School-to-University Transition As a Change of Environmental Press

by
J. M. GENN

FACULTY OF EDUCATION

Volume 2 Number 1

School-to-University Transition As a Change of Environmental Press

by
J. M. GENN

University of Queensland Papers
Faculty of Education

Volume 2 Number 1

UNIVERSITY OF QUEENSLAND PRESS
St. Lucia

23 December 1971

Printed in Australia by Watson Ferguson & Co., Brisbane

National Library of Australia card number and ISBN 0 7022 0750 0

Registered in Australia for transmission by post as a book

Contents

SCHOOL-TO-UNIVERSITY TRANSITION AS A CHANGE OF ENVIRONMENTAL PRESS

I. Introduction

In 1960 Fishman said that school-to-college transition was a particularly young topic within the purview of social science interest in higher education (1960 : 250). Ten years later one could comment that not a great deal of serious research study of transition has yet been made.

This paper is centred around an empirical research project that involved measurement of students' perceptions of school and of university environments for learning. Such measurement in a sense constitutes measurement of the experience of school-to-university transition, and is an attempt to be quantitative in a field where little such work has been done.

As a foundation for the empirical research project a study was made of the literature concerned with the nature and influence of learning environments in schools and in universities and with differences between school and university environments. A review-discussion of this literature constitutes a significant part of this paper and is reported in section II. Section III of the paper serves to provide an explanation and discussion of the theoretical orientation of the research project and is concerned with the concept of environmental press and the problems of measuring environmental press. In section IV the research hypotheses are derived. Section V provides details relating to the research methodology. Section VI reports the testing of the hypotheses along with the major findings arising from the research project. The educational implications of the findings are discussed in the final section of the paper, section VII.

Studying educational institutions and what they are doing to students is a delicate field of research, not only because of the methodological difficulties, but also because of the complexity of human relations among researchers, administrators, teachers and students. The writer is grateful to all those who made it possible for the research project's data about school and university environments to be gathered.

The research project reported here is part of a wider study (Genn, 1969) that also involved determination of some non-intellective correlates of satisfaction and success in university first-year studies.

II. A Review-Discussion of the Literature Concerning Differences Between School and University Environments

This review will begin with a consideration of what has been written concerning the broader changes in institutional experiences attendant upon transition from school to university and then will become more specific by reference to literature that relates to school-to-university changes in student-student interactions, student-teacher interactions and student-task interactions. As will be seen, there is no shortage in the literature of what might be called transition vignettes, pen pictures or word pictures. Some are graphic, some sensational and some, as Stern (1965: 133) has noted, may be the source of valid insights.

Because an Australian study of transition problems should be illuminated and strengthened by acquaintance with how these problems have been considered in other places, some reference will be made to what appear to be relevant issues, themes, problems and evidence revealed in the literature of other British Commonwealth countries and the United States. Because of a concern with chemistry education in the research described later in this paper, literature which relates generally to science education and more particularly to chemistry education will here be specially noted.

1. Institutional experiences

Particularly relevant to this research project is a study by Stern (1961). Conducting a type of transition study, he measured students' recollected perceptions of their high school environments, their anticipated perceptions of the college environment they were entering, and the perceptions of the college environment by a senior group in it. The incoming students had "great expectations" but appeared to be heading for "paradise lost". Commenting provocatively on the implications of the study's findings, Stern says: "The students come expecting to learn; they learn not to expect so much. These data suggest that student apathy is the *consequence* of unfulfilled expectations in the transition from high school to college, rather than the cause." (p. 58).

The traumatic aspects of transition have frequently been graphically described. The Murray Committee (Schonell et al., 1962: 227), for example, was definite in its view that, "whatever the academic standard of Australian university entrants, there can be no question of the abruptness of the transition experienced in passing from school to university". The precise nature of this abruptness, however, is not always clear, although reference is sometimes made to such factors as: size, vertical articulation, and goals.

SIZE

The Murray Committee (Schonell et al., 1962: 227) saw the university student as "an unrecognised member of a formless mass of students in which no one appears to

him to know or care how or if he works", and Sanders (1957: 153) draws a similar picture with the added dimension of a comparison of the university with the school. He says: "Most first-year students find themselves translated from small classes in which, as seniors, they received individual attention at school, into very large classes in which they are ciphers, as well as juniors, in the universities."

The big university, and most universities are big, is often associated by critics with student trauma and comes under attack often. Coombs says "quite bluntly", that in his view "a big university is almost inevitably a poor university and a large class means poverty in the quality of teaching" (Schonell et al., 1962: 390). The big university is continually referred to as a cold and impersonal place, where students are just locker-numbers and seat numbers. Stern (1967: 276) speaks of the "anomic de-personalization" of the large university. He sees it with its "garrison-like properties" and is not surprised at the appearance of behaviours consistent with a garrison. His pen pictures have an empirical basis far stronger than that of many of the essayists, and so too do those of Pace (1966: 173), who regrets the undesirable features of "large metropolitan concentrations whether civic or collegiate", particularly the features of "impersonality, privacy more than community, things more than lives".

The work of Barker and his associates (Barker, Gump et al., 1964) on behaviour-setting size seems to be particularly relevant here. A behaviour setting (such as a chemistry lecture) is seen as determining or coercing individual behaviour, whatever the individual motivations of the inhabitants of the setting might be. In particular, the population (size) of a setting influences the frequency, range and depth of participation of individuals, and makes consequent differences to interpersonal relations, satisfactions and the like (Willems, 1964; Campbell, 1970). The underpopulated setting makes a greater "claim". The individual in such a setting has to make a "greater effort", deal with "more difficult and important tasks", engage in a "wider variety of activities", be less sensitive to and make less evaluation of "difference between people", have a "lower level of maximum performance", become more functionally important within the setting and more responsible, and the individual has to have "greater functional self-identity". Other consequences of the underpopulated setting are "lower standards and fewer tests for admission", "increased dependence upon every other person", and "more frequent occurrences of success and failure" (Barker, 1960: 28-33).

Also relevant to this discussion of the correlates of size is the research of Astin and Holland (1961), who correlated size of institution with various psychological properties of the environment. Size was positively related to the extent to which the institutional culture was characterised by aggression, passivity, deference, sexuality, exhibitionism and pragmatism. Size negatively correlated with achievement, counteraction, understanding and fantasied achievement.

VERTICAL ARTICULATION

One hears frequently of the need to "bridge the gap" between school and university, and sophisticates are likely to speak of "vertical articulation": the efficient interrelation of content, methods and objectives (Lawrence, 1955: 25). Matthews (1957: 116) says that: "The temple of learning has many floors but one thing is common to those in charge of every floor—they are dissatisfied with the training given on the floor below. It is what you might call an endemic complaint." When the university complains about what happens on the floor below it is usually in terms of students there being "spoon-fed", over-taught, crammed with facts, and not trained in independent thought and study. In the opinion of many people, there is an almost unbridgeable gap between secondary school and university. However, it is interesting to note that some writers think that the gap, particularly that between school and the first year at university, is not large enough (Schonell et al., 1962: 248, 249).

The issue of vertical articulation, like many others, is bedevilled by the fact that it is impossible to sustain the concept of *a* school or *a* university; subject divisions within schools almost certainly possess different atmospheres, and there is no doubt that university departments or schools do. Evidence to support this assertion is forthcoming from several studies, particularly those of Pace, Astin and Aiken. Pace (1964) has shown that in a complex college or university there are many environments. As Pace has said, the environment of the sociology department is different from the environment of the chemistry department. Pace's evidence is to the effect that each department of a large university is part of the total environment and shares certain characteristics in common with all other departments, but that each department also has its distinctiveness. Astin (1965) has shown that there are consistent differences relating to various fields of study in the classroom environments of different college courses. Aiken (1964) has shown differences among various subject departments in their "toughness" of grading procedures.

GOALS

It is sometimes claimed that another difference between the institutions of school and university is concerned with the clarity of goal definition. While the senior section of the Australian high school has tended to have a single goal (namely that of ensuring that its students are successful in university entrance examinations), the university, and the society which supports it, have not clearly defined the university's function. "Is the university merely a glorified high school or is it a community of scholars?" asks Steacie (1957: 42). Sanders (1957: 145) writes of the two functions of a university: "The first function involves the concept of the university as an institution in which knowledge is pursued for its own sake, while the second involves the concept of a community service station." Partridge (1965: 72) provides a brief exposition and explanation of the problem now facing the universities:

> It is . . . widely agreed that the intellectual and social forces which have been loosed upon the universities and other institutions which were shaped and developed with a very different kind of society have produced a situation in which the aims and functions of the universities have been transformed and perhaps confused and distorted: and brought the universities especially to a condition in which it is pretty well impossible for them in much of their activity to remain true to the aims or traditions of academic work which have been established over a long period of history.

2. Student-student interaction

In the typical case a student in his last year at secondary school has been with most of his fellow students for about four years, in class and out. There are bonds of friendship between him and a number of his fellows, and in the class generally there is a strong spirit of friendliness and cooperation. There is also a strong solidarity in preparation for the coming struggle against the external examiner, as well as friendly rivalry within the class.

There is no need here to describe in detail what happens as far as this same student's relationships with fellow students in the first-year classes at university are concerned. In general there is the severing of many former friendships, feelings of isolation and loneliness and the need to adjust to a new set of peers with whom he is competing for scarce goods, viz. the limited number of passes to be granted at the end of the year. The situation seems to foster "privacy" more than "community", to use Pace's terms (1966: 173). In Australia, chances for "community" are relatively small anyway, when most students are "commuters", i.e. living at home or in private lodgings and coming into the universities daily almost solely for classes. Sanford (1965: 731) has said that "in hard academic work it is every man for himself". If this

is so then it must mean less cooperation and helpfulness among students, and Sanford (1965: 731), for one, thinks that universities might think out ways of encouraging the strong to help the weaker and so to minimise what he calls "the purely competitive and self-seeking aspects of our educational systems". Without the aid of any scientific evidence whatever, it would seem to most observers that there is a real clash between the coercion of the typical first-year university environment, and a student's social and emotional needs for friendly interaction with other students.

For both the school and university levels there is very little Australian evidence on student-student interaction. Most of the available research evidence is from the United States of America and is focussed on peer-group influences. Newcomb (1962) has given a useful research-based account of peer-group influences at the college level, and Coleman (1961) has done likewise at the school level.

Newcomb observes that, at least in the United States, students have strong needs for acceptance by age and sex peers (p. 473). He shows (p. 488) that conditions are ripe for peer-group formation in the American college, taking students' needs and other factors, particularly the common problems of students and their relative isolation, into account.

It seems that in Australia, and particularly in the first year of university studies, while conditions may in some sense be ripe for peer-group formation, there are real difficulties in the way. Whatever groups existed in secondary school have been shattered and there is the need to start rebuilding groups. Also, the fact that in Australia it is essentially an intellectual elite that enters the university *might* mean that needs for "acceptance by age and sex peers" are not as strong as they would be in a sample more representative of the age group. Also it *might* be that, even when they were in secondary school, the now first-year university students were more "lone ranger" types and less likely to be strongly peer-group dependent. *If* in Australia there are what Braham (1965) has described as "peer-group deterrents to intellectual development", then these students entering university must either have been in the groups but have overcome the deterrents, or have had little to do with such "deterring" groups. As most Australian university students are commuters, the propinquity condition mentioned by Newcomb (pp. 474-476) as important for peer-group formation lacks some force in Australia, and his other salient condition, pre-college acquaintance (p. 474), often does not apply either. It *seems* that *first-year* university classes in Australia may contain quite a number of "lone ranger" types.

Newcomb (pp. 478-482) relates actual influence of peer-groups to their size and to homogeneity in such matters as age, sex, and social class. Newcomb says that there is a homogeneity of attitudes that is linked with such homogeneity as has just been mentioned and that it is through the homogeneity of attitudes that the peer-group influence operates. What he has to say seems particularly pertinent to some of our homogeneous university classes, particularly in the professional courses, such as Medicine. It would seem valid to assume that in such classes, even in first year, and arising from common needs, aims and the general homogeneity of attitudes, there would be a dominant ethos and culture characterising the class as a whole.

3. Student-teacher interaction

Teachers have sometimes been described as the "faculty in loco parentis". Certainly *school* teachers are often viewed as acting and needing to act "in loco parentis", and they are often described as manifesting such behaviours as Alpern (1966: 594) has described as "hovering concern". Schools are generally describable as places of harangues, homework, much telling and showing and checking-up, places which send reports to parents. The school teacher is close to his students, he takes "a personal interest" in each of them, he knows what they are doing or not doing, and he can and does punish when he sees fit.

Very significantly, schools are places where the attempt is made to "teach students through" the matriculation (external) examination, sometimes, it seems, even in spite of the students' abilities or inclinations. Teachers feel a strong obligation to help their students pass this examination, and form a strong alliance with their students in an attempt to beat or outwit the external examiner. The teacher's behaviour may be motivated by a strong degree of self-interest, also, in that the examination results may be used for the assessment of an individual teacher's or school's worth (Morris, 1963: 10). According to Olsen (quoted in Schonell et al., 1962: 216), "secondary school teachers often concentrate unduly on types of questions likely to be asked in the matriculation examination, so that the student may have little need to think for himself, and when this is the case, the result may well be an over-estimate of the student's potential capacity for university studies".

While the *school* teachers are often described as the "faculty in loco parentis" a relatively recent description of *university* teachers refers to them as the "faculty in absentia" (Yamamoto and Dizney, 1966: 146). The allegedly "in absentia" university faculty are typically described as having a "leave-them-to-it" approach, or, worse still, a "couldn't-care-less" attitude. Critics of the university gather what they claim is evidence to back their criticisms. Lecturers, they say, are often nameless and inaccessible, and student disenchantment is said to have increased in proportion to the increase of this inaccessibility (Stern, 1960: 68).

Newspapers at times are full of letters criticising allegedly bad teaching at university, and blaming the high failure rate upon the teaching (Powell, 1964: 179). It is sometimes alleged that "many failures in the examination room are the result of previous failures in the lecture hall" (Matthews, 1957: 121). It is often pointed out that university teaching is the one major profession requiring no recognised course of training, and that university people, rigorous and critical in their testing of ideas generally, do not apply the same rigour in a study of their own teaching and examining procedures (Powell, 1964: 179). Matthews says "there is far too much faith in the legend that good teaching is a natural outcome of vast learning" (1957: 121). Partridge (1965: 80) is frank when he says: "Few of us will deny that teaching is one of the worst neglected subjects in our universities; a lot is done but it isn't much thought about."

Academic advance for university faculty is said to be related to non-teaching rather than teaching activities (Yamamoto and Dizney, 1966: 146), particularly to research output, and the evidence supports this view. For example, Alexander (1960: 38) says "university appointment and promotion committees undoubtedly put more emphasis on achievements in research". Institutional rewards for faculty people who take an interest in student attitudes and values are claimed to be virtually nil (Goodstein, 1960: 129). Alexander (1960: 38) says there is a "greater glamour of research as compared with teaching". It is alleged that "there is a major disquiet in universities" (Schonell et al., 1962: 378) because "preoccupation with private research often leads to teaching being regarded as a chore, as the price one pays for freedom to get on with one's work" (quoted in Schonell et al., 1962: 378). There is allegedly a type of lecturer "with his head in the air and his heart in research" and it is claimed that "to such lecturers the personal problems of their students are of minor importance" (Schonell et al., 1962: 291). To complicate the picture there is the view, often expressed, that, "in fact, reading, research and the discipline of writing for publication are the life blood of successful lecturing" (Schonell et al., 1962: 292). Sometimes this is phrased in terms of it not being possible to be a good university teacher if one is not active in research.

University teachers are said to put the onus for learning on their students (Powell, 1964: 188), and to extol student qualities of independence and personal effort, or what Alpern (1966: 591) calls "self-generated cognitive activity". There would be divided opinion, inside and outside universities, relating to the views that "it is part of the responsibility of the universities to encourage and develop the intention to learn" (Chant, in Matthews, 1957: 123), and that "it is possible to argue that . . .

universities should not sneer at the more authoritarian school techniques and should make the gifted but lazy or inadequately motivated student work hard in spite of himself" (Schonell et al., 1962: 370, 371).

In general, university teachers tend to be stereotyped as cold and impersonal. The lecturer who said "we don't lecture to medical students, we lecture in . . ." (citing the subject) (Schonell et al., 1962: 373), would strengthen this stereotyping.

4. Student-task interaction

As has been noted earlier, at university the student is left largely to himself to organise himself for unsupervised independent study, and sometimes it is claimed that he is left to himself to work out *what* to study. Under these conditions the student could easily overrate the complexity of the task, fearing that because he is at university he is nearing the so-called frontiers of knowledge, where genius is required to survive. Almost certainly he will wonder and worry about what kind of examination he must face and what kind of marking standards obtain at university (Schonell et al., 1962: 171).

By way of contrast, at school, the matriculation examination was one that a student could prepare for. "At secondary school they point out the important parts" (Schonell et al., 1962: 147). Ends and means at school were clearly defined, usually almost unlimited help was available, and there was a strong pressure on the student to achieve. In any case, if, as Morris (1963: 10) says, "a knowledge of facts is usually sufficient for students to pass a (school) chemistry examination", there was no need to be brilliant to pass.

First-year students of science subjects, in some cases, have been described as bringing to college "a mistaken picture of science; something like a stamp collection of facts or a game of getting the right answer" (Rogers, 1960: 19). It is alleged that "the pupils learn as for a radio quiz" (Morris, 1963: 9). Gascoigne (1962: 145) says that the "two chief complaints about the school teaching of chemistry are that it is antiquated . . . and that it has a non-theoretical, descriptive approach which tends to make chemistry a dull catalogue of facts to be memorized". Students completing such courses are not only unready but negatively ready, it would seem, for university tasks which are at least alleged to require maximal understanding, and a minimal use of sheer memory, for their successful completion.

It would appear from the evidence from quite a number of studies that somewhat different constellations of student attributes enter into success at high school and at university. Orderliness, for example, is less important in school than in university (Gough, 1953: 326), probably because the university task is less structured. Achievement via conformity, Ac, is a personal trait associated with academic achievement during high school years, while Ai (achievement via independence) is more often characteristic of scholastic achievement at university (Crandall, 1963: 440). These relationships probably reflect significant differences between school and university tasks. There is evidence too that some measure of introversion and lack of social participation characterise those who are successful in their first-year examinations (Olsen, 1957: 177). While the relationship between introversion and high school achievement is not clear (Purkey, 1966: 101; Snider, 1966: 44-46), at least the information relating to the university task seems to indicate that the university task is a major one that requires some withdrawal from the world for its successful completio .

