ELSE WHERE	DEPTS TOTAL	GRADS HIRED	OWN GRADS TO ALL GRADS
BIOL	15	65	7	[illegible]	[illegible]	[illegible]	[illegible]
CHEM	16	58	5	136	[illegible]	[illegible]	[illegible] .0861
ENGL	8	79	12	76	[illegible]	0.51	0.152
HIST	14	104	13	94	[illegible]	0.53	0.173
MATH	14	175	15	173	348	0.59	[illegible] .0857
PHIL	16	96	15	73	169	0.56	[illegible]
PHYS	15	99	33	149	349	0.41	[illegible]
PSYC	14	126	33	153	[illegible]	0.44	0.249
ALLR	***	792	136	955	1747	0.45	0.170

COMPILE TIME= 0.74 SEC,EXECUTION TIME= 0.92 SEC,OBJECT CODE= 2720 BYTES,ARRAY AREA= 1764 BYTES,TOTAL AREA [illegible] 55056 BYTES

TOTAL CPU TIME USED: 1.71 SECONDS

```
$COMPILE  JELLIFFE  PROGRAM SUMMARIZING EVALUATION DATA
```

```
      1        DIMENSION M(18,24)
      2        DIMENSION NN(9)
      3        DATA M /432*0/
      4        DATA NN /'BIOL','CHEM','ENGL','HIST','MATH','PHIL','PHYS','PSYC',
     1'ALL8'/
      5        READ,((M(I,J), J=1,24), I=1,18)
      6        PRINT 5,(NN(II),II=1,8)
      7      5 FORMAT (' '////5X,8(A4,11X)/)
      8        PRINT 15, ((M(I,J), J=1,24), I=1,18)
      9     15 FORMAT (8(3(3I3,1X),3X)/)
     10        WRITE (6,16)
     11     16 FORMAT (/8X,'(1ST COL.=YES/NO ON TA EVALUATION; 2ND COL.=SCORE ASS
     1IGNED TO EVALUATION; 3RD COL.=ANSWERING Q 11 AND/OR 12)'////)
     12        WRITE (6,17)
     13     17 FORMAT (34X,'COLLEGES',10X,'Q 11-12',10X,'Q 10: %YES',8X,
     1'ASSIGNED'/36X,'REPORTING',9X,'ANSWERED',9X,'TA - REVIEW',7X,
     1'E- SCORE'/)
     14        II=1
     15        NBOTH=0
     16        AVESUM=0.0
     17        AVESCR=0.0
     18        DO 10 J=1,24,3
     19        MBOTH=0
     20        MSUM=0
     21        MCOL=18
     22        SUM=0.0
     23        COL=0.0
     24        ESCORE=0.0
     25        DO 20 I=1,18
     26        SCORE=0.0
     27        IF (M(I,J) .LT. 0) GO TO 19
     28        MSUM=MSUM+M(I,J)
     29        IF (M(I,J+1) .LT. 1) GO TO 18
     30        IF (M(I,J+1) .EQ. 2) SCORE=1.0
     31        IF (M(I,J+1) .EQ. 1) SCORE=.25
     32        ESCORE=ESCORE+SCORE
     33     18 IF (M(I,J+2) .GT. 0) MBOTH=MBOTH+M(I,J+2)
     34        GO TO 20
     35     19 MCOL=MCOL-1
     36     20 CONTINUE
     37        COL=FLOAT(MCOL)
     38        SUM=FLOAT(MSUM)/COL
     39        ESCORE=ESCORE/COL
     40        PRINT 25,NN(II),MCOL,MBOTH,SUM,ESCORE
     41     25 FORMAT (25X,A4,8X,I2,16X,I2,3X,2F17.4)
     42        II=II+1
     43        NBOTH=NBOTH+MBOTH
     44        AVESUM=AVESUM+SUM
     45        AVESCR=AVESCR+ESCORE
     46     10 CONTINUE
     47        AVESUM=AVESUM/8.
     48        AVESCR=AVESCR/9.
828
     49        PRINT 35,NN(II),NBOTH,AVESUM,AVESCR
     50     35 FORMAT(/25X,A4,7X,'****',16X,I2,3X,2F17.4)
     51        STOP
     52        END
```

```
$DATA
```

BIOL			CHEM			ENGL			HIST			MATH			PHIL			PHYS			PSYC		
1	2	1	1	2	1	0	2	0	0	0	0	0	0	0	1	1	1	1	2	0	-1	0	0
1	0	1	1	2	0	1	2	1	-1	0	0	0	0	1	-1	0	0	-1	0	0	1	2	1
0	0	1	1	1	1	1	2	1	0	0	1	1	1	0	0	0	1	1	1	1	0	0	1
0	0	0	0	0	1	-1	0	0	0	0	1	-1	0	0	0	0	0	0	0	0	-1	0	0
-1	0	0	-1	0	0	0	0	1	0	0	1	-1	0	0	0	0	1	0	0	0	-1	0	0
0	0	0	1	1	0	1	2	1	1	0	0	1	0	1	-1	0	0	1	1	1	0	0	1
1	0	1	1	2	0	1	2	1	1	1	1	0	0	1	1	1	1	1	0	0	1	2	1
1	2	1	0	0	1	-1	0	0	1	1	0	-1	0	0	-1	0	0	1	1	1	1	2	1
1	2	1	1	1	1	-1	0	0	1	2	0	1	2	1	1	2	0	0	0	1	1	0	1
-1	0	0	1	2	1	1	1	1	1	2	1	-1	0	0	1	2	1	-1	0	0	1	0	1
1	0	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	1	1	2	0	0	0	0
1	1	1	0	0	1	1	0	1	1	2	1	0	0	1	1	2	1	1	2	1	1	2	1
-1	0	0	-1	0	0	0	1	1	-1	0	0	1	2	1	1	2	1	1	2	1	-1	0	0
0	1	0	1	1	1	1	2	1	-1	0	0	0	0	1	1	2	1	0	1	0	1	0	1
1	2	1	0	0	1	-1	0	0	1	2	1	0	0	1	1	2	1	1	2	1	0	0	1
0	0	1	1	1	0	-1	0	0	-1	0	0	0	0	0	0	0	0	1	2	1	1	1	1
0	1	1	1	1	1	1	2	0	0	0	0	0	0	0	-1	0	0	1	1	1	1	2	1
1	1	1	0	0	0	-1	0	0	0	0	1	0	0	0	1	2	1	-1	0	0	1	2	1