III. Theoretical Orientation of this Research Study—The Concept of Environmental Press and Basic Methodology of Press Measurement

It is important, as Sanford has said (1956: 3), that conceptualisation should not lag behind observation and the amassing of empirical data. The research reported here was greatly helped by being built upon a valuable conceptualisation of the nature and influence of academic environments, viz. that achieved by Murray, Pace and Stern and usually referred to in terms of environmental press, or, more generally, in terms of need-press theory.

The interest in this particular study is in the environmental press that characterise school and university learning environments. However, to understand the press concept and the operationalisation of the concept in adequate measurement of press, it is necessary to refer briefly to the need-press theory.

Need-press theory has its roots in Lewinian field theory, with its basic postulate of $B = f(P,E)$, behaviour is a function of the person and the environment (Stern, 1964). Need-press theorists focus their attention upon defining the crucial elements of persons and environments and upon designing appropriate techniques for measuring these elements in such a way as not to destroy the interactive nature of these variables. Basic concepts are *needs*, as the crucial elements of persons, *press*, as the crucial elements of environments, and *interaction* (transaction) between individual and environment.

Murray originally defined need as: ". . . a force (the physico-chemical nature of which is unknown) in the brain region, a force which organizes perception, apperception, intellection, conation and action in such a way as to transform in a certain direction an existing, unsatisfying situation" (Murray, 1938: 123-124). Subsequently Murray and Kluckhohn (1953: 17) and Stern (1962: 28-31; 1967: 10) stress that needs are hypothetical constructs whose existence is inferred from characteristic modes of behaviour employed by a person, and from the goals or purposes which an interaction helps him to achieve.

Press are the environmental counterparts of the person's needs, and: "Just as needs are inferred from the characteristic modes of response of an individual, so press are reflected in the characteristic pressures, stresses, rewards, conformity-demanding influences of the . . . culture" (Pace and Stern, 1958: 270). Thus just as an individual with his core of needs is a complex stimulus to those he encounters, so too the environment, with its cluster of press, is a complex stimulus (Pace, 1966: 163; 1963: 73, 79; Feder, 1965: 33).

Raising matters of idiosyncratic and consensual press perception, Stern (1962: 29), following Murray (1938), reminds us that "in the ultimate sense of the term, press refers to the phenomenological world of the individual, the unique and inevitably private view each person has of the events in which he takes part", but says that there is a point at which this private world merges with that of others. Stern (1962: 29; 1967: 19) duly recognises the significance of idiosyncratic press data and these data are also recognised and used in parts of the wider study (Genn, 1969) of which this research project is a part. However, in this present paper, interest is in overall environmental differences as reflected in difference between mean or average press perceived by the one group of students, first in the school environment and later in the university environment.

It is worth noting here that while much time and care has in the past been given to the measurement of the person P, no comparable effort has been made to measure E, the environment (Pace, 1966: 159; Stern, 1962: 27). This neglect has occurred in spite of the apparent importance of knowing as much as possible about both P and E if behaviour B is to be understood and predicted.

The first attempt to measure environmental press was made by Pace and Stern when they developed the College Characteristics Index (CCI). This index was closely related to the Stern Activities Index (AI) which was designed to measure needs. Each of these indexes comprises thirty dimensions, with ten items for each dimension. These dimensions are defined as follows (Stern, 1963*b*: 2-3):

Need-press scale definitions

1 ABA *Abasement*-ass *Assurance:* self-depreciation versus self-confidence.
2 ACH *Achievement:* striving for success through personal effort.
3 ADA *Adaptability*-dfs *Defensiveness:* acceptance of criticism versus resistance to suggestion.
4 AFF *Affiliation*-rej *Rejection:* friendliness versus unfriendliness.
5 AGG *Aggression*-bla *Blame Avoidance:* hostility versus its inhibition.
6 CHA *Change*-sam *Sameness:* flexibility versus routine.
7 CNJ *Conjunctivity*-dsj *Disjunctivity:* planfulness versus disorganization.
8 CTR *Counteraction*-inf *Inferiority Avoidance:* restriving after failure versus withdrawal.
9 DFR *Deference*-rst *Restiveness:* respect for authority versus rebelliousness.
10 DOM *Dominance*-tol *Tolerance:* ascendancy versus forbearance.
11 E/A *Ego Achievement:* striving for power through social action.
12 EMO *Emotionality*-plc *Placidity:* expressiveness versus restraint.
13 ENY *Energy*-pas *Passivity:* effort versus inertia.
14 EXH *Exhibitionism*-inf *Inferiority Avoidance:* attention-seeking versus shyness.
15 F/A *Fantasied Achievement:* daydreams of extraordinary public recognition.
16 HAR *Harm Avoidance*-rsk *Risktaking:* fearfulness versus thrill-seeking.
17 HUM *Humanities, Social Science:* interests in the humanities and the social sciences.
18 IMP *Impulsiveness*-del *Deliberation:* impetuousness versus reflection.
19 NAR *Narcissism:* vanity.
20 NUR *Nurturance*-rej *Rejection:* helping others versus indifference.
21 OBJ *Objectivity*-pro *Projectivity:* detachment versus superstition (AI) or suspicion (CCI).
22 ORD *Order*-dso *Disorder:* compulsive organization of details versus carelessness.
23 PLY *Play*-wrk *Work:* pleasure-seeking versus purposefulness.
24 PRA *Practicalness*-ipr *Impracticalness:* interest in practical activities versus indifference.
25 REF *Reflectiveness:* introspective contemplation.
26 SCI *Science:* interests in the natural sciences.
27 SEN *Sensuality*-pur *Puritanism:* interest in sensory and esthetic experiences.
28 SEX *Sexuality*-pru *Prudishness:* heterosexual interests versus their inhibition.
29 SUP *Supplication*-aut *Autonomy:* dependency versus self-reliance.
30 UND *Understanding:* intellectuality.

To measure, for example, the *need* for achievement, the student is asked, in the Activities Index (AI), to indicate whether he likes or dislikes such activities as the following: setting difficult goals for himself; working for someone who will accept nothing less than the best that's in him; competing with others for a prize or goal; taking examinations; choosing difficult tasks in preference to easy ones; sacrificing everything else in order to achieve something outstanding. To measure, for example, the *press* of the environment towards achievement, the students in the environment are asked, in the College Characteristics Index (CCI), to answer whether such descriptions of their college as follow are true or false: the competition for grades is intense; it is fairly easy to pass most courses without working very hard; most courses require intensive study and preparation out of class; personality, pull and bluff get students through many courses; students who work hard for high grades are likely to be regarded as odd; students set high standards of achievement for themselves.

Confining attention henceforth in this paper to press measurement, it is important to note that the CCI appears to have respectable reliability and validity (Pace and Stern, 1958; Stern, 1962: 38, 47; Stern, 1963*a*: 8; McFee, 1961; Becker, Goodstein and Mittman, 1965), and conscious faking does not create abnormal problems (Stern, 1967: 56, 458).

Because press items, as Stern has said (1967: 19), must be "imbedded in the context of a fairly circumscribed situation", it has been necessary to construct special instruments for measuring press in high schools and in evening colleges. Thus there is the High School Characteristics Index (HSCI) (Stern, 1961; 1962: 32; 1967), and the Evening College Characteristics Index (ECCI) (Stern, 1962: 32; 1965: 136; 1967). As something of a contradiction of the opening sentence of this paragraph, there is also now a generalised environment index, the Organizational Climate Index (OCI) (Stern, 1965: 136; 1967).

There are, to use Stern's terms (1967: 359 and 443), several metamorphoses or mutants of the foundational CCI-type environmental press indexes. Two of these mutants, viz. Thistlethwaite's ICC and Pace's CCA, are referred to here, because of their relevance to the press measurement made in this study. Thistlethwaite's ICC (Inventory of College Characteristics) (1960 and 1962) is interesting because it contains separate scales for the measurement of faculty press and student press in the hope of achieving, as Pace (1964: 6) has said, "a more diagnostic instrument". Faculty press refers to the environmental press that can be attributed to the behaviour of the faculty, and student press refers to the environmental press that can be attributed to the behaviour of students. In the CCI or HSCI, for example, a particular press scale is composed of a mixture of faculty press items and student press items, and Thistlethwaite thinks that this prevents the derivation of clear educational implications from the data arising from the administration of the various scales of the environment index. In Pace's CCA (College Characteristics Analysis) (1964) there is a similar separation of the measurement of faculty press and student press, with the press specified as that prevailing in a sub-environment or sub-culture of a complex college or university.

IV. Some Hypotheses Concerning Environmental Press Differences Between School and University Environments

Aim of this study

The general aim is to isolate and consider some educational and psychological issues relevant to transition of students from school to university. The particular aim is to study the nature of chemistry education environments in school and university, and the nature of the differences between the school and the university environments.

The remainder of this section of the paper will be concerned with establishing hypotheses of a fairly general nature. The next section will set out the methodology by which such hypotheses might be tested and the next after that will be where hypotheses are restated in a form amenable to statistical testing, and where results of the testing are provided.

Hypothesis 1

> That the overall *faculty* press of the environment in which chemistry education occurs at school is perceived as distinctly different from the corresponding press at university, by students who have experienced both environments.
> (As an extension of this basic hypothesis there is the further statement, viz.: that differences between school and university along particular press dimensions would be predictable and so too would the press variables which are most important in distinguishing school environments from university environments.)
>
> In symbolic form the basic hypothesis is that

$$E_1 \neq E_2$$

(i.e. E_1 is not equal to E_2, where
E_1 = perceived faculty press of the school chemistry education environment
and E_2 = perceived faculty press of the university chemistry education environment.)

This hypothesis is really a "continuity-contrast" hypothesis (Stern, 1961), on the side of contrast. Inasmuch as a number of dimensions of press are being considered in their totality, separately and in interaction, the hypothesis is simultaneously describable as wholistic, pluralistic and dynamic.

In section II of this paper, where the school-to-university transition literature and related literature was reviewed, there emerged a number of assumptions and findings concerning transition, and these lie behind the generation of this hypothesis. Such assumptions and findings, eligible for testing, and subsumed by this hypothesis, were noted particularly in the subsections of section II labelled Institutional Experiences, Student-Teacher Interaction and Student-Task Interaction. Such a matter as the coercive effect of class size on faculty behaviour is one of the most salient considerations behind the hypothesis. So too the matter of differing concepts of what constitutes good teaching, at school and at university, is salient. One recalls Alpern's (1966) description of school teachers' "hovering concern" and its contrast with "leave-them-to-it" as the alleged attitude of the university teachers.

A more specific and localised consideration behind the hypothesis and its extension lies in some data provided by small samples of school teachers and of university lecturers who were involved in this study. The teachers (N = 11) and the lecturers (N = 11) were asked to set out what they were trying to do in their chemistry teaching; the question was completely open-ended and naturally the researcher was interested to see what issues the respondents would raise. There was a great similarity in the replies of the teachers and lecturers, but one matter on which there was a vast difference was the extent to which one of the objectives was concerned with helping students "pass the examination". This was freely mentioned by *nine* of the eleven school teachers and by *none* of the eleven university lecturers. It then becomes a matter of interest to see if students' reports of faculty press at school and at university reflect this major difference in the objectives of the school and university faculties.

Hypothesis 2

This is almost the same as Hypothesis 1 but relates to *student* press. The hypothesis is:

> That the overall *student* press of the environment in which chemistry education occurs at school is perceived as distinctly different from the corresponding press at university, by students who have experienced both environments.
> (As an extension of this basic hypothesis there is the further statement, viz.: that differences between school and university along particular press dimensions would be predictable and so too would the press variables which are most important in distinguishing school environments from university environments.)

In symbolic form the basic hypothesis is that

$$E_1 \neq E_2$$

(i.e. E_1 is not equal to E_2, where
E_1 = perceived student press of the school chemistry education environment
and E_2 = perceived student press of the university chemistry education environment.)

As before, there are assumptions and prior findings which this hypothesis subsumes, and which are eligible for testing when this hypothesis is tested. Some such

assumptions and prior findings have been noted earlier in the review of the literature (section II), especially in those subsections labelled Institutional Experiences, Student-Teacher Interaction, Student-Student Interaction and Student-Task Interaction. Such matters as (i) the coercive effect of class size on student behaviour, and (ii) the academic and socio-economic selection factors which determine which school students become university students, are probably some of the most salient considerations behind the hypothesis. Also it is of some moment here to note that student press in the university first-year class will probably reflect the fact that the class is a newly-formed one.

Hypothesis 3

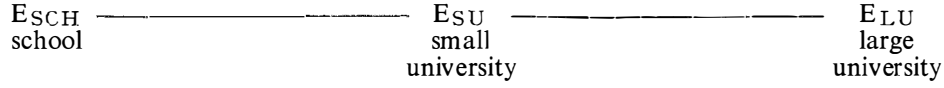
That faculty and student press of the environment in which chemistry education occurs at a large university are perceived as distinctly different from the corresponding press at a small university, and that a small university, as far as its press are concerned, is a cross between a school and a large university.

Symbolically we have:

$$E_{LU} \neq E_{SU}$$

i.e. E_{LU} is not equal to E_{SU},
where E_{LU} is the perceived press of the environment at a large university,
E_{SU} is the perceived press of the environment at a small university,
and where the press being considered is either faculty or student press throughout.

Also, graphically, and referring to either faculty press or student press throughout, the hypothesis is that E_{SU} falls between E_{LU} and E_{SCH}, where E_{SCH} is the perceived press of the school.



The most salient consideration behind this hypothesis is the coercive effect of institutional size on faculty or student behaviour. As far as size of chemistry department is concerned, the small university lies between the typical school and the large university. Therefore it could be hypothesised that the behaviours coerced by the small university would be intermediate between those coerced by the school and those coerced by the large university. Of course most, if not all, the social-cultural forces that have shaped universities and determined the typical university ethos, would be at work in the small university, making its press more "university-like" than the press of the typical school, irrespective of the size factor. However, the size factor in the small university might mean that more "hovering concern", less of the alleged "leave-them-to-it" attitude, and generally more friendliness, participation and cooperation, i.e. more "school-like" attributes, would be in evidence in the small university than in the large.

Arising from what has just been said is a corollary to this hypothesis, viz.: that, assuming that student satisfaction with teaching depends on faculty press being more "school-like" than "university-like", student satisfaction with teaching should show a decrease as we compare, in turn, school students with students at a small university, and then students at a small university with students at a large university.

V. Research Methodology

This section is concerned with a discussion of the measuring instruments, the sampling and test administration procedures, and the experimental designs and

analyses, that were used to obtain answers to the basic questions implied in the hypotheses which have been outlined and discussed in section IV.

1. Instrumentation

i) CONSTRUCTION AND PSYCHOMETRIC PROPERTIES OF CHEMISTRY EDUCATION ENVIRONMENT INDEX (CEEI)

To measure the environmental press of the chemistry education environment a special instrument, called the Chemistry Education Environment Index (CEEI), was constructed.

It is necessary to discuss briefly here the concept of a chemistry education environment. As has already been noted, Astin (1965) and Pace (1964) have shown the reality of sub-environments in colleges and universities. Often, naturally, these environments are centred on academic subjects. Falk (1967: 112) has noted that "the environment of a department will embody the attitudes conventional in that field", and she asks: "Do the knowledge and skills and attitudes to be acquired in a particular field differ in ways which will make generalizations about 'good teaching' . . . misleading guides when applied to a particular subject?"

In secondary schools the "chemistry department" is not as visible or separate as it is in university. However, in terms of the specialist teachers, the distinctive group of students, the specialist laboratories, lecture rooms and libraries, the other peculiar behaviour settings and the general ethos characterising chemistry learning and teaching at school, it seems sufficiently realistic to speak of a school "chemistry department". In any case, it is reasonable to ask students, whether they are at school or at university, about their perceptions of the environmental press which they experience in their chemistry classes.

It was decided to measure separately faculty press and student press. The advantages of the separation of faculty and student press measurement have been noted earlier (p. 14).

The faculty press was to be that arising from the behaviour of the teacher or teachers, or more generally, from the teaching that characterised a department. In schools the typical, but certainly not the only situation, is where students have the one teacher for chemistry. In university the situation is that the teaching is done by a number of lecturers (usually only three or four for a class), plus a number of demonstrators and tutors. There may be ten to twenty demonstrators or tutors with whom a student might have some contact, over a year. Inasmuch as it is the lecturers, the senior-status personnel, who are the most powerful, in that they do most of the teaching, control the syllabus and the examining, and direct the work of the demonstrators and tutors, it is likely that university students would think principally of lecturer behaviour when asked about "what the teachers do", and the like. However, on certain matters, the questions have reference to the teaching as a whole, and the effect of the behaviour of *all* the teachers in the department would be reflected in the perceptions the student respondents report. While the possibility of variation among the behaviours or influences of the various teachers of a particular university class is not discounted, it was found that students generally had no difficulty in deciding whether a particular statement about the teachers was, on the whole, more true than false, or vice versa. If there was some difficulty in generalising or "averaging out" teacher press, then it was considered likely that the press most dominant for the particular student would be reported.

The student press measurement was intended to reflect the prevailing ethos or press of the class as a whole, and was not specified as the press of the immediate group of a student's colleagues or friends, as had been the case in some earlier instruments (for example, in Thistlethwaite's ICC and Pace's CCA). It was realised that a student's answers, particularly when he is a member of a large class, to questions about "what students in the class do", and the like, would be determined to a greater or lesser extent by his knowledge of his immediate student associates and friends.

Faculty and student press were each to be measured along the same thirty psychological dimensions as are involved in the Activities Index (AI) and the College Characteristics Index (CCI). There was first a search for a pool of items, the huge pool eventually consisting of thirty scales, of fifteen items each, for each of faculty press and student press. Some items in existing press scales of Pace and Stern (the CCI), Stern (the HSCI, ECCI and OCI), and Thistlethwaite (the ICC), were adapted for the chemistry education environment; many other new items had to be generated. Quite a number of "needs" items, as provided in the AI, in Murray (1938), in Edward's Personal Preference Schedule (EPPS) and in Rohde's Sentence Completion Method (1957), proved to be the stimuli for the construction of "new" press items.

Then this pool of items was examined by school chemistry teachers, university chemistry lecturers, demonstrators and tutors, and by educational psychologists and student counsellors familiar with Murray's psychological theory. From all these various expert critics, opinions concerning the validity and general suitability of the items, and concerning the approach as a whole, were obtained. This procedure was in line with an effort to ensure that items finally used would have face validity in school and in university chemistry education environments, and would have psychological validity in relation to Murray's criteria.

Because of the almost inordinate size of the indexes (both before item analysis, and after item analysis had removed one third of the items), there was a temptation to either limit the number of press dimensions to be considered or to reduce the number of items per press scale. Certain chemistry teachers, in school and in university, were dubious about the relevance of certain of the Murray dimensions, but to start any a priori selection and rejection of dimensions on the basis of apparent relevance or otherwise seemed a risky enterprise. There was, it seemed, an almost inviolate integrity of the Murray scheme. It was, it seemed, either to be taken as it was, or not used at all. There was, of course, the strong possibility that some apparently irrelevant dimensions of press might turn out to be otherwise. Pace has commented on the wholeness and interrelatedness of everything that happens in a learning situation. "Any learning or teaching activity has multiple effects. Even though the teacher claims no concern about such matters as social relations, attitudes, interests, citizenship, and philosophy of life, the learning activities will have consequences in these areas anyway" (Pace, 1958: 82). As for the other possible abbreviation procedure, viz. shortening the scales, it appeared that any attempt to reduce the original lengths of the scales to below fifteen items or the final lengths of the scales to below ten items, would, in the interests of maintaining reasonable reliability of measurement, be out of the question.

Following amendments consequent upon the criticisms provided by the chemistry education experts and the psychological experts, the press scales were administered to samples of school and university chemistry students, who, as well as providing information necessary for statistical item analysis procedures, also had the opportunity to write critical comments of the items, and of the instrument generally. The trial forms of the press scales are available for perusal (Genn, 1969: 166-204). The statistical item analysis procedure brought each of the thirty faculty press scales and each of the thirty student press scales from fifteen items down to ten items. It is important to note that the same scales and items were used for measuring school environmental press and university environmental press.

The CEEI may be inspected in Appendix A, where its parts are called Research Instrument I (the section measuring faculty press), and Research Instrument III (the section measuring student press). The component press scales of Research Instrument I and of Research Instrument III are referred to later in this paper by the abbreviated names supplied earlier (p. 13); for example, abasement is ABA, achievement is ACH, and so on.

A summary of various matters and procedures relating to the construction of the CEEI is available (Genn, 1969: 229-244). Some aspects that have already been

mentioned are there elaborated upon, and, in particular, the technical detail of certain procedures is provided.

Some psychometric properties of the CEEI were revealed as the research proceeded, and are noted here.

Kuder-Richardson Formula 20 Reliabilities were calculated twice for each of the thirty scales measuring faculty press and each of the thirty scales measuring student press. The first calculation related to the first administration, when school faculty press and school student press were reported. The second calculation related to the second administration when university faculty press and university student press were reported. Appendix B records the reliabilities.

A study of standard deviations calculated for each of the various press scales, for the N = 135 sample (which is the residual sample described below, and which is used in the major school-to-university comparisons that constitute the main purpose of this project), provides some evidence relating to the basic validity of the press measurement procedures. The table of standard deviations is provided in Appendix C. One notes there that

i) The variability along the faculty press scales relating to the university environment is less than the variability along the corresponding faculty press scales relating to the school environment in twenty-nine out of thirty comparisons;

and *ii*) The variability along the student press scales relating to the university environment is less than the variability along the corresponding student press scales relating to the school environment in twenty-four out of thirty comparisons.

Results of the kind obtained in (*i*) and (*ii*) would of course be expected. University press data were related to one environment, school press data were derived from a wide range of environments.

Strong evidence concerning the basic validity of press measurement by the CEEI emerged in various matrices reporting intercorrelations of press scales and in the factor analyses of the various intercorrelation matrices. Intercorrelation matrices and results of factor analyses are provided in the detailed report (Genn, 1969).

It is important to mention here the criticism of the validity of press measurement that is sometimes made, to the effect that students' press perceptions are projections of personality needs, and that the environmental press index is merely a disguised personality measure (Stern, 1967: 56). Need-press theorists and researchers have given much consideration to this question (Saunders, 1962; McFee, 1961; Stern, 1967), and the findings are to the effect that needs (personality) and press perception are essentially independent. Data pertaining to the press measurement by the CEEI also indicate that the press perception, and especially that of the faculty press, is essentially independent of students' personality needs (Genn, 1969: 103, 333-339, 110-112, 401). (Needs were measured by the Activities Index (AI), as part of the wider study.)

ii) CONSTRUCTION AND PSYCHOMETRIC PROPERTIES OF SATISFACTION WITH TEACHING SCALE (SATTCH)

A scale, Satisfaction with Teaching (SATTCH), was developed on the basis of the Satisfaction with Faculty scale in the Educational Testing Service (ETS) College Student Questionnaires (CSQ) (Peterson, 1965). Five items (items 11-15) were added to the ten items in the Satisfaction with Faculty scale, making a Likert-type scale of fifteen items, each to be answered on a four-point scale. A copy of the SATTCH scale is provided in Appendix D.

The definition of the Satisfaction with Faculty scale of the CSQ is as follows:

> Satisfaction with Faculty refers to a general attitude of esteem for instructors and the characteristic manner of student-faculty relationships at the respondent's college. Students with high scores regard their instructors as competent, fair,

> accessible, and interested in the problems of individual students. Low scores imply dissatisfaction with faculty and the general nature of student-faculty interaction. (Peterson, 1965: 16).

The five items added were concerned with essentially the same matters as those involved in this definition. The Purdue Rating Scale for Instruction influenced the selection of the particular additional items. So too did various researches which have been noted already in this report, and which dealt with matters of student-teacher interaction, student satisfaction with teaching, and the like.

A reliability coefficient of .76 (coefficient alpha) is reported for the CSQ Satisfaction with Faculty scale. In view of the SATTCH scale's being half as long again, and assuming that the added items are of the same nature and quality as those of the Satisfaction with Faculty scale, the reliability of SATTCH should be at least satisfactory for the purposes of this research, where group comparisons are to be made.

Further information about the psychometric properties of the Satisfaction with Teaching (SATTCH) scale is provided in the detailed report (Genn, 1969).

2. The sample and test administration

One hundred and thirty-five students (ninety-five men and forty women), in the 1967 Chemistry I class for Medicine students at the University of Queensland, Brisbane, constituted the main sample. There were also two minor samples, and some data from these are used for comparative purposes in this study. One sample (N = 87 or 86 or 85) was of students in a Chemistry I class (Pure Science) at the University of Queensland, Brisbane, 1967; the other sample (N = 69 or 68 or 54 or 53) was of students in a Chemistry I class at the University College of Townsville, 1967.

In March 1967 all available students in the Chemistry I class for Medicine students at the University of Queensland, Brisbane, completed both the Chemistry Education Environment Index (CEEI) and the Satisfaction with Teaching scale (SATTCH), in terms of their 1966 secondary school experience. In July 1967, after two terms at university, they completed the CEEI and SATTCH again, this time in terms of their university experience.

Almost simultaneously with the testing of this Chemistry I class, from which the main sample (N = 135) for this study was derived, there was the testing of a Chemistry I class (Pure Science students) at Brisbane, using identical tests and testing procedures. Also, but with some inevitable differences in the testing schedule and the testing procedures, identical tests were administered to students in a Chemistry I class at the University College of Townsville. These testings, and only in some of their aspects, have only one connection with the main-line development of this report, so only the pertinent results are reported here. The minor samples referred to above were derivatives of these testings.

The study's main sample had to be such that all students in it did all the tests specially administered for the research, and also such that the results of these students in the previous year's Queensland matriculation end-of-school chemistry examination (1966) and in the first-year university examination (1967) were available. Students repeating the first-year course in 1967 were thus not eligible for inclusion in the final sample, nor were students who had done their final-year pre-university studies outside of Queensland. To increase the homogeneity of the sample, students who had not been full-time school students in 1966 were omitted. Thus the final sample for the major research study is homogeneous, in that all students in it have a relatively uniform educational background in Queensland, they are at the University for the first time, and all are following exactly the same study programme which includes, of course, their Chemistry I studies.

The size of the study's main sample, viz. the 135 students in the Chemistry I class for Medicine students, reflects a high degree of cooperation, by a very high proportion of available students.

Further details concerning sampling and test administration procedures are available (Genn, 1969: 298-316).

3. Experimental designs and analyses

This research, as far as the testing of the first two hypotheses is concerned, involves comparisons of a kind where a group called "school" is to be compared with the same group, under different circumstances, called "university". Also the comparisons are to be wholistic, i.e. they are to be made taking full account of a number of variables, m, all operating together in each of the groups being compared.

Multivariate techniques appear to be highly relevant in a study of the nature of learning environments in school and university, and so are used in this study. Such techniques, with the exception of factor analysis, have not as yet been much used in educational research.

Using multivariate analysis of variance it is possible, taking cognizance of the m variables simultaneously operating, to decide whether groups (in this study, two), are in fact different or whether differences are not sufficiently great to warrant rejection of the null hypothesis, Ho. This hypothesis would be to the effect that the groups being compared on the m variables have arisen from the same population. If Ho is rejected one can proceed to make separate univariate analyses, in which one sees what differences, if any, exist between the groups, on each variable.

If Ho is rejected one can also proceed to a discriminant analysis which gives to each of the variables a discriminant weight. A discriminant function is obtained, and an individual's score on this function is calculable, knowing his score on each of the m variables and knowing the discriminant weight for each of the variables. The discriminant scores for each of the groups cluster around the respective group centroids. A centroid is the average discriminant score for a group, on the discriminant function. The purpose of the discriminant analysis is, as it were, to pull the centroids as far apart as possible and to make the discriminant scores for each group cluster as closely as possible around the respective centroids. This discriminant function is a new hypothetical variable which can usually be named and given psychological meaning, and, as we shall presently see, this is a very useful way of arriving at a condensed and empirically-based statement about what constitutes the essential difference between groups. The naming or interpretation of the discriminant function is accomplished in this study by noting the variables which are most highly correlated with the function (Veldman, 1966).

The analyses involved in the testing of the third hypothesis and its corollary were in the nature of a preliminary exploration only, and involved neither the multivariate procedures just described nor other rigorous statistical procedures and tests.

VI. Testing the Research Hypotheses: Major Findings

The main task will be to discover, in the testing of each of the first two hypotheses, whether school and university press differ, when thirty press variables are considered simultaneously and as a whole, with due regard being taken of the interdependence and interaction of the variables. From the background of research, theory and discussion concerning the nature of the difference between school and university it would be possible to hypothesise concerning the essential psychological nature of the difference between school and university environments. However, here we will merely test a null hypothesis of no difference between the environments, and then allow the nature of the difference, if there is one, to be defined empirically by the discriminant analysis. Also from the background of research, theory and discussion, one could hypothesise concerning school-university differences on each of the thirty press dimensions, for both faculty and student press. Such univariate hypothesising would, however, conceal the main-line development of this paper and will

be left to the reader to undertake, should he so wish. The statistical analyses associated with the testing of the wholistic hypotheses will furnish all the detail necessary for testing any such univariate hypothesising.

Hypotheses here are numbered in exactly the same manner as in section IV, but are re-stated with some reduced scope and with the first two hypotheses in the null form.

Hypothesis 1

That, taking all of the thirty faculty press variables together, there is no difference between the perceived faculty press in the chemistry education environments at school and at university.

DESIGN AND ANALYSIS

One hundred and thirty-five (135) students answered the faculty press scales twice, first in terms of their school experience, then in terms of their university experience.

The major statistical techniques employed in the testing of the hypothesis were multivariate analysis of variance and discriminant analysis. The computations associated with the use of these techniques were accomplished with the aid of a computer program adapted from Veldman (1966: 275-277).

A full account of the statistical analysis associated with the testing of this hypothesis is provided in Appendix E.

A summary account of the statistical analysis is now provided here, together with some interpretation of the analysis and discussion of major findings.

Multivariate analysis of variance. $F = 17.22$: $df = 30, 105$: $P = .0000$

Discriminant analysis. Only one discriminant function was obtained.

School centroid = 10.67
University centroid = 5.49

Variables for which correlation with the discriminant function was greater than |.50| were: achievement ACH (.67), adaptability ADA (.67), affiliation AFF (.73), counteraction CTR (.70), ego-achievement E/A (.58), fantasied achievement F/A (.64), humanities-social science HUM (.51), nurturance NUR (.75), orderliness ORD (.51), reflectiveness REF (.54) and supplication SUP (.68).

Univariate analyses of variance. In univariate F tests (degrees of freedom = 1, 134 : P = .05), school faculty press was found to be significantly less than university faculty press on deference DFR and dominance DOM. School faculty press was significantly greater than university faculty press on all other scales except abasement ABA, change CHA, objectivity OBJ, play PLY and sex SEX.

SUMMARY

Ho is rejected. There *is* a difference between the perceived faculty press in the chemistry education environments at school and at university. The discriminant variable is highly correlated with press towards achievement, adaptability, affiliation, counteraction, nurturance, and supplication. The discriminant variable is virtually identical with "hovering concern" (Alpern, 1966: 594), by which he meant that school teachers are in general more friendly, concerned and supervisory than the university lecturers. The differing concepts of what constitutes good teaching at school and at university are reflected in the discriminant variable. (At this point it is interesting to note that students' satisfaction with teaching shows a statistically significant decrease ($P < .0000$), from school to university [Genn, 1969: 428]). The nature of the discriminant variable and the evidence from the univariate analyses of variance are

generally consistent with school-university faculty press differences that would be expected on the basis of Barker's theorising concerning the coercive properties of the size factor.

Hypothesis 2

That, taking all of the thirty student press variables together, there is no difference between the perceived student press in the chemistry education environments at school and at university.

DESIGN AND ANALYSIS

One hundred and thirty-five (135) students answered the student press scales twice, first in terms of their school experience, then in terms of their university experience.

The statistical techniques and various computations associated with the testing of this hypothesis are the same as those associated with the testing of Hypothesis 1, above.

A full account of the statistical analysis associated with the testing of this hypothesis is provided in Appendix F.

A summary account of the statistical analysis is now provided here, together with some interpretation of the analysis and discussion of major findings.

Multivariate analysis of variance. $F = 10.68 : df = 30, 105 : P = .0000$

Discriminant analysis. Only one discriminant function was obtained.

School centroid = 2.61
University centroid = —0.74

Correlations of variables with the discriminant function, where r was greater than |.30|, were for affiliation AFF (.54), aggression AGG (.39), counteraction CTR (.31), dominance DOM (.49), impulsiveness IMP (.36), play PLY (.37), practicalness PRA (.54), abasement ABA (—.40) and deference DFR (—.53).

Univariate analyses of variance. In univariate F tests ($df = 1, 134 : P = .05$), school student press was significantly less than university student press on abasement ABA, conjunctivity CNJ, deference DFR, energy ENY, harm-avoidance HAR, reflectiveness REF and sensuality SEN. School student press was significantly greater than university student press on adaptability ADA, affiliation AFF, aggression AGG, counteraction CTR, dominance DOM, emotionality EMO, exhibitionism EXH, impulsiveness IMP, play PLY, practicalness PRA and supplication SUP.

SUMMARY

Ho is rejected. There *is* a difference between the perceived student press in the chemistry education environments at school and at university. The discriminant variable is meaningful. On the basis of the correlations of individual press variables with the discriminant function it could be described as the extent to which the student press is friendly, playful, impulsive, counteractive, dominating, aggressive, practical, not abasive, and not deferential. The values of the centroids show that the discriminant variable has a greater value for the school environment than for the university environment. The nature of the discriminant variable and the evidence from the univariate analyses of variance are generally consistent with differences between school and university student press that one would expect on the basis of the selection factors one knows are at work, and on the basis of Barker's theorising concerning the coercive effects of size of class. It would appear also that the findings emerging from the testing of this hypothesis are consistent with the fact that the university class is a newly-formed class, a collection of relative strangers.

Hypothesis 3

That a small university, as far as the press of its chemistry education environment is concerned, is somewhere between a typical school and a large university.

There is also a corollary to this hypothesis (see pp. 16, 22), to the effect that:

Student satisfaction with teaching will show a decrease as we compare, in turn, school students with students at a small university, and then students at a small university with students at a large university.

DESIGN AND ANALYSIS

The groups involved were, for faculty press, 68 "school" students (i.e. students in a Chemistry I class at Townsville University College reporting retrospectively on their school experience), 54 of these same students in a Chemistry I class at a small university (Townsville University College), and 85 science students in a Chemistry I class at a large university (Brisbane). The numbers involved, for student press, were 69, 54 and 86, respectively.

A table was constructed (Appendix G, Table 1) in which, for each of the 30 dimensions of faculty press, the actual mean scores for school, for the small university, and the large university, were inserted.

As far as faculty press is concerned, in 23 out of 30 three-way comparisons the small university was intermediate in position, i.e. between school and large university.

A similar table (Appendix G, Table 2) was constructed for student press, and in this case, in 16 out of 30 three-way comparisons, the small university occupied the intermediate position.

In both tables, and particularly in the first, it appeared that there were good grounds for upholding the hypothesis. What is more, when, in relation to the corollary to this hypothesis, satisfaction with teaching (SATTCH) was looked at, in the three environments, the small university was again intermediate, and comparison indicated that satisfaction decreased from school, through small university, to large university (Appendix G, Table 3).

SUMMARY

These results are interesting and significant and in line with the theoretically-based expectations outlined in section IV when the hypothesis was generated. A small university is something like school and something like a big university. Students in a small university must have a different "transition experience" from those in a large university.

VII. Educational Implications

In this study an attempt has been made to determine some aspects of the nature of school and of university chemistry education environments. To the extent that in this ecological research sound data have been gathered, they provide some empirical grounds for discussion of differences between school and university and should lessen the need for reliance on polemics in such discussions (Stern, 1965: 148). Such press data as are reported will, it is hoped, help the university and the schools to see in what ways university and school press most markedly differ. What the schools and the university do with such information is another matter, but conceivably such information could be used to more neatly articulate school and university, without schools or the university losing their essential characters.

Developmental and educational psychologists, will, it is hoped, find interest in the comparative school-university press data obtained in this study. The theoretical

orientation of such psychologists would influence the interpretations that might be made. For example, following Maslow (1954), some would evaluate school and university press in terms of the extent to which press were conducive to the maximising of self-actualising behaviours. Havighurst's concept of developmental tasks (1953) would influence some psychologists to evaluate school and university in terms of the extent to which the environmental press were fostering the achievement of tasks which belong to the late adolescent period. Generally, developmental psychologists might group press into categories of anabolic (conducive to self-enhancing growth) and catabolic (antithetical to personal development) (Stern, 1967: 13, 430). School and university environments might then be evaluated in terms of the extent to which anabolic press are maximised and the catabolic minimised. Argyris (1957: 176) notes that "there are some basic incongruencies between the growth trends of a healthy personality in our culture and the requirements of formal organization". In these terms the institution whose press minimised such incongruencies would be judged the better. In all considerations of press there is some concept of "good" press, where "good" is defined in psychological terms.