(1ST COL.=YES/NO ON TA EVALUATION; 2ND COL.=SCORE ASSIGNED TO EVALUATION; 3RD COL.=ANSWERING Q 11 AND/OR 12)

	COLLEGES REPORTING	Q 11-12 ANSWERED	Q 10: %YES TA - REVIEW	ASSIGNED E- SCORE
BIOL	15	12	0.6000	0.3333
CHEM	16	11	0.6250	0.3438
ENGL	12	9	0.7500	0.6458
HIST	14	9	0.5714	0.3393
MATH	14	9	0.3571	0.1786
PHIL	14	11	0.6429	0.5357
PHYS	15	9	0.7333	0.4833
PSYC	14	13	0.7143	0.4464
ALL8	***	83	0.6243	0.4133

```
COMPILE TIME=     0.82 SEC,EXECUTION TIME=     0.83 SEC,OBJECT CODE=     2696 BYTES,ARRAY AREA=     1764 BYTES,UNUSED=    56992 BYTES

**TOTAL CPU TIME USED:       1.69 SECONDS**
```

A P P E N D I X E

Ten recommendations taken from the Rochester conference 1967 as reported in The Graduate Student by Nowlis, Clark, and Rock (1968)

Ten recommendations approved by 25 deans and professors representing some 19 universities at the June 1967 conference heald at the University of Rochester (Nowlis et al, op. cit., pp. 6-21).

1) Progressive sequence. When possible, the graduate student should have a progressive sequence of experience in undergraduate teaching, starting with an apprenticeship requiring close supervision and moving on to an assistantship which permits greater responsibility and freedom for design and conduct of the course.

2) Elimination of blind alleys. The readership and the non-classroom teacher assistantship which involve exclusively those duties that are meaningless, irrelevant, or menial should be eliminated, since such duties are more appropriately assigned on an hourly basis to other available personnel or can be made a reasonably small part of the duties of the bona fide teaching assistant.

3) Varied experience. As far as possible, experience with a variety of teaching methods and teaching resources should be available to the teaching assistant: discussion, lecture, individual tutoring, participation in educational innovations, laboratories, supervision of undergraduate independent research, audio and visual and

computer aids, programmed instruction, etc.

4) Integration of research and scholarly competence with teaching skills. Whenever appropriate, the teaching tasks assigned to the graduate student should be so designed as to require him to integrate his developing scholarly competence with his developing skills. Graduate assistants ought not to be assigned to teaching activities unrelated to their competence.

5) Criteria for reappointment. While all or most graduate students should be eligible for a one-term apprenticeship, criteria of teaching promise and present competence should be applied to all subsequent appointments at the assistantship level.

6) Support and the attainment of the degree. Ph.D. students should be guaranteed a three- to five-year program of support, contingent upon successful progress toward the degree. Teaching requirements should not prevent completion of degree requirements within normal time limits, and assigned duties should suppliment development of competence in the student's field. It should be unnecessary to assign teaching duties to poorly qualified students for support of their study.

7) Professional status. "All departments using Teaching Assistants should foster a climate of professional respect through (a) providing assistants with adequate

physical facilities for both their teaching duties and their own studies; (b) assigning work with careful attention to avoiding duties that are too heavy or unnecessarily menial, and with periodic review of appropriateness to assignments, and (c) establishing student-faculty discussions of standards of appointment, workable ways of handling student's requests, and other matters of professional concern (Univ. of Calif., Berkeley, 1966, p. 184)".* The title given the graduate student should reflect the level of responsibility he has assumed.

8) A cooperative responsibility. Resources both within and without the university should be applied through various methods to the improvement of training and supervision of graduate student teachers.

9) Academic orientation. The teaching apprenticeship and assistantship should provide experiences through which the graduate student may gain greater understanding of the nature and problems of the teaching profession: the relation of his speciality and of his discipline to the general goals of undergraduate education; good housekeeping with respect to grading and academic rules, regulations, and procedures; the diversity of in-

* This principle is one of the four recommendations regarding the teaching assistant made to the Academic Senate at Berkely.

stitutions in which he may work and of the students he will encounter; the ethics of teaching; the problem of acheiving some balance among his future teaching duties and other professional and academic responsibilities.

10) Evaluation. Various procedures should be used in the evaluation of the performance of the teaching assistant and of the group of assistants assigned to any one course or to a general departmental program. The information secured through evaluation should be used in guiding the assistant and in improving the course or program.