Philosophical considerations, too, can be served by school and university press data. Pace (1958: 83) says: "Educational objectives are statements of philosophy. They derive from concepts of the good life and the good citizen, as these are seen by those who operate the educational institution, the class-room, the study unit." If press may be assumed to be reflections of objectives then philosophical foundations of school and university may be discerned in press data.

This leads one to note that the university, with such press data as are available from this research, may be in a stronger position to evaluate itself, at this time when educational institutions generally are showing an increased self-consciousness and awareness. Pace and Stern say: "Institutional press should have some clear relationship to institutional purpose" (1958: 275-276). They go on to say: "The objectives of a college are formal or explicit statements of intent: they indicate the directions in which a college means to influence the behavior of students" (p. 276). Related to explicit objectives is what may be called an explicit press (Stern, Stein and Bloom, 1956: 55, 73), which the institution or the faculty aims to provide. There is also an implicit press (Pace and Stern, 1958: 276), which is what students say exists. Pace and Stern (1958: 276) note that

> a serious lack of congruence between implicit press and explicit objectives would suggest to faculty members and administrators that certain aspects of the environment ought to be changed in order to make the total impact of the institution more consistent or more effective.

Pace (1958) reminds us that the relation of an institution's long-term goals to its day-to-day activities may be more obvious to the teachers than the students, and that difficulty may be in failure to relate what he calls explicit and implicit goals rather than in actual conflict of such goals.

Appendix A

The Chemistry Education Environment Index (CEEI)

This index consists of two separate parts, called Research Instrument I and Research Instrument III, respectively.

Research Instrument I contains thirty scales, each of ten items, for the measurement of *faculty press.*

Research Instrument III contains thirty scales, each of ten items, for the measurement of *student press.*

The press dimensions have already been numbered 1-30 (see page 13). For both Research Instrument I and Research Instrument III every thirtieth item refers to the same psychological dimension. For example, items 7, 37, 67, 97, 127, 157, 187, 217, 247, and 277 (ten items in all), are the components of scale 7, which is for conjunctivity, CNJ.

(Please note that two copies of each instrument were answered. For each instrument the first copy was that which students answered in terms of their secondary school experience, the second was that which the students answered in terms of their university experience. The first and second copies were of course identical in terms of the actual questions they contained. Only the second copies of each instrument are provided here. The first copies differed from the second copies only on the cover sheets, where, in the first copies, instruction 5 was necessarily amended, the rubber-stamped note following the instructions was not used and instead there was a note reminding students that the questions were to be answered retrospectively. This instruction was as follows:

IMPORTANT NOTE

Please interpret all questions and statements relating to your chemistry education, (teacher(s), students in your class, facilities, your own actions, experience, attitudes, etc.), as relating to YOUR CHEMISTRY EDUCATION IN YOUR LAST (SENIOR) YEAR AT YOUR SECONDARY SCHOOL. In answering such questions and statements you are thus reporting on YOUR PAST EXPERIENCE in chemistry education and not your present experience, despite the form of many of the questions and statements which are put in the present tense to suit other research uses of this instrument.)

UNIVERSITY OF QUEENSLAND
CHEMISTRY EDUCATION RESEARCH PROJECT

RESEARCH INSTRUMENT I*

Information and Instructions to Students

1. Would you please supply the following information?

SURNAME: .....

OTHER NAMES: .....

2. It is hoped that the chemistry education research project in which you are now cooperating will provide information which will be of benefit to all concerned with chemistry education.
3. In no case will the answers of individual students be singled out. The results will be in the form of statistical summaries and will be used for research purposes only.
4. You are asked to write T (for True) or F (for False) in reply to each statement provided in the pages that follow.
5. Statements about your chemistry education, (teacher(s), students, facilities, etc.), refer to your chemistry education at your ~~school~~, university, ~~institute~~, ~~etc.~~ and *not to any outside additional tuition you may receive.*
6. YOU WON'T *KNOW* the answer for many of the statements because there may not be any really definite information on which to base your answer. YOUR RESPONSE WILL SIMPLY MEAN THAT IN YOUR OPINION THE STATEMENT PROVIDED IS PROBABLY TRUE OR PROBABLY FALSE.
7. Please work through the list of statements as quickly as you can.
8. To mark your answer simply put T (for True) or F (for False) in the bracket at the end of each statement.
9. PLEASE MAKE THE LETTERS, T OR F, *DISTINCTLY*. IF YOU DECIDE TO CHANGE AN ANSWER PLEASE CROSS OUT THE FIRST ANSWER COMPLETELY AND START AGAIN. e.g. TO CHANGE T TO F CROSS OUT T and WRITE F, THUS, (~~T~~) (F).
10. WOULD YOU PLEASE MAKE SURE THAT YOU PROVIDE AN ANSWER, EITHER (T) OR (F), FOR EVERY STATEMENT?

PLEASE NOTE: ALL QUESTIONS REFER TO YOUR CHEMISTRY EDUCATION AT UNIVERSITY THIS YEAR

---

* The development of this instrument has been greatly helped by the work of G. G. Stern, C. R. Pace, H. A. Murray, D. L. Thistlethwaite and others.

1. No one is expected to suffer in silence if the policies of the chemistry teacher(s) happen to create personal hardship. ( )
2. A competitive spirit among the students is fostered by the chemistry teacher(s). ( )
3. Marks in tests and examinations in chemistry are read out in class or posted on the notice board, so that everybody knows who got the high and low marks. ( )
4. For the chemistry teacher(s) there seems to be little time for informal conversation with students out of class. ( )
5. Any trouble with students is resolved as quickly as possible, by the chemistry teacher(s). ( )
6. The chemistry teaching keeps abreast of modern developments in the subject. ( )
7. The chemistry course is very well organised and progresses systematically from week to week. ( )
8. Students are encouraged by the chemistry teacher(s) to speak up freely and openly in class. ( )
9. There is no air of superiority in the manner of the chemistry teacher(s) towards students. ( )
10. Students are not asked by the chemistry teacher(s) for any advice or suggestions. ( )
11. What goes on in the community appears to be of little interest to the chemistry teacher(s). ( )
12. Students in the chemistry classes learn that they are not only expected to have ideas but to do something about them. ( )
13. Chemistry teaching here lacks vigour. ( )
14. It is unusual for the chemistry teacher(s) to invite someone from around the town or some visiting expert to speak to the class. ( )
15. Students are persuaded by the chemistry teacher(s) to have high goals and to seek to attain them. ( )
16. Protective screens are set up around experiments where there is the slightest risk of explosion or splashing. ( )
17. Literary, musical, artistic or dramatic activities here are not engaged in by the chemistry teacher(s). ( )
18. In chemistry classes even occasional joking and laughing are not encouraged. ( )
19. It seems that a private world of ideas is made, and for the most part lived in, by the chemistry teacher(s). ( )
20. Very helpful and kind is a fitting description of the chemistry teacher(s). ( )
21. No one needs to be afraid of expressing an unusual or unpopular point of view in this chemistry class. ( )
22. Nothing much is said if students happen to report to a chemistry class a little late. ( )
23. A good sense of humour is a noticeable characteristic of the chemistry teacher(s). ( )
24. In the chemistry course chemical technology and practical chemistry are more emphasised than theoretical matters. ( )
25. The chemistry course encourages students to reflect on their experiences. ( )
26. Many students come to really like chemistry because of the way it is taught here. ( )

27. The beauty of colour of some substance or the symmetry of design of some crystal or molecule do not seem to excite the chemistry teacher(s). ( )
28. Nothing is done in this chemistry class to diminish any shyness that students might have towards members of the opposite sex. ( )
29. There is on no account any "spoonfeeding" of students by the chemistry teacher(s). ( )
30. Students are continually warned by the chemistry teacher(s) to be critical of current ideas and theories in chemistry. ( )

31. You are often made to feel inadequate by the chemistry teacher(s). ( )
32. There is a lot of "homework" in chemistry. ( )
33. Poor work is criticized pretty severely by the chemistry teacher(s). ( )
34. Determined efforts to establish friendly relations with students are made by the chemistry teacher(s). ( )
35. Very considerable patience is shown by the chemistry teacher(s) in handling problems and problem students in class. ( )

36. The chemistry course varies very little from year to year. ( )
37. The goals and purposes of the course are clearly explained by the chemistry teacher(s). ( )
38. Students are made to feel confident that success in chemistry is possible, if they really want it. ( )
39. Students are encouraged to dispute with the teacher(s) on theoretical and practical matters in chemistry. ( )
40. A student who is always coming up with some rather odd or unusual idea in the chemistry class would be considered as a nuisance by the teacher(s). ( )

41. The benefits that human society has derived from chemical research are often pointed out by the chemistry teacher(s). ( )
42. Ideas and events are responded to by the chemistry teacher(s) in a pretty cool and mild-mannered way. ( )
43. A great interest in the work of teaching characterises the chemistry teacher(s). ( )
44. Opportunities are provided in chemistry classes for students to develop their skills and talents directing the work of others. ( )
45. Little interest in the vocational ambitions of the students is shown by the chemistry teacher(s). ( )

46. Conditions which involve some risk or physical danger are not tolerated in the chemistry classes. ( )
47. No concern with the way our society is organized or how it operates is shown by the chemistry teacher(s). ( )
48. Doing things on the spur of the moment is characteristic of the chemistry teacher(s). ( )
49. Proper social forms and manners are insisted upon by the chemistry teacher(s). ( )
50. Every opportunity is (or would be) taken by the chemistry teacher(s) to help handicapped or under-privileged students. ( )

51. Regulations are interpreted liberally and violations treated with understanding and tolerance by the chemistry teacher(s). ( )
52. If chemistry practical experiments are not written up neatly or in a specified style the rule is that they have to be re-written. ( )
53. Non-academic matters are not allowed to take up any time in chemistry classes. ( )
54. That chemistry is an important subject because it has so many practical applications is a constant theme of the chemistry teacher(s). ( )

55. In this chemistry education there are many facilities and opportunities for individual creative activity. ( )
56. The chemistry teaching is as good as you can get. ( )
57. Every opportunity to provide demonstrations for students is taken by the chemistry teacher(s). ( )
58. The role of "master of ceremonies" or "the life of the party" at a students' dance or party would be an unlikely one for the chemistry teacher(s). ( )
59. Sympathetic and understanding is a fitting description of the chemistry teacher(s). ( )
60. There is a real striving by the chemistry teacher(s) to present material as clearly as possible so that it can be understood. ( )
61. You're seldom made to feel you're wasting the time of the chemistry teacher(s). ( )
62. Students are urged by the teacher(s) to excel in their chemistry studies. ( )
63. Students are encouraged to always make some sort of attempt to do some chemistry practical or theoretical work, even if success is not likely. ( )
64. Friendly relations amongst members of the class are fostered by the chemistry teacher(s). ( )
65. When a particular student is disliked by the chemistry teacher(s) it is made pretty clear to him. ( )
66. Quite a lot of travelling around has been done by the chemistry teacher(s). ( )
67. The need for planning in experimental work in chemistry is constantly stressed. ( )
68. There is a willingness on the part of the chemistry teacher(s) to hear students' complaints. ( )
69. Leadership of the class by the chemistry teacher(s) is very democratic. ( )
70. The manner of the chemistry teacher(s) is authoritative and forceful. ( )
71. Social and moral issues do not seem to be the concern of the chemistry teacher(s). ( )
72. The behaviour of the chemistry teacher(s) is typically unemotional. ( )
73. No efforts are spared by the chemistry teacher(s) to "get the subject across" to the students. ( )
74. You could accurately describe the chemistry teacher(s) here as colourful and striking personalities. ( )
75. Students are encouraged by the chemistry teacher(s) to think about exciting and unusual careers. ( )
76. Students are told exactly what to do in case of injury in the chemistry class. ( )
77. There is evidence of quite wide reading outside of chemistry and science by the chemistry teacher(s). ( )
78. New ideas are met with immediate enthusiasm by the chemistry teacher(s). ( )
79. Students who are not neatly dressed are likely to have this called to their attention by the chemistry teacher(s). ( )
80. A lot of time is spent by the teacher(s) in helping individual students to master chemistry study difficulties. ( )
81. The values of open-mindedness and objectivity (judging on basis of evidence) are stressed by the chemistry teacher(s). ( )
82. "A place for everything and everything in its place" would be an appropriate description of the chemistry class rooms and laboratories. ( )
83. You don't get any time for a spell in chemistry classes. ( )
84. Practical efficiency in doing work is a characteristic of the chemistry teacher(s). ( )

85. Students' ideas on serious matters are welcomed by the chemistry teacher(s). ( )

86. The chemistry teaching is very research conscious. ( )
87. Any attempts by students belonging to this chemistry class to draw anything other than the most plain and diagrammatic sketches are discouraged. ( )
88. To be a great chemist or even a good chemistry student one gets the impression that it is necessary to abandon interest in those aspects of life which interest most people. ( )
89. Students are given a lot of guidance and direction by the chemistry teacher(s). ( )
90. Strong dedication to teaching and scholarship in chemistry characterises the chemistry teacher(s). ( )

91. Students who interrupt a lecture or lesson with a question make the chemistry teacher(s) lose patience. ( )
92. Students' capacities are really pushed to the limit by the chemistry teacher(s). ( )
93. Students are usually made to answer to the head of the school or chemistry department as well as to the teacher(s) when the students have done something wrong in chemistry class. ( )
94. In the study of chemistry here there are many opportunities for students to make and develop friendships with other students. ( )
95. Cracking jokes at the expense of students is just not done by the chemistry teacher(s) here. ( )

96. There are the same (or no) extracurricular chemistry activities each year. ( )
97. The tasks set by the chemistry teacher(s) are usually clear so everyone knows what to do. ( )
98. A constant theme of the teacher(s) is that difficulties in learning chemistry would be reduced if students did more work. ( )
99. A student who wished to be liked by the chemistry teacher(s) would not disagree with the teacher(s) during class discussion. ( )
100. Discipline in chemistry classes is very strict. ( )

101. Discussions on "chemistry" topics in national and international news are encouraged in the class. ( )
102. Chemistry lectures or lessons are presented in an unemotional manner. ( )
103. A lot of energy and enthusiasm goes into the chemistry teaching. ( )
104. The chemistry section or department here likes to advertise itself and keep up a good publicity. ( )
105. The high accomplishments of former students are sometimes referred to by the chemistry teacher(s). ( )

106. Behaviour that could cause danger to other students in the chemistry class is severely punished. ( )
107. One gets the impression that non-scientific subjects are not considered very highly by the chemistry teacher(s). ( )
108. Students who tend to say or do the first thing that occurs to them are likely to meet trouble in the chemistry class. ( )
109. Poise and sophistication are highly respected by the chemistry teacher(s). ( )
110. Co-operation amongst students is fostered by the chemistry teacher(s). ( )

111. If a student interprets a chemistry test or examination question in a certain reasonable way, and writes a good answer, he would get a good mark even if his interpretation does not agree with that of the teacher. ( )

112. There is some record made here of student attendance at chemistry classes; (either in a special "chemistry" roll or in a class roll marked sometime each day). ( )
113. Students are strongly advised by the chemistry teacher(s) to use vacations for study rather than playing or relaxing. ( )
114. Education for leadership is strongly emphasised in this chemistry education. ( )
115. This chemistry course leads students to philosophise about different concepts of truth. ( )

116. Chemistry as a subject has a high reputation here. ( )
117. Vivid and novel expressions in students' written papers and records of experiments are usually criticized by the chemistry teacher(s). ( )
118. Students are sometimes told by the chemistry teacher(s) to forget about social life and do some more study. ( )
119. Students' personal problems are of no interest to the chemistry teacher(s). ( )
120. Most of the chemistry instruction here is little more than a repetition of what is in the text books. ( )

121. When you get into trouble with the chemistry teacher(s) other people in authority soon know about it. ( )
122. Students are encouraged to read and do work beyond the chemistry syllabus. ( )
123. Students are made to explain *why* they did something wrong when they have done something not approved by the chemistry teacher(s). ( )
124. To make all students feel they are important members of the class seems to be a goal of the chemistry teacher(s). ( )
125. Consideration for students characterises the chemistry teacher(s) here. ( )

126. New ideas for teaching chemistry are always being tried out here. ( )
127. In chemistry classes the presentation of material is well planned and illustrated. ( )
128. No stone is left unturned by the chemistry teacher(s) in trying to get everyone to understand difficult topics. ( )
129. The impression the students get from the chemistry teacher(s) is that the students are mere beginners in the study of chemistry. ( )
130. There is a pretty long list of "dos" and "don'ts" for chemistry practical work. ( )

131. Social injustice is never spoken of by the chemistry teacher(s). ( )
132. Students' examination results are discussed dispassionately by the chemistry teacher(s). ( )
133. Chemistry classes are boring. ( )
134. There are plenty of charts and notices in the chemistry class rooms and/or laboratories. ( )
135. A varied and unusual career is a characteristic of the chemistry teacher(s) here. ( )

136. In chemistry classes there is a constant concern to protect students from dangerous situations which could cause accidents. ( )
137. Philosophical, logical or ethical issues are often pointed out in the course of the chemistry teaching. ( )
138. Students feel they can express themselves freely in chemistry class. ( )
139. That students be well-dressed and well-groomed is considered an important matter by the chemistry teacher(s). ( )
140. The manner of the chemistry teacher(s) is somewhat impersonal, aloof and inaccessible. ( )

141. Sometimes questions in chemistry class are treated by the teacher(s) as if students were making personal criticisms of the teacher(s). ( )
142. Signs and notices make it easy to find your way around the chemistry laboratory and get what you want. ( )
143. "Business before pleasure" is a fitting description of the attitude of the chemistry teacher(s) to work and play. ( )
144. The practical value of chemistry in helping a student to get a good job is often stressed by the chemistry teacher(s). ( )
145. Students in their chemistry education get little encouragement to think about developing their own personal values and a philosophy of life. ( )

146. Students are encouraged by the chemistry teacher(s) to go further in chemistry studies. ( )
147. Little effort is made by the chemistry teacher(s) to use pictures, colour and decoration to make the chemistry classroom and laboratory pleasing to the eye. ( )
148. One gets the impression that students' romances and romantic problems are of no interest or concern to the chemistry teacher(s). ( )
149. It is common for the chemistry teacher(s) to go to great trouble to help students. ( )
150. Students are given considerable help in discovering interrelationships among various aspects of the chemistry course. ( )

151. Students are made to feel that they count by the chemistry teacher(s). ( )
152. Those who do the best work in chemistry are the most highly esteemed by the teacher(s). ( )
153. It is arranged that the smartest students in chemistry work together. ( )
154. There is a real attempt by the chemistry teacher(s) to get to know all the students pretty well. ( )
155. Use of sarcasm by the chemistry teacher(s) is pretty common. ( )

156. It is not long before any chemistry apparatus that is new on the market arrives here. ( )
157. Students are continually advised by the chemistry teacher(s) to study regularly and systematically. ( )
158. Channels for the expression of students' complaints are readily accessible in this chemistry section or department. ( )
159. The importance of taking nothing for granted in chemistry, even what is in the text books, is stressed by the chemistry teacher(s). ( )
160. The manner of the chemistry teacher(s) is tolerant and somewhat easy-going. ( )

161. Discussions about improving society are often initiated by the chemistry teacher(s). ( )
162. In the chemistry classes there is little to arouse much excitement or feeling. ( )
163. Many chemistry lectures or lessons are delivered in a monotone with little inflection or emphasis. ( )
164. A joke or story at some stage of proceedings is often thrown in by the chemistry teacher(s). ( )
165. The huge demand for trained persons is quite often referred to by the chemistry teacher(s). ( )

166. The chemistry teaching is very "safety-first" conscious, and a determined effort is made to ensure that safety rules are well known. ( )
167. Chemistry the way it is presented has no link with personal and social problems. ( )

168. Policy changes in the chemistry department occur slowly and only after considerable discussion. ( )
169. Always being well-dressed and groomed is a characteristic of the chemistry teacher(s). ( )
170. There is much concern on the part of the chemistry teacher(s) about the progress of each student in the class. ( )

171. Tolerance and understanding are shown by the chemistry teacher(s) in the way unusual or difficult students are dealt with. ( )
172. No deviation from established practices is tolerated in chemistry classes, no matter what the circumstances. ( )
173. It is a characteristic of the chemistry teacher(s) to live almost only for chemistry and things academic. ( )
174. Learning to work with others is emphasised in this chemistry education. ( )
175. There is little conjecture by the chemistry teacher(s) about what chemistry will be like in the years that lie ahead. ( )

176. "Chemistry in the news" is often referred to by the chemistry teacher(s). ( )
177. The spectacular possibilities of chemistry are fully exploited by the teacher(s). ( )
178. Old-fashioned in attitudes to boy-girl relationships would be a fair description of the chemistry teacher(s). ( )
179. Students are required to do just what work they are told to do by the chemistry teacher(s) and at the time indicated. ( )
180. In this chemistry course the main emphasis is on students' developing genuine understanding and critical judgement. ( )

181. Students' feelings are spared by the chemistry teacher(s) when indicating work is not good enough. ( )
182. The chemistry department here is outstanding in the emphasis it places upon student achievement. ( )
183. It is usual for the chemistry teacher(s) to regularly check up on students to make sure their work is being carried out properly. ( )
184. A personal interest in students is taken by the chemistry teacher(s). ( )
185. Individual students are often criticized in front of the class by the chemistry teacher(s). ( )

186. Students are often referred to books other than the set chemistry texts. ( )
187. A student who had been to a particular chemistry lecture or lesson could give a student who was absent a full and clear statement of the work covered. ( )
188. The importance of acting on personal conviction rather than accepting tradition tends to be emphasised by the chemistry teacher(s). ( )
189. Students may see the chemistry teacher(s) out of class by appointment only. ( )
190. Students who know the chemistry teacher(s) seem to get a better break. ( )

191. Expressions of strong personal belief by the chemistry teacher(s) are rare. ( )
192. Great interest in and enthusiasm for the subject is exhibited by the chemistry teacher(s). ( )
193. Students are urged by the chemistry teacher(s) to work to the limit. ( )
194. Spectacular chemistry displays for the rest of the institution and visitors are put on at least once a year. ( )
195. Students become more ambitious under the influence of the chemistry teacher(s). ( )

196. Accidents that have occurred in the past or in other places are mentioned by the chemistry teacher(s) on every possible occasion as warnings. ( )

197. It seems that social and personal problems of mankind are of very remote or no interest to the chemistry teacher(s). ( )
198. Quick decisions and action are not characteristic of the chemistry teacher(s). ( )
199. Personal experiences, feelings and ideas are often spoken of by the chemistry teacher(s). ( )
200. Students are always being told they will get help if they bring along particular study problems to the chemistry teacher(s). ( )

201. Students' motives are suspected by the chemistry teacher(s) and the worst interpretations are made of trivial incidents. ( )
202. The layout of the chemistry classrooms and laboratories here is very neat and orderly. ( )
203. Students are often advised by the chemistry teacher(s) to curtail sporting and social life in favour of more solid study. ( )
204. The chemistry course would be useful to students who go into positions demanding sound practical knowledge and technical abilities. ( )
205. What some people speak of as the mysteries of human life and existence would not, it seems, be of great interest to the chemistry teacher(s). ( )

206. A real interest in chemistry is aroused by the chemistry teacher(s). ( )
207. Poetry, music, painting and sculpture would not seem to greatly interest the chemistry teacher(s). ( )
208. If students were having trouble with romance interfering with their studies, they wouldn't even think of going to the chemistry teacher(s) for sympathy and advice. ( )
209. Quite a bit is done by the chemistry teacher(s) in the way of giving students guidance about careers. ( )
210. The fundamentals of the subject are really probed by the chemistry teacher(s). ( )

211. There is no tendency on the part of the chemistry teacher(s) to belittle the students. ( )
212. Really difficult problems are often posed by the chemistry teacher(s) as a challenge to the students. ( )
213. The quality of your work in chemistry cannot be kept a secret here. ( )
214. It would be more likely for the chemistry teacher(s) to say something friendly rather than unfriendly about each of the students. ( )
215. There is no holding of grudges by the chemistry teacher(s) against students who have caused trouble. ( )

216. The chemistry tests and examinations are always of much the same type. ( )
217. There is no wasted time here; everything has been planned right to the minute in chemistry classes. ( )
218. Students who are not having much success in the subject are encouraged by the chemistry teacher(s) to keep trying. ( )
219. It is made quite clear by the chemistry teacher(s) that authority rests with the teacher(s) and that there is to be no opposition. ( )
220. Some students appear to have lots of special privileges in the chemistry class. ( )

221. The ability to change the views of others seems to be enjoyed by the chemistry teacher(s). ( )
222. The atmosphere here does not seem to be very stimulating for the chemistry teacher(s). ( )
223. The work of teaching does not seem to bore the chemistry teacher(s). ( )

224. It would be most unusual for the chemistry section or department to do anything out of the ordinary. ( )
225. The fruits of success in chemistry study are often referred to by the chemistry teacher(s). ( )

226. Students are warned in very certain terms of any dangerous parts of a chemistry experiment and advised of precautions to take. ( )
227. A determined effort is made by the chemistry teacher(s) to destroy student prejudices and narrowness of outlook. ( )
228. The manner of the chemistry teacher(s) is spontaneous and free. ( )
229. Social grace and polish are highly respected by the chemistry teacher(s). ( )
230. It is usual for the chemistry teacher(s) to notice if students are absent and to ask after them. ( )

231. Moodiness and unpredictability are not characteristics of the chemistry teacher(s). ( )
232. Students are pretty much regimented in chemistry classes. ( )
233. It is characteristic of the chemistry teacher(s) to be easy-going and light-hearted. ( )
234. A real attempt is made by the chemistry teacher(s) to give the student the practical training he will need in his career field. ( )
235. Student behaviour and the factors behind it seem to be of interest to the chemistry teacher(s). ( )

236. Students are encouraged by the chemistry teacher(s) to pursue chemistry hobbies and the like. ( )
237. The chemical composition of the colours in a painting would be of more concern to the chemistry teacher(s) than the feeling or mood the painting conveyed. ( )
238. One gets the impression that there is a lack of sensitivity on the part of the chemistry teacher(s) towards the social and emotional problems of students. ( )
239. Little stress is put on teaching effectiveness by the chemistry teacher(s). ( )
240. Students are repeatedly invited to ask about anything in the chemistry course they do not understand. ( )

241. The points of view of the chemistry teacher(s) have to be complied with if students want good marks in chemistry. ( )
242. The chemistry course requires intensive study and preparation out of class. ( )
243. Students are closely supervised in chemistry classes to guard against mistakes. ( )
244. Everyone in the chemistry class is helped to get acquainted by the teacher(s). ( )
245. That the class is very unimpressive is often indicated by the chemistry teacher(s). ( )

246. Text books in chemistry are changed pretty often. ( )
247. The day's topic is usually outlined by the chemistry teacher(s) at the beginning of the class. ( )
248. Chemistry subject matter is taught but there is little concern shown by the teacher(s) as to whether students learn or not. ( )
249. The decision of the chemistry teacher(s) is final and students are expected to accept this, without question. ( )
250. Students who complete chemistry assignments, prac. books, etc. late are marked down. ( )

251. An active part in community affairs is played by the chemistry teacher(s). ( )

252. There are continual attempts by the chemistry teacher(s) to arouse enthusiasm for, and interest in chemistry studies. ( )
253. Every effort is made by the chemistry teacher(s) to involve every student in all activities of the class. ( )
254. Witty or clever remarks are typical of the chemistry teacher(s). ( )
255. An expressed hope of the chemistry teacher(s) is that some of the students will go into some sort of scientific research work. ( )

256. Performance of unauthorised chemistry experiments is considered a very serious offence. ( )
257. The inadequacy and limitations of solely scientific activities and interests are pointed out to students by the chemistry teacher(s). ( )
258. One gets the impression that to succeed in chemistry it is necessary to be reflective rather than impetuous. ( )
259. Looking and acting "right" is very important to the chemistry teacher(s). ( )
260. Student complaints and grievances are always listened to by the chemistry teacher(s) and frequently attempts are made to remedy situations. ( )

261. Students are trusted by the chemistry teacher(s). ( )
262. Formal rules and regulations have a very important place in this chemistry department. ( )
263. It is hard to side-track the chemistry teacher(s) into discussion of non-chemistry matters. ( )
264. The academic atmosphere in the chemistry department is practical, emphasising efficiency and usefulness. ( )
265. There is quite a lot of philosophising by the chemistry teacher(s) about different concepts of truth. ( )

266. Students are encouraged by the chemistry teacher(s) to consider chemistry as a career. ( )
267. Beauties of art and nature would not appear to greatly interest the chemistry teacher(s). ( )
268. The world of this chemistry department seems very remote from the real world of men and women. ( )
269. To a great extent students belonging to this chemistry class feel free to do what work they want to when they want to. ( )
270. New ways of testing whether students really understand chemistry are continually being devised by the teacher(s). ( )

271. Almost anyone is likely to be blamed, even those who had little to do with it, if something happens to go wrong in the chemistry class. ( )
272. Special efforts are made by the chemistry teacher(s) to give recognition to students who do exceptional work in chemistry. ( )
273. In chemistry class errors or failures are talked about freely so that others may learn from them. ( )
274. Students here are greeted by the chemistry teacher(s), out of class. ( )
275. It is difficult to get the chemistry teacher(s) annoyed or angry. ( )

276. Things are always done the same way from year to year in the chemistry department. ( )
277. The reading one is required to do for the chemistry course is carefully and clearly set out for students. ( )
278. You would not be likely to increase in confidence as a result of having been taught by the chemistry teacher(s). ( )
279. The more respectful a student is the more popular he is likely to be with the chemistry teacher(s). ( )

280. The patience of the chemistry teacher(s) with students slow to understand is almost without limit. ( )
281. Quite an active part in the affairs of this institution, outside of the chemistry section or department, is taken by the chemistry teacher(s). ( )
282. Whether students do good work or bad work seems to make little difference to the chemistry teacher(s). ( )
283. Whether or not a student is working is not really known by the chemistry teacher(s). ( )
284. The chemistry teacher(s) can really hold students' attention. ( )
285. Students here really get an idea of the excitement and challenge of chemistry discovery and research. ( )
286. Dangers of chemistry experimentation at home are often mentioned by the teacher(s) ( )
287. Much is made by the chemistry teacher(s) of the tremendous impact of chemistry discovery on human society. ( )
288. Students are often told by the chemistry teacher(s) to go away and think before raising a problem again. ( )
289. Students belonging to this chemistry class are encouraged to think of themselves as a rather special and somewhat separate group. ( )
290. It is usual for the chemistry teacher(s) to go carefully through any class tests, indicating and discussing correct answers and pointing out errors. ( )
291. Students get a very fair deal from the chemistry teacher(s). ( )
292. Students are urged to be tidy and orderly in written and practical work in chemistry. ( )
293. Constant advice to spend more time in study is given by the chemistry teacher(s). ( )
294. Students are urged by the chemistry teacher(s) to develop manual dexterity. ( )
295. A serious consideration of basic goals and values in teaching is made by the chemistry teacher(s). ( )
296. Because of the influence of the chemistry teacher(s) most students show increasingly scientific attitudes and more scientific approaches to chemistry. ( )
297. The importance of the careful use of the senses in data-gathering in chemistry is continually and strongly emphasised by the teacher(s). ( )
298. Prudish attitudes do not characterise the chemistry teacher(s). ( )
299. Students are permitted to set their own pace in their chemistry studies. ( )
300. Quite frequent chemistry tests help reveal to students the extent of their understanding of the course. ( )

UNIVERSITY OF QUEENSLAND
CHEMISTRY EDUCATION RESEARCH PROJECT

RESEARCH INSTRUMENT III*

Information and Instructions to Students

1. Would you please supply the following information?

SURNAME: .....

OTHER NAMES: .....

2. It is hoped that the chemistry education research project in which you are now cooperating will provide information which will be of benefit to all concerned with chemistry education.
3. In no case will the answers of individual students be singled out. The results will be in the form of statistical summaries and will be used for research purposes only.
4. You are asked to write T (for True) or F (for False) in reply to each statement provided in the pages that follow.
5. Statements about your chemistry education, (teacher(s), students, facilities, etc.), refer to your chemistry education at your ~~school~~, university, ~~institute~~, ~~etc.~~ and *not to any outside additional tuition you may receive.*
6. YOU WON'T *KNOW* the answer for many of the statements because there may not be any really definite information on which to base your answer. YOUR RESPONSE WILL SIMPLY MEAN THAT IN YOUR OPINION THE STATEMENT PROVIDED IS PROBABLY TRUE OR PROBABLY FALSE.
7. Please work through the list of statements as quickly as you can.
8. To mark your answer simply put T (for True) or F (for False) in the bracket at the end of each statement.
9. PLEASE MAKE THE LETTERS, T OR F, *DISTINCTLY*. IF YOU DECIDE TO CHANGE AN ANSWER PLEASE CROSS OUT THE FIRST ANSWER COMPLETELY AND START AGAIN. e.g. TO CHANGE T TO F CROSS OUT T AND WRITE F, THUS, (T) (F).
10. WOULD YOU PLEASE MAKE SURE THAT YOU PROVIDE AN ANSWER, EITHER (T) OR (F), FOR EVERY STATEMENT?

PLEASE NOTE: ALL QUESTIONS REFER TO YOUR CHEMISTRY EDUCATION AT UNIVERSITY THIS YEAR

---

* The development of this instrument has been greatly helped by the work of G. G. Stern, C. R. Pace, H. A. Murray, D. L. Thistlethwaite and others.

1. Students would not do anything outside the exact task set down by the chemistry teacher(s). ( )
2. There is a lot of competition amongst the students belonging to this chemistry class. ( )
3. Most students would prefer that their results in chemistry be not made known to the whole class. ( )
4. Most students have a friendly attitude towards the chemistry teacher(s). ( )
5. Students pay little attention to rules and regulations relating to their chemistry classes. ( )
6. Students have plenty of suggestions for changes in the chemistry course or in the way it is presented. ( )
7. Students about to do a chemistry experiment plan carefully what they are going to do. ( )
8. Most students would not ask a question in a chemistry class to get some further explanation of some point from the teacher. ( )
9. Most students look up to and admire the chemistry teacher(s). ( )
10. In the chemistry class students exert considerable pressure on one another to behave in a sensible, studious way. ( )
11. In the chemistry classes students would not raise matters relating to social reform. ( )
12. In the chemistry classes students express themselves dispassionately with caution and restraint. ( )
13. Students put a lot of energy into their chemistry studies, in class and out. ( )
14. It is easy to obtain student volunteers for impromptu demonstrations in chemistry classes. ( )
15. Most students belonging to this chemistry class would regard very high ambitions as pretty unrealistic. ( )
16. Students are careful and cautious whenever doing chemistry experiments. ( )
17. Few students belonging to this chemistry class read magazines and books involving history, economics or political science. ( )
18. Students belonging to this chemistry class are quite an impetuous group.( )
19. Students belonging to this chemistry class take a great deal of pride in their personal appearance. ( )
20. Many of the able students belonging to this chemistry class help the less able in their chemistry studies. ( )
21. Students belonging to this chemistry class tend to write "acceptable" answers rather than answers that they think should be written. ( )
22. Students are very precise and exact in the routine chemistry laboratory procedures. ( )
23. In a gap in proceedings in a chemistry class one can often hear discussion of sporting events, movies, etc. ( )
24. Students are happier learning of practical applications of chemistry than in probing the fundamentals of the subject. ( )
25. Many students belonging to this chemistry class are interested in books and movies dealing with psychological problems. ( )
26. Science journals or magazines are read by many students belonging to this chemistry class. ( )
27. Few students would seem to be really moved by the colourful beauty of a chemical reaction or the symmetry or design of some molecule. ( )
28. Few of the students belonging to this chemistry class would spend much time reading stories and novels about romantic love. ( )
29. A student belonging to this chemistry class who was always trying to "help out" would be likely to be regarded as a nuisance by the other students. ( )

30. Most students belonging to this chemistry class can concentrate very intently on a theoretical problem. ( )

31. If the students thought too much work was being asked for by the chemistry teacher(s), then the students would tell the teacher(s). ( )
32. Most students do the bare minimum of work in chemistry. ( )
33. Most students welcome criticism of their work by the chemistry teacher(s). ( )
34. Students like to have friendly conversations with the chemistry teacher(s) out of class. ( )
35. Most students show a good deal of caution and self control in their behaviour in chemistry classes. ( )

36. Many of the students belonging to this chemistry class have lived in different parts of the country, or overseas. ( )
37. Students try to ensure that they know what chemistry work is required of them by the teacher(s). ( )
38. Students belonging to this chemistry class seem to thrive on difficulty—the tougher things get the harder they work. ( )
39. In class, students rarely express opinions different from those of the chemistry teacher(s). ( )
40. In the chemistry class there are several cliques and groups and if you're not in one you're pretty much on your own. ( )

41. Students are not interested in any possible social relevance of their chemistry studies. ( )
42. Students take their part in the chemistry class activities without much display of enthusiasm. ( )
43. Few students would work at their chemistry studies to the point of being very tired. ( )
44. Most students belonging to this chemistry class are pretty shy. ( )
45. What one wants to do or be later in life is a favourite topic amongst students belonging to this chemistry class. ( )

46. Students who "act the fool" in the chemistry laboratory would be very unpopular with their fellows. ( )
47. Most students belonging to this chemistry class would know little about art, music, drama. ( )
48. Students belonging to this chemistry class are, on the whole, very cautious in their thinking and behaviour. ( )
49. Looking and acting "right" is very important to students belonging to this chemistry class. ( )
50. Most students see their learning of chemistry as part of their preparation to better serve society in later years. ( )

51. Students tend to treat criticism by the chemistry teacher(s) as personal criticism. ( )
52. It is extremely rare for students to arrive late for the chemistry classes. ( )
53. Students are out for fun in the chemistry classes. ( )
54. A move to increase the amount of practical work in chemistry and the credit for such work would be welcomed by students. ( )
55. The students belonging to this chemistry class would be well represented at a lecture by an outstanding philosopher or theologian. ( )

56. Students belonging to this chemistry class seldom talk in their spare time about scientific topics. ( )
57. Modern dancing or ballet would not be of great appeal to most of the students belonging to this chemistry class. ( )

58. Students belonging to this chemistry class spend a lot of time talking about their boy-friends or girl-friends. ( )
59. Students usually look for help the moment they strike some difficulty in their chemistry studies or practical work. ( )
60. Quite frequently students belonging to this chemistry class will get together in their own time and talk about things they have learned in class. ( )

61. Students generally feel that they are making real progress in their chemistry studies. ( )
62. Few students try hard to excel in chemistry. ( )
63. Most students are pretty shy about having to give their views on some matter under discussion in the chemistry class. ( )
64. Students bail-up the chemistry teacher(s) almost any time to ask for help with some difficulty they have met in their studies. ( )
65. When students dislike the chemistry teacher(s) they let it be known to the teacher(s). ( )

66. Students wish the chemistry syllabus was changed more frequently. ( )
67. Students often cause distractions which interrupt the presentation of the work by the chemistry teacher(s). ( )
68. Very few students would keep trying to do a difficult chemistry problem in their own time, if they didn't have to. ( )
69. Students frequently refer to the chemistry teacher(s) by first name or nick name. ( )
70. Some of the students seem to monopolise the practical work in chemistry and many students therefore don't get a chance to do much. ( )

71. Students would not think that the chemistry class is the place to start a discussion of social problems that science has brought or can solve. ( )
72. In the chemistry classes heated arguments among students are rare. ( )
73. Students concentrate intently in chemistry class. ( )
74. There would be no difficulty getting students to prepare a talk for presentation to the chemistry class. ( )
75. Most students belonging to this chemistry class do not aim at high standards of achievement. ( )

76. Students are apprehensive about doing chemistry experiments where trouble could come if they aren't extremely careful. ( )
77. Few students belonging to this chemistry class would be interested in an educational film about writers and poets. ( )
78. Letting their reasoning be guided by their feelings is not characteristic of students belonging to this chemistry class. ( )
79. Students belonging to this chemistry class are always looking for compliments. ( )
80. Students would be happy to run errands or give some other sort of help to the chemistry teacher(s). ( )

81. Students belonging to this chemistry class are, on the whole, tolerant and understanding. ( )
82. Notes that students make in chemistry classes are for the most part pretty untidy and scrappy. ( )
83. Having a good time comes first with most students belonging to this chemistry class. ( )
84. Students deplore the fact that advanced chemistry is becoming less descriptive and practical and more theoretical. ( )
85. There is little real interest in the basic meaning of religion amongst students belonging to this chemistry class. ( )

86. Most of the students belonging to this chemistry class would voluntarily come to hear a talk by a famous scientist. ( )
87. The creative arts are quite unimportant in the opinion of most of the students belonging to this chemistry class. ( )
88. Students belonging to this chemistry class often talk about who is in love with whom. ( )
89. Most students belonging to this chemistry class have much regard for what others think of some idea, plan or procedure. ( )
90. Discussions on serious subjects are not common amongst students belonging to this chemistry class. ( )

91. Students belonging to this chemistry class are polite and humble, no matter what happens. ( )
92. Students set high standards of achievement for themselves in chemistry. ( )
93. The more chemistry tests that are given the happier the students are. ( )
94. Few students would stay behind in their own time to help with a chemistry laboratory clean-up or something of that nature. ( )
95. Students are conscientious about taking good care of chemistry laboratory equipment. ( )

96. Everyone belonging to this chemistry class has pretty much the same attitudes, opinions and beliefs. ( )
97. The written work of most chemistry students is well-planned and presented. ( )
98. Students who won't leave a chemistry problem till they have mastered it are thought to be a little odd by other students. ( )
99. Most students would put themselves to considerable inconvenience if it meant doing something to please the chemistry teacher(s). ( )
100. You have to act like all the others in the chemistry class in order to be in with members of the class. ( )

101. In the chemistry classes students often show active concern about national and international affairs. ( )
102. Students show little feeling or excitement in the chemistry classes. ( )
103. It is hard for the chemistry teacher(s) to get much work out of the class. ( )
104. There are quite a number of students who are "know-alls" in the chemistry classes. ( )
105. Most students belonging to this chemistry class are more concerned with the present than with the future. ( )

106. Students make a special effort to know all the laboratory safety rules and procedures well. ( )
107. Not many students belonging to this chemistry class would go to a lecture by an outstanding literary critic. ( )
108. Students often start things in chemistry practical work without thinking how they will develop or where they will end. ( )
109. Students belonging to this chemistry class who are not properly groomed are likely to be made aware of this by other students. ( )
110. Students belonging to this chemistry class try in all sorts of ways to be friendly, especially to those who seem to need friendship. ( )

111. The students' attitude to the chemistry teacher(s) is one of acceptance and co-operation. ( )
112. Students often arrive for a chemistry class without the right text books or note books. ( )
113. Students do very little chemistry study over weekends or during term holidays. ( )

114. Most of the students belonging to this chemistry class have little or no interest in history, music and such impractical courses. ( )
115. Students who are concerned with developing their own personal and private system of values are likely to be regarded as odd by most students belonging to this chemistry class. ( )
116. Most of the students belonging to this chemistry class would give up some of their spare time for participation in clubs or societies devoted to scientific work and discussion. ( )
117. Whether the chemistry laboratory was tastefully painted would be of little concern to most of the students. ( )
118. Quite a number of the students would do better in chemistry if they weren't romantically involved. ( )
119. Students don't help one another much in their chemistry studies. ( )
120. Intellectual activities or problems are very stimulating for most students belonging to this chemistry class, even when the activity or the solution has no apparent immediate usefulness. ( )
121. Students are rather shy and inhibited in the way they answer questions asked by the chemistry teacher(s). ( )
122. Students like the teacher(s) to spur them on to greater efforts in chemistry. ( )
123. Students dislike any special treatment being given to either the very good or very poor chemistry students. ( )
124. There is a strong sense of partnership between chemistry class and teacher(s). ( )
125. Students are sometimes noisy and inattentive in the chemistry class. ( )
126. Students belonging to this chemistry class dress and act pretty much alike, in their spare time. ( )
127. Most students belonging to this chemistry class follow a regular study plan throughout the year. ( )
128. If there was an optional term examination in chemistry most students would turn up for it. ( )
129. The students seldom make fun of the chemistry teacher(s). ( )
130. Students wouldn't dream of protesting to the chemistry teacher(s) against some disliked ruling. ( )
131. Students belonging to this chemistry class often show that they are actively concerned about ways to make this world a better place in which to live. ( )
132. Students behave quite calmly and placidly in the chemistry classes. ( )
133. It is only the very rare student who spends a long time solving a difficult chemistry problem or looking up some chemistry references in the library. ( )
134. Students' dress in the chemistry classes is colourful and lively, or, alternatively, it would be if students had free choice. ( )
135. Amongst students belonging to this chemistry class there is little sympathy for ambitious day dreams about the future. ( )
136. Students who are very conscious of danger in chemistry experiments are considered a little odd. ( )
137. Most students belonging to this chemistry class would regard a student who insists on analysing and classifying art, music and drama as a little odd. ( )
138. Water fights and other student pranks would be unthinkable in the chemistry class. ( )
139. Poise and sophistication are highly respected by the students belonging to this chemistry class. ( )
140. Students belonging to this chemistry class would probably give strong support to a campaign such as The Freedom from Hunger campaign. ( )

141. Students would be virtually unanimous in acknowledging that marking by the chemistry teacher(s) is fair. ( )
142. It is rare for chemicals to be spilt or apparatus broken in the chemistry laboratory. ( )
143. Most of the students belonging to this chemistry class stop work if they get half a chance. ( )
144. Amongst students belonging to this chemistry class, achievements are weighed in terms of their practical value. ( )
145. Students belonging to this chemistry class do not commonly take part in long, serious discussions out of class. ( )

146. The student who spends some of his spare time in a chemistry laboratory is likely to be regarded as a little odd by other students. ( )
147. A concert or art exhibit would be strongly patronized in their own free time by most of the students belonging to this chemistry class. ( )
148. Most of the students belonging to this chemistry class engage in group social activities with members of the opposite sex. ( )
149. Students like the chemistry teacher(s) to tell them exactly what to do and how to do it. ( )
150. Many students belonging to this chemistry class would rather talk about philosophy or poetry or religion instead of the movies or sports. ( )

151. Students just admit that they are wrong, rather than argue with the chemistry teacher(s). ( )
152. Students who work hard for high marks in chemistry are likely to be regarded as odd by most other students. ( )
153. Most students are rather hesitant to let it be known that they don't know or understand something in chemistry class. ( )
154. Students frequently help other students out of class in their chemistry studies. ( )
155. The desks in chemistry classes are all cut up from doodling with knives and pencils. ( )

156. Students like the chemistry teaching to be based closely on the text books. ( )
157. Students here prepare systematically for chemistry tests and examinations. ( )
158. Students really work hard to change a chemistry class rule that they don't like. ( )
159. Students are critical in their study of chemistry theory and practice rather than just learners of the theory or copiers of the practice. ( )
160. Students belonging to this chemistry class are always trying to win an argument. ( )

161. Students belonging to this chemistry class rarely express strong personal belief. ( )
162. There is great excitement amongst students when chemistry examination results are released. ( )
163. Students would not really inspire the chemistry teacher(s) to strive to help them. ( )
164. Students are (or would be) keen on chemistry displays and in taking part in them. ( )
165. Many students belonging to this chemistry class hope to achieve future fame and/or wealth. ( )

166. Students are very "safety-first" conscious in the chemistry classes. ( )
167. Many students belonging to this chemistry class are also very keen on history, literature, etc. ( )

168. Students don't talk loudly or "fool about" in the chemistry class when the teacher is absent. ( )
169. There is a general idea of appropriate dress which students belonging to this chemistry class seem to follow. ( )
170. Handicapped or underprivileged students belonging to this chemistry class are especially helped by other students belonging to the class. ( )
171. Many students belonging to this chemistry class seem to act moody and are hard to figure out. ( )
172. Many students are quite careless in any numerical calculation they do in chemistry. ( )
173. Many students belonging to this chemistry class don't do much except go to classes and go home to study. ( )
174. Many of the students belonging to this chemistry class enjoy working with their hands and are pretty good at making or repairing things. ( )
175. Most of the students belonging to this chemistry class would have little or no interest in modern art. ( )
176. Science is the most appealing way of life for the majority of the students belonging to this chemistry class. ( )
177. Students belonging to this chemistry class dress for comfort rather than appearance, (if they have the choice). ( )
178. Many students would appear to be more interested in romance and marriage than in their chemistry education. ( )
179. Students prefer group work to individual work in chemistry. ( )
180. Students who attempt discussions on serious subjects are often made to feel foolish or out of place by other students belonging to this chemistry class. ( )
181. Students are rather timid in the presence of the chemistry teacher(s). ( )
182. Students with top marks in chemistry are admired by other students. ( )
183. Students here tend to go against advice from the chemistry teacher(s) almost on principle. ( )
184. All students belonging to this chemistry class really feel that they are significant members of the class. ( )
185. Students belonging to this chemistry class try hard to keep out of trouble. ( )
186. Students do not like chemistry examinations of an unusual type. ( )
187. Students belonging to this chemistry class who plan ahead in their studiesare in the minority. ( )
188. Students prefer that the chemistry teacher(s) be easy-going i.e. not too demanding in requirements of work to be done, and its quality. ( )
189. Students speak very respectfully to the chemistry teacher(s). ( )
190. Students belonging to this chemistry class are on the whole pretty persuasive types. ( )
191. Students belonging to this chemistry class take strong positions regarding minority groups. ( )
192. Students belonging to this chemistry class tend to hide their deeper feelings from each other. ( )
193. Students feel they really must work hard because of the importance of their chemistry studies. ( )
194. It is difficult to imagine most students belonging to this chemistry class dressing up for a fancy dress ball or masquerade. ( )
195. Most students belonging to this chemistry class spend much time planning their careers. ( )
196. "Showing off" in handling dangerous chemicals or apparatus just wouldn't happen here. ( )

197. An optional lecture on some aspect of the history or philosophy of science would be well attended by students belonging to this chemistry class. ( )
198. Students belonging to this chemistry class are always coming up with new fads and expressions. ( )
199. Good manners and making a good impression are important amongst students belonging to this chemistry class. ( )
200. When someone is away sick for a while from the chemistry class there would always be plenty of students glad to help him with work he has missed. ( )

201. Students belonging to this chemistry class seem to be largely free of prejudice. ( )
202. In the chemistry laboratory there are many messy lockers and cupboards belonging to members of this class. ( )
203. Most members of this class take their chemistry studies very seriously. ( )
204. Most of the students belonging to this chemistry class are interested in jobs in business, engineering, management and in practical fields where science is applied. ( )
205. Students belonging to this chemistry class are not given to analysing their own and others' motives, feelings and behaviour. ( )

206. Amongst students belonging to this chemistry class there is a lot of interest in the philosophy and method of science. ( )
207. Beauties of art and nature would not appear to greatly interest most students belonging to this chemistry class. ( )
208. To be regarded as attractive by those of the opposite sex would be very important to most students belonging to this chemistry class. ( )
209. Most students belonging to this chemistry class seem to need a lot of encouragement to keep at their work. ( )
210. Students try to probe the fundamentals of chemistry. ( )

211. Students would not think of criticizing the policies and teaching practices of the chemistry teacher(s), to the teacher(s). ( )
212. Most students belonging to this chemistry class are genuinely interested in learning and studying the subject. ( )
213. Students rather wish there was more freedom of atmosphere and procedure in chemistry practical classes. ( )
214. Students frequently talk among themselves about chemistry, out of class. ( )
215. Students often argue with the chemistry teacher(s), in class. ( )

216. There are many students belonging to this chemistry class from widely different geographic regions. ( )
217. Students belonging to this chemistry class do things by mood rather than by plan. ( )
218. Students speak up openly and freely in chemistry classes. ( )
219. Students who echo the opinions of the chemistry teacher(s) are not liked by other students. ( )
220. Students are not very tolerant of odd or unusual students in the chemistry class. ( )

221. Practically no students belonging to this chemistry class are involved in community reforms. ( )
222. Students belonging to this chemistry class can be wildly happy one moment and hopelessly sad the next. ( )
223. When working on some chemistry task students take frequent rest periods. ( )
224. It would be difficult to get students belonging to this chemistry class to do anything out of the ordinary. ( )

225. Most students belonging to this chemistry class talk about their future imaginatively and with enthusiasm. ( )

226. Students belonging to this chemistry class take particular interest in newspaper and other reports of dangers and accidents associated with the use of certain chemicals. ( )
227. Most students belonging to this chemistry class are not interested in social and political problems that science has brought or might help to solve. ( )
228. There is plenty of noise in the chemistry class before the teacher arrives. ( )
229. Social grace and polish are highly respected by the students belonging to this chemistry class. ( )
230. Students belonging to this chemistry class are very sympathetic to other students who are having difficulties with their studies. ( )

231. There is a spirit of openness and trust amongst students belonging to this chemistry class. ( )
232. Students keep their work bench in the chemistry laboratory very tidy and in order. ( )
233. Most students belonging to this chemistry class lead a pretty active social life. ( )
234. Most of the students consider the opinions and values of the chemistry teacher(s) somewhat strange and ivory-towered. ( )
235. Students belonging to this chemistry class are not really much concerned about deep philosophical or ethical matters. ( )

236. Many students belonging to this chemistry class seriously believe they will some day contribute to the advancement of science. ( )
237. The chemical composition of the colours in a painting would probably be of more concern to most students than the feeling or mood the painting conveyed. ( )
238. Some of the most popular students belonging to this chemistry class seem to be quite a hit with members of the opposite sex. ( )
239. Students are always going around getting suggestions from others about how to do some chemistry task. ( )
240. Students are more inclined to pass over a difficulty in their chemistry studies than ask a question about it. ( )

241. Students try to comply with the viewpoints of the chemistry teacher(s) to get good marks in chemistry. ( )
242. The high calibre of chemistry students puts a lot of pressure on one. ( )
243. Students are not frightened of giving wrong answers to questions asked by the chemistry teacher(s). ( )
244. There is a lot of group spirit amongst the chemistry students. ( )
245. Students play practical jokes on other students belonging to the class and on the chemistry teacher(s). ( )

246. Students generally look for novelty and variety in the chemistry course. ( )
247. Students belonging to this chemistry class strive for precision and clarity in their speech and writing. ( )
248. Students belonging to this chemistry class tend to take the easy way out when things "get tough". ( )
249. Students are a closely knit group when it comes to resisting the influence of the chemistry teacher(s). ( )
250. The students as a group are easy for the chemistry teacher(s) to manage. ( )

251. Discussions about improving society are common amongst students belonging to this chemistry class. ( )

252. Students belonging to this chemistry class can get into very heated arguments one day and be the best of friends the next day. ( )
253. The loss of a chemistry period due to some special holiday would be welcomed by most students. ( )
254. Students tend to be colourful and dramatic in the way they report some matter to the chemistry class. ( )
255. Students belonging to this chemistry class really expect to be important persons someday. ( )

256. Students seem to remember details of dangerous chemical reactions with particular clarity. ( )
257. It would be fairly common for a group of students belonging to this chemistry class to talk about trends in art, music or the theatre. ( )
258. Students belonging to this chemistry class are inclined to ask questions or raise difficulties before having thought sufficiently about some matter. ( )
259. The students belonging to this chemistry class are very clothes-conscious. ( )
260. Students belonging to this chemistry class are sympathetic towards the misfortunes or distress of other students. ( )

261. As a group, students belonging to this chemistry class tend to be rather cynical. ( )
262. To aim for perfection in details characterises most students belonging to this chemistry class. ( )
263. Students would be unlikely to miss a party or a dance in order to finish some preparation for a chemistry class. ( )
264. A student with manual dexterity and technical skill is admired by other students belonging to this chemistry class. ( )
265. Students belonging to this chemistry class often philosophize about different concepts of truth. ( )

266. Many students belonging to this chemistry class read science for pleasure. ( )
267. Many students belonging to this chemistry class chew lollies or gum in classes. ( )
268. When opportunity allows, spectacular and very fashionable dressing are common amongst students belonging to this chemistry class. ( )
269. Students belonging to this chemistry class commonly share their problems. ( )
270. Most students belonging to this chemistry class are of an intellectual frame of mind. ( )

271. Students belonging to this chemistry class are rather lacking in self-confidence. ( )
272. Students pay little attention to how well they do relative to others in the chemistry class. ( )
273. Criticism by the chemistry teacher(s) is taken by most students as concern for the welfare of the students. ( )
274. Most students belonging to this chemistry class would rather lose an argument than offend the feelings of others. ( )
275. Students tend to blame their inadequacies in chemistry on to the chemistry teacher(s). ( )

276. Students like innovations in chemistry teaching method. ( )
277. Students really attend seriously to their work in chemistry classes. ( )
278. Students belonging to this chemistry class work well under stress. ( )
279. A lot of students belonging to this chemistry class will do something even when they know they will be criticized for it. ( )
280. It is rare for students not to do specific pieces of work required by the chemistry teacher(s). ( )

281. Social issues are rarely discussed by students belonging to this chemistry class. ( )
282. Students approach each new topic or task in chemistry with an air of excitement and anticipation. ( )
283. There are few "loafers" in this chemistry class. ( )
284. Quite a number of students belonging to this chemistry class are "show-offs". ( )
285. Students belonging to this chemistry class like to speculate on unusual opportunities for quick advancement. ( )

286. A lecture on the chemical aspects of smoking and lung cancer would be well attended by students belonging to this class. ( )
287. Students belonging to this chemistry class are not concerned with the way our society is organized and how it operates. ( )
288. Most students would agree there is no place for impulsive behaviour in this chemistry class. ( )
289. Students generally receive compliments when they arrive in the chemistry class with new clothing or hair-do's. ( )
290. Students give whole-hearted and friendly support to the chemistry teacher(s). ( )

291. Students take every opportunity to criticize the chemistry teacher(s). ( )
292. Students belonging to this chemistry class are extremely careful in matters of detail. ( )
293. "Business before pleasure" is a fitting description of the approach to work and play of most students belonging to this chemistry class. ( )
294. Practical efficiency and a cooperative spirit prevail in group work in practical chemistry. ( )
295. Understanding themselves better is a concern of most students belonging to this chemistry class. ( )

296. Quite a few students belonging to this chemistry class actually do extra science projects of some kind for their own interest and pleasure. ( )
297. Students get more pleasure from a consideration of scientific facts and theories than from seeing and doing practical work. ( )
298. Discussion of the opposite sex is common amongst students belonging to this chemistry class. ( )
299. Students have a strong sense of being a member of a team studying chemistry. ( )
300. Most students feel the chemistry course is too deep and theoretical for their needs. ( )

Appendix B

Kuder Richardson reliabilities

1. For the thirty press scales of the Chemistry Education Environment Index (CEEI) (Faculty Press) (Research Instrument I)—Students reporting on the Chemistry Education Environment (Faculty Press) at school, 1966; (N = 191):—Column I.

2. For the thirty press scales of the Chemistry Education Environment Index (CEEI) (Student Press) (Research Instrument III)—Students reporting on the Chemistry Education Environment (Student Press) at school, 1966; (N = 188):—Column II.

3. For the thirty press scales of the Chemistry Education Environment Index (CEEI) (Faculty Press) (Research Instrument I)—Students reporting on the Chemistry Education Environment (Faculty Press) at university, 1967; (N = 169):—Column III.

4. For the thirty press scales of the Chemistry Education Environment Index (CEEI) (Student Press) (Research Instrument III)—Students reporting on the Chemistry Education Environment (Student Press) at university, 1967; (N = 169):—Column IV.

Press Scale	I	II	III	IV
ABA	.63	.55	.41	.48
ACH	.58	.63	.43	.56
ADA	.52	.56	.44	.41
AFF	.74	.61	.52	.51
AGG	.70	.58	.50	.44
CHA	.62	.41	.50	.36
CNJ	.68	.68	.59	.58
CTR	.62	.57	.59	.38
DFR	.61	.31	.44	.30
DOM	.60	.37	.32	.20
E/A	.67	.68	.58	.59
EMO	.64	.36	.57	.25
ENY	.72	.67	.69	.62
EXH	.65	.25	.61	.27
F/A	.67	.61	.71	.56
HAR	.66	.64	.61	.58
HUM	.70	.77	.54	.70
IMP	.54	.60	.22	.45
NAR	.55	.56	.48	.60
NUR	.74	.72	.54	.66
OBJ	.67	.62	.52	.51
ORD	.53	.62	.45	.47
PLY	.59	.66	.19	.56
PRA	.66	.27	.59	.39
REF	.63	.70	.58	.65
SCI	.74	.72	.65	.58
SEN	.60	.41	.45	.35
SEX	.69	.59	.40	.57
SUP	.54	.43	.37	.42
UND	.70	.67	.63	.55

Appendix C

Standard deviations for the thirty Faculty Press Scales (relating to the university environment) (CEEI, Research Instrument I), the thirty Faculty Press Scales (relating to the school environment) (CEEI, Research Instrument I), the thirty Student Press Scales (relating to the university environment) (CEEI, Research Instrument III) and the thirty Student Press Scales (relating to the school environment) (CEEI, Research Instrument III) (N = 135)

Scale		Faculty Press: University	Faculty Press: School	Student Press: University	Student Press: School
1	ABA	1.82	2.33	2.14	2.17
2	ACH	1.78	2.26	2.15	2.30
3	ADA	1.89	2.04	1.94	2.20
4	AFF	1.79	2.74	2.08	2.30
5	AGG	1.87	2.71	1.95	2.34
6	CHA	1.81	2.18	1.75	1.84
7	CNJ	2.32	2.66	2.29	2.63
8	CTR	2.32	2.31	1.77	2.14
9	DFR	2.03	2.43	1.73	1.76
10	DOM	1.75	2.28	1.59	1.82
11	E/A	1.93	2.51	2.23	2.33
12	EMO	2.15	2.40	1.57	1.75
13	ENY	2.56	2.79	2.39	2.51
14	EXH	2.16	2.54	1.75	1.65
15	F/A	2.38	2.60	2.27	2.26
16	HAR	2.48	2.52	2.35	2.45
17	HUM	2.03	2.54	2.78	3.10
18	IMP	1.52	2.13	1.93	2.13
19	NAR	1.82	2.30	2.35	2.15
20	NUR	2.12	2.62	2.64	2.59
21	OBJ	2.06	2.45	2.00	2.38
22	ORD	2.08	2.10	2.02	2.50
23	PLY	1.54	2.31	2.19	2.45
24	PRA	2.25	2.62	1.87	1.83
25	REF	2.04	2.35	2.47	2.57
26	SCI	2.30	3.01	2.21	2.80
27	SEN	1.96	2.45	1.77	1.88
28	SEX	1.65	2.46	2.17	2.17
29	SUP	1.69	2.30	1.97	1.95
30	UND	2.42	2.64	2.24	2.54

Appendix D

Satisfaction with Teaching Scale (SATTCH)

This scale was administered twice, first with reference to students' school experience and second with reference to students' first-year university experience. Students were asked to answer retrospectively with respect to the school environment. The questions in SATTCH refer to chemistry education at school or at university and not to any outside chemistry teaching the students might receive. Students were asked to answer each question by making a tick next to the response which they wished to make.

The SATTCH scale was part of a longer questionnaire used in the wider research of which this project is a part. The questionnaire, with detailed instructions for its administration, is available (Genn, 1969: 285-297).

SATISFACTION WITH TEACHING SCALE (SATTCH)

1. What proportion of the chemistry teaching you have received during the year could be described as superior?
   1. Very little
   2. Somewhat less than half
   3. Somewhat more than half
   4. Almost all
2. In general, have you enjoyed your chemistry studies during the year?
   1. No, I have definitely not enjoyed them
   2. No, but I am only mildly disappointed
   3. My expectations are reasonably well satisfied
   4. I have enjoyed my studies very much
3. During the year how successful would you say the chemistry teaching has been in challenging you to produce to the limit of your intellectual and creative capacities?
   1. Wholly unsuccessful
   2. Somewhat unsuccessful
   3. Quite successful
   4. Very successful
4. What amount of personal encouragement in your chemistry studies have you received from the teacher(s)?
   1. None
   2. Not much
   3. A fair amount
   4. Quite a lot
5. To what extent are you known by name to the chemistry teacher(s)?
   1. Not known at all
   2. Vaguely known, perhaps
   3. Known fairly well
   4. Definitely known
6. What degree of genuine interest in students and their problems has been shown by the chemistry teacher(s)?
   1. A very small degree
   2. A rather small degree
   3. A fair degree
   4. A very high degree
7. Have you had the feeling in your chemistry studies that you have been judged (e.g. graded) more on the basis of extraneous or irrelevant factors than on the basis of the quality of your work?

1. Quite often
2. Once in a while
3. Very rarely
4. Never

8. What has been your general impression of the tolerance for student argument and disagreement on the part of the chemistry teacher(s)?
   1. Student disagreement has been definitely penalised
   2. Disagreement has not been particularly welcome
   3. Disagreement has been accepted
   4. Reasonable student disagreement has been definitely valued and encouraged
9. How *competent*, in your opinion, have you found your chemistry teacher(s) to be in the subject?
   1. Not sufficiently competent
   2. Barely competent
   3. Quite competent
   4. Very competent
10. On the whole, how satisfied are you with the opportunity you have had to meet with your chemistry teacher(s) privately about course work and your own progress?
    1. Mostly dissatisfied
    2. Fairly satisfied
    3. Quite satisfied
    4. Extremely satisfied
11. How enthusiastic about the job of teaching would you estimate your chemistry teacher(s) to have been, during the year?
    1. Not at all
    2. Very slightly
    3. Fairly enthusiastic
    4. Very enthusiastic
12. Would you agree that students have been treated more like children than like adults, by the chemistry teacher(s)?
    1. Strongly agree
    2. Agree but not strongly
    3. Disagree, but not strongly
    4. Strongly disagree
13. Has the subject of chemistry appeared to be interesting to the teacher(s)?
    1. Not at all interesting
    2. Slightly interesting
    3. Fairly interesting
    4. Very interesting
14. How would you rate the presentation of subject matter in chemistry?
    1. Not at all good
    2. Barely satisfactory
    3. Fairly good
    4. Very good
15. How close to your ideal of a chemistry teacher would you rank the chemistry teacher(s)?
    1. Not at all close to the ideal
    2. Quite a fair way from ideal
    3. Fairly close to ideal
    4. Very close to ideal

Appendix E

Statistical analysis associated with the testing of Hypothesis 1

DISCRIMINANT ANALYSIS
TWO GROUPS
(SAME SUBJECTS, FIRST AT SCHOOL THEN AT UNIVERSITY)
(N = 135)
VARIABLES USED
30 FACULTY PRESS SCALES

PRINCIPAL AXIS ANALYSIS (ASYMMETRIC MATRIX)

TRACE = 4.9205

100.00 PCT. OF TRACE WAS EXTRACTED BY 1 ROOT

OVERALL F RATIO	DEGREES OF FREEDOM	PROBABILITY
17.2216	30 and 105	.0000

CENTROID FOR SCHOOL GROUP
10.6696

CENTROID FOR UNIVERSITY GROUP
5.4876

CORRELATION OF VARIABLES WITH DISCRIMINANT FUNCTION

1.	ABA	0.1234	16.	HAR	0.4119
2.	ACH	0.6656	17.	HUM	0.5062
3.	ADA	0.6725	18.	IMP	0.2720
4.	AFF	0.7256	19.	NAR	0.4211
5.	AGG	0.3300	20.	NUR	0.7496
6.	CHA	0.1386	21.	OBJ	0.1037
7.	CNJ	0.1907	22.	ORD	0.5075
8.	CTR	0.7038	23.	PLY	0.1496
9.	DFR	—0.1570	24.	PRA	0.2759
10.	DOM	—0.1022	25.	REF	0.5351
11.	E/A	0.5836	26.	SCI	0.3399
12.	EMO	0.4822	27.	SEN	0.3734
13.	ENY	0.4291	28.	SEX	0.0825
14.	EXH	0.2603	29.	SUP	0.6847
15.	F/A	0.6364	30.	UND	0.4583

UNIVARIATE "F" and "t" TESTS
(DEGREES OF FREEDOM FOR "F" = 1, 134; for "t" = 134)

	Mean	S. Dev.	Mean	S. Dev.	Diff. Between Means	F	t	P
	School		University					
1. ABA	3.5630	2.3337	3.4370	1.8201	0.1259	0.3627	0.6023	.5552
2. ACH	6.0444	2.2603	3.7407	1.7762	2.3037	133.9820	11.5751	.0000
3. ADA	5.9704	2.0365	3.7926	1.8860	2.1778	104.6630	10.2305	.0000
4. AFF	6.4444	2.7424	3.2296	1.7927	3.2148	163.3173	12.7796	.0000
5. AGG	4.3407	2.7085	2.9852	1.8737	1.3556	28.6824	5.3556	.0000
6. CHA	3.4519	2.1798	3.2000	1.8127	0.2519	1.4176	1.1906	.2340
7. CNJ	5.7852	2.6566	5.2519	2.3181	0.5333	4.6457	2.1554	.0309
8. CTR	6.7185	2.3051	3.6741	2.3185	3.0444	165.7252	12.8734	.0000
9. DFR	4.2444	2.4297	5.0148	2.0257	—0.7704	9.2242	—3.0371	.0032
10. DOM	3.5333	2.2829	4.1556	1.7506	—0.6222	7.0196	—2.6495	.0089
11. E/A	4.7852	2.5074	2.7926	1.9326	1.9926	60.5101	7.7788	.0000
12. EMO	4.8444	2.4002	2.9778	2.1481	1.8667	51.2635	7.1599	.0000
13. ENY	5.8074	2.7902	3.9704	2.5588	1.8370	37.3062	6.1079	.0000
14. EXH	4.0963	2.5382	3.4519	2.1593	0.6444	7.5512	2.7479	.0069
15. F/A	4.7333	2.5997	2.1333	2.3783	2.6000	99.7133	9.9857	.0000
16. HAR	5.6593	2.5244	4.2815	2.4815	1.3778	31.9222	5.6500	.0000
17. HUM	4.7926	2.5360	2.9111	2.0348	1.8815	51.8064	7.1977	.0000
18. IMP	4.7704	2.1324	4.0148	1.5202	0.7556	13.7521	3.7084	.0006
19. NAR	4.3630	2.2953	3.2148	1.8232	1.1481	25.7795	5.0774	.0000
20. NUR	7.3333	2.6247	3.7778	2.1210	3.5556	185.1268	13.6061	.0000
21. OBJ	7.0074	2.4480	6.5778	2.0601	0.4296	3.2960	1.8155	.0681
22. ORD	5.9852	2.1046	4.2815	2.0751	1 7037	53.4626	7.3118	.0000
23. PLY	5.4815	2.3089	5.0667	1.5406	0.4148	3.3515	1.8307	.0658
24. PRA	4.3778	2.6186	3.6296	2.2468	0.7481	9.4503	3.0741	.0029
25. REF	4.0741	2.3496	2.4074	2.0378	1.6667	56.7156	7.5310	.0000
26. SCI	4.5259	3.0057	3.2000	2.2991	1.3259	20.0571	4.4785	.0001
27. SEN	5.0444	2.4491	3.8370	1.9558	1.2074	23.0085	4.7967	.0000
28. SEX	4.6519	2.4625	4.4148	1.6483	0.2370	0.8077	0.8987	.6262
29. SUP	5.4519	2.2989	3.0741	1.6893	2.3778	109.7715	10.4772	.0000
30. UND	5.9333	2.6365	4.2444	2.4174	1.6889	42.4706	6.5169	.0000

Appendix F

Statistical analysis associated with the testing of Hypothesis 2

DISCRIMINANT ANALYSIS
TWO GROUPS
(SAME SUBJECTS, FIRST AT SCHOOL THEN AT UNIVERSITY)
(N = 135)
VARIABLES USED
30 STUDENT PRESS SCALES
PRINCIPAL AXIS ANALYSIS (ASYMMETRIC MATRIX)
TRACE = 3.0508
100.00 PCT. OF TRACE WAS EXTRACTED BY 1 ROOT

OVERALL F RATIO	DEGREES OF FREEDOM	PROBABILITY
10.6777	30 and 105	.0000

CENTROID FOR SCHOOL GROUP
2.6103
CENTROID FOR UNIVERSITY GROUP
—0.7442

CORRELATION OF VARIABLES WITH DISCRIMINANT FUNCTION

1.	ABA	—0.4051	16.	HAR	—0.1275
2.	ACH	—0.0419	17.	HUM	—0.2056
3.	ADA	0.1338	18.	IMP	0.3654
4.	AFF	0.5406	19.	NAR	—0.1217
5.	AGG	0.3890	20.	NUR	0.2055
6.	CHA	—0.0014	21.	OBJ	—0.0462
7.	CNJ	—0.1369	22.	ORD	0.0283
8.	CTR	0.3148	23.	PLY	0.3754
9.	DFR	—0.5267	24.	PRA	0.5409
10.	DOM	0.4917	25.	REF	—0.1747
11.	E/A	0.0376	26.	SCI	0.1705
12.	EMO	0.1672	27.	SEN	—0.2301
13.	ENY	—0.1750	28.	SEX	0.1314
14.	EXH	0.2649	29.	SUP	0.2049
15.	F/A	0.0241	30.	UND	0.0984

UNIVARIATE "F" AND "t" TESTS
(DEGREES OF FREEDOM FOR "F" = 1, 134; FOR "t" = 134)

	Mean	S. Dev.	Mean	S. Dev.	Diff. Between Means	F	t	P
	School		University					
1. ABA	3.6074	2.1742	4.8963	2.1371	—1.2889	50.6149	—7.1144	.0000
2. ACH	5.4519	2.2956	5.8370	2.1541	—0.3852	3.0781	—1.7544	.0779
3. ADA	5.5333	2.1970	4.9630	1.9414	0.5704	8.7176	2.9526	.0040
4. AFF	5.9111	2.2980	4.3630	2.0785	1.5481	53.0407	7.2829	.0000
5. AGG	5.2963	2.3415	3.9481	1.9487	1.3481	35.8688	5.9891	.0000
6. CHA	5.2000	1.8411	5.4519	1.7500	—0.2519	2.0080	—1.4170	.1551
7. CNJ	4.5778	2.6288	5.4148	2.2946	—0.8370	13.2244	—3.6365	.0007
8. CTR	5.1556	2.1426	4.3481	1.7694	0.8074	17.5232	4.1861	.0002
9. DFR	4.5926	1.7567	6.1630	1.7308	—1.5704	60.5239	—7.7797	.0000
10. DOM	4.6815	1.8243	3.4519	1.5950	1.2296	41.1999	6.4187	.0000
11. E/A	3.4741	2.3312	3.4519	2.2335	0.0222	0.0117	0.1084	.9104
12. EMO	4.1778	1.7464	3.7852	1.5653	0.3926	5.2195	2.2846	.0225
13. ENY	3.6519	2.5102	4.6296	2.3905	—0.9778	16.9736	—4.1199	.0002
14. EXH	5.6519	1.6525	5.0667	1.7520	0.5852	8.9940	2.9990	.0036
15. F/A	4.9111	2.2590	5.0741	2.2661	—0.1630	0.5856	—0.7652	.5482
16. HAR	4.3926	2.4528	4.9926	2.3523	—0.6000	7.9966	—2.8278	.0056
17. HUM	4.2296	3.0982	4.5852	2.7819	—0.3556	2.2986	—1.5161	.1279
18. IMP	6.5407	2.1318	5.3356	1.9340	1.1852	30.8240	5.5519	.0000
19. NAR	4.5630	2.1520	4.9556	2.3472	—0.3926	3.4077	—1.8460	.0636
20. NUR	6.2593	2.5876	5.8741	2.6399	0.3852	3.5317	1.8793	.0590
21. OBJ	6.4889	2.3754	6.8815	2.0002	—0.3926	3.3747	—1.8370	.0649
22. ORD	4.4815	2.5029	4.3778	2.0216	0.1037	0.2271	0.4766	.6399
23. PLY	6.5481	2.4547	4.8148	2.1915	1.7333	55.6641	7.4608	.0000
24. PRA	5.8963	1.8349	4.7481	1.8727	1.1481	36.8557	6.0709	.0000
25. REF	3.7556	2.5718	4.2815	2.4725	—0.5259	6.1195	—2.4738	.0140
26. SCI	3.9556	2.7965	3.9481	2.2088	0.0074	0.0011	0.0336	.9723
27. SEN	4.6519	1.8790	4.9630	1.7739	—0.3111	4.0821	—2.0204	.0426
28. SEX	6.0222	2.1721	5.7185	2.1693	0.3037	1.9344	1.3908	.1630
29. SUP	6.3333	1.9475	5.9333	1.9671	0.4000	4.3828	2.0935	.0359
30. UND	4.7259	2.5369	4.6519	2.2421	0.0741	0.1212	0.3481	.7284

Appendix G

Statistical analysis associated with the testing of Hypothesis 3

TABLE 1

Mean scores on 30 Faculty Press Scales for school (N = 68), small university (N = 54) and large university (N = 85)

	School	Small University	Large University
1. ABA	3.3824	3.7407	4.1647
2. ACH	5.0441	5.0185	3.8941
3. ADA	5.9265	4.7778	3.8000
4. AFF	7.0588	4.7037	2.5765
5. AGG	3.8382	2.8148	3.3882
6. CHA	3.4118	4.3519	3.4000
7. CNJ	5.8088	5.7037	4.7294
8. CTR	6.9559	5.3333	3.1765
9. DFR	3.7353	4.4630	5.6235
10. DOM	3.1618	4.5000	4.4941
11. E/A	4.9559	4.0185	2.2353
12. EMO	5.7059	4.3333	2.3176
13. ENY	6.5882	5.3333	2.8941
14. EXH	3.7353	3.8889	2.8000
15. F/A	4.5147	3.0185	1.4941
16. HAR	5.3824	5.3148	4.5647
17. HUM	4.9559	3.7593	2.6000
18. IMP	5.0147	4.9074	3.4941
19. NAR	4.1618	3.1296	3.1765
20. NUR	7.7941	5.2963	3.7647
21. OBJ	7.4706	7.4630	6.5176
22. ORD	5.3235	5.2222	4.3882
23. PLY	5.6029	4.5741	4.2000
24. PRA	4.2500	4.3519	3.0118
25. REF	4.2794	3.1667	2.1529
26. SCI	4.2794	4.5185	2.8824
27. SEN	5.0441	4.3519	3.4824
28. SEX	5.7794	5.0370	4.0000
29. SUP	5.7941	3.5000	2.5765
30. UND	6.2794	5.8148	4.2235

TABLE 2

Mean scores on 30 Student Press Scales for school (N = 69), small university (N = 54) and large university (N = 86)

	School	Small University	Large University
1. ABA	3.6522	4.3889	4.9070
2. ACH	5.2029	5.5926	5.6860
3. ADA	5.5072	5.2593	4.9884
4. AFF	6.1304	5.2037	3.9070
5. AGG	4.7536	4.3333	4.1628
6. CHA	5.1594	5.2407	5.9186
7. CNJ	4.3623	5.3333	4.5698
8. CTR	5.3768	4.5741	4.1047
9. DFR	5.0290	5.6481	5.6047
10. DOM	3.9130	3.7778	3.2558
11. E/A	3.7681	3.3148	3.5349
12. EMO	4.5652	3.8704	3.4070
13. ENY	4.1159	4.2963	4.3023
14. EXH	5.3913	5.3519	5.1744
15. F/A	4.6957	4.6667	4.9419
16. HAR	4.5217	5.7593	4.6744
17. HUM	3.9420	3.7037	4.5349
18. IMP	6.6522	5.8333	5.6744
19. NAR	4.2029	4.4815	4.5814
20. NUR	6.2754	6.4630	5.4070
21. OBJ	7.0870	6.9815	6.4884
22. ORD	4.4493	4.9630	4.1279
23. PLY	6.1739	5.4815	5.4302
24. PRA	5.7391	6.0926	5.6279
25. REF	3.8551	3.7222	4.2209
26. SCI	4.2609	4.9444	5.0698
27. SEN	4.6957	4.6111	5.2674
28. SEX	5.9130	5.8148	5.8721
29. SUP	6.4638	6.5370	5.8605
30. UND	4.6667	4.5185	4.6512

TABLE 3

Satisfaction with teaching in school, small university and large university

	N	Mean	Standard Deviation
School	68	46.2206	8.4276
Small University	53	39.4151	6.7780
Large University	87	34.5057	7.0611

References

AIKEN, L. R., 1964: "Interdepartmental Variability and Student Expectations of Coll ge Grades", *Educational and Psychological Measurement*, Vol. XXIV, No. 4, 823-829.

ALEXANDER, A. E., 1960: "Some Reflections on the Teaching of Chemistry in Australian Universities", *Vestes*, Vol. III, 36-40.

ALPERN, D. K., 1966: "In Place of Recitations: An Experiment in Teaching", *Teachers College Record*, 589-594.

ARGYRIS, C., 1957: "The Individual and Organization: Some Problems of Mutual Adjustment", *Administrative Science Quarterly*, II, 1-24, and reproduced in HACK, W. G. et al. (Eds.), 1965: *Educational Administration: Selected Readings*, Chapter 14, 159-182, Allyn and Bacon, Boston.

ASTIN, A. W., 1965: "Classroom Environment in Different Fields of Study", *Journal of Educational Psychology*, Vol. 56, No. 5, 275-282.

ASTIN, A. W. and HOLLAND, J. L., 1961: "The Environmental Assessment Technique: A Way to Measure College Environments", *Journal of Educational Psychology*, Vol. 52, No. 6, 308-316.

BARKER, R. G., 1960: "Ecology and Motivation", in JONES, M. R. (Ed.): *Nebraska Symposium on Motivation 1960*, Chapter 1, 1-49, University of Nebraska Press, Lincoln.

BARKER, R. G., GUMP, P. V. et al., 1964: *Big School, Small School: High School Size and Student Behavior*, Stanford University Press, Stanford, California.

BECKER, S. L., GOODSTEIN, L. D. and MITTMAN, A., 1965: "Relationships between the Minnesota Multiphasic Personality Inventory and the College Characteristics Index", *The Journal of College Student Personnel*, 219-223.

BRAHAM, M., 1965: "Peer Group Deterrents to Intellectual Development During Adolescence", *Educational Theory*, Vol. XV, No. 3, 248-258.

CAMPBELL, W. J., 1970: "Some Effects of Size and Organization of Secondary Schools on the Experiences of Pupils in Extracurricular Behaviour Settings", Chapter 10, 185-196, in CAMPBELL, W. J. (Ed.): *Scholars in Context*, John Wiley & Sons, Australasia, Sydney.

COLEMAN, J. S., 1961: *The Adolescent Society; The Social Life of the Teenager and Its Impact on Education*, Free Press of Glencoe, New York.

CRANDALL, V. J., 1963: "Achievement", in STEVENSON, H. et al.: *Child Psychology*, National Society for the Study of Education Yearbook, LXII, Part I, Chapter 10, 416-459, University of Chicago Press, Chicago.

FALK, B., 1967: "The Use of Student Evaluation", *The Australian University*, Vol. 5, No. 2, 109-121.

FEDER, D. D., 1965: "Intriguing Problems in Predicting College Success", *Educational and Psychological Measurement*, Vol. XXV, No. 1, 29-37.

FISHMAN, J. A., 1960: "An Introduction to the Social Psychology of School-to-College Transition", *The Journal of Educational Sociology*, Vol. 33, No. 6, 249-251.

GASCOIGNE, R. M., 1961: "Chemical Theory and the Teaching of Chemistry", in AYLWARD, G. H. and SYMES, F. S. (Eds.): *Approach to Chemistry: Lectures and Workshop Reports of the* 1961 *Summer School for Chemistry Teachers at the University of New South Wales*, 144-149, The University of New South Wales, Sydney.

GENN, J. M., 1969: *Chemistry Scholars in School and University Contexts—A Study of Transition from School to University* (unpublished Ph.D. Thesis, University of Queensland).

GOODSTEIN, L., 1960: "A Summing Up", in SPRAGUE, H. T. (Ed.): *Research on College Students*, 124-130, Western Interstate Commission for Higher Education, Boulder, Colorado.

GOUGH, H. G., 1953: "What Determines the Academic Achievement of High School Students", *Journal of Educational Research*, Vol. XLVI, No. 5, 321-331.

HAVIGHURST, R. J., 1953: *Human Development and Education*, Longmans Green, New York.

LAWRENCE, A. E., 1955: "Articulation of High School and College Chemistry Instruction", *Journal of Chemical Education*, Vol. 32, No. 1, 25-28.

MASLOW, A. H., 1954: *Motivation and Personality*, Harper, New York.

MATTHEWS, T. H., 1957: "Academic Failures", in BISSELL, C. T. (Ed.), Proceedings of a Conference held by the National Conference of Canadian Universities at Ottawa, November 12-14, 1956, *Canada's Crisis in Higher Education*, 114-124, University of Toronto Press, Toronto.

MCFEE, A., 1961: "The Relation of Students' Needs to Their Perceptions of a College Environment", *Journal of Educational Psychology*, Vol. 52, No. 1, 25-29.

MORRIS, G. C., 1963: "Can Suitable Objectives Be Obtained for Chemistry Teaching?", *The Australian Science Teachers' Journal*, No. 26, 7-20.

MURRAY, H. A. (Ed.), 1938, 1962: *Explorations in Personality: A Clinical and Experimental Study of 50 Men of College Age by the Workers at the Harvard Psychological Clinic*, Science Editions Inc., New York.

MURRAY, H. A. and KLUCKHOHN, C., 1953: "Outline of a Conception of Personality", in KLUCKHOHN, C. K., MURRAY, H. A. and SCHNEIDER, D. M., *Personality in Nature, Society and Culture*, Chapter 1, 3-49, Knopf, New York.

NEWCOMB, T. M., 1962: "Student Peer-Group Influence", in SANFORD, R. N. (Ed.): *The American College: A Psychological and Social Interpretation of the Higher Learning*, Chapter 13, 469-488, Wiley, New York.

OLSEN, F. J., 1957: "Failure in First Year University Examinations", *The Australian Journal of Education*, Vol. II, No. 3, 175-186.

PACE, C. R., 1958: "Educational Objectives", in HENRY, N. B. (Ed.): *Integration of Educational Experiences*,(National Society for the Study of Education 57th Yearbook, Part III), Chapter IV, 69-83, University of Chicago Press, Chicago.

PACE, C. R., 1963: "Differences in Campus Atmosphere", in CHARTERS, W. W. and GAGE, N. (Eds.): *Readings on the Social Psychology of Education*, 73-79, Allyn and Bacon, Boston.

PACE, C. R., 1964: *The Influence of Academic and Student Subcultures in College and University Environments*, Co-operative Research Project, No. 1083, University of California, Los Angeles.

Pace, C. R., 1966: "Selective Higher Education for Diverse Students", in MCGRATH, E. J. (Ed.): *Universal Higher Education*, 159-173, McGraw Hill, New York.

PACE, C. R. and STERN, G. G., 1958: "An Approach to the Measurement of Psychological Characteristics of College Environments", *Journal of Educational Psychology*, Vol. 49, No. 5, 269-277.

PARTRIDGE, P. H., 1965: "The Martin Report", *Vestes*, Vol. VIII, No. 2, 71-81.

PETERSON, R. E., 1965: *Technical Manual: College Student Questionnaires*, Educational Testing Service, Princeton.

POWELL, J. P., 1964: "Experimentation and Teaching in Higher Education", *Educational Research*, Vol. 6, 179-191.

PURKEY, W. W., 1966: "Measured and Professed Personality Characteristics of Gifted High School Students and an Analysis of their Congruence", *The Journal of Educational Research*, Vol. 60, No. 3, 99-103.

ROGERS, E. M., 1960: "The Research Scientist Looks at the Purposes of Science Teaching", in HENRY, N. B. (Ed.): *Rethinking Science Education*, (National Society for the Study of Education Yearbook, LIX, Part I), 19-22, University of Chicago Press, Chicago.

ROHDE, A. R., 1957: *The Sentence Completion Method: Its Diagnostic and Clinical Applications to Mental Disorders*, The Ronald Press Co., New York.

SANDERS, C., 1957: "University Selection: Its Theory, History, and Psychology", *The Australian Journal of Education*, Vol. 1, No. 3, 145-167.

SANFORD, N., 1956: "Introduction", in SANFORD, N. (Ed.), "Personality Development during the College Years", *Journal of Social Issues*, 12, 3-12.

SANFORD, N., 1965: "General Education and Personality Theory", *Teachers College Record*, 721-732.

SAUNDERS, D. R., 1962: *A Factor Analytic Study of the AI and the CCI*, Educational Testing Service, Princeton.

SCHONELL, F. J., ROE, E., MEDDLETON I. G. et al., 1962: *Promise and Performance*, University of Queensland Press and University of London Press, Brisbane.

SNIDER, J. G., 1966: "The Canadian High School Achievement Syndrome as Indicated by the California Psychological Inventory", *Ontario Journal of Educational Research*, 9, 1, 43-47.

STEACIE, E. W. R., 1957: "The Responsibility of the University in the Training of Scientists and Technologists", in BISSELL, C. T. (Ed.): Proceedings of a Conference Held by the National Conference of Canadian Universities at Ottawa, November 12-14, 1956: *Canada's Crisis in Higher Education*, 41-47, University of Toronto Press, Toronto.

STERN, G. G., 1960: "Student Values and Their Relationship to the College Environment", in SPRAGUE, H. T. (Ed.): *Research on College Students*, pp. 67-104, Western Interstate Commission for Higher Education, Boulder, Colorado.

STERN, G. G., 1961: "Continuity and Contrast in the Transition from High School to College", in BROWN, N. C. (Ed.): *Orientation to College Learning—A Reappraisal*, 33-58, American Council on Education, Washington.

STERN, G. G., 1962: "The Measurement of Psychological Characteristics of Students and Learning Environments", in MESSICK, S. J. and ROSS, J. (Eds.): *Measurement in Personality and Cognition*, Chapter 3, pp. 27-68, Wiley, New York.

STERN, G. G., 1963*a*: "Characteristics of the Intellectual Climate in College Environments", *Harvard Educational Review*, 33, 5-41.

STERN, G. G., 1963*b*: *Scoring Instructions and College Norms: Activities Index: College Characteristics Index*, Psychological Research Center, Syracuse.

STERN, G. G., 1964: "B = f(P, E)", *Journal of Projective Techniques*, 28, 161-168.

STERN, G. G., 1965: "Student Ecology and the College Environment", *The Journal of Medical Education*, Vol. 40, No. 3, 132-154.

STERN, G. G., 1967: *People in Context: The Measurement of Environmental Interaction in School and Society* (mimeographed), Syracuse University; now published, 1970, by John Wiley & Sons.

STERN, G. G., STEIN, M. and BLOOM, B. S., 1956: *Methods in Personality Assessment*, The Free Press, Glencoe.

THISTLETHWAITE, D. L., 1960: "College Press and Changes in Study Plans of Talented Students", *Journal of Educational Psychology*, Vol. 51, No. 4, 222-234.

THISTLETHWAITE, D. L., 1962: "Fields of Study and Development of Motivation to Seek Advanced Training", *Journal of Educational Psychology*, Vol. 53, No. 2, 53-64.

VELDMAN, D. J., 1966: *Fortran Programming for the Behavioral Sciences*, Holt, Rinehart and Winston, New York.

WILLEMS, E. P., 1964: "Review of Research", in BARKER, R. G., GUMP, P. V. et al., *Big School, Small School: High School Size and Student Behavior*, Chapter 3, pp .29-37, Stanford University Press, Stanford, California.

YAMAMOTO, K. and DIZNEY, H. F., 1966: "Eight Professors—A Study of College Students' Preferences Among Their Teachers", *Journal of Educational Psychology*, Vol. 57, No. 3, 146-150.

A SELECTION OF UNIVERSITY OF QUEENSLAND PAPERS

Available from the University of Queensland Press, St. Lucia

Recommended prices

School Attainments and Home Backgrounds of Aboriginal Children, by F. J. Schonell, I. G. Meddleton, and B. H. Watts, Faculty of Education, vol. I, no. 3 ..... 55c

The Reading Attainments of Primary School Children in Three Queensland Schools, by R. J. Andrews, Faculty of Education, vol. I, no. 4 ..... 30c

Developments in Early Adolescence and the Structure of Secondary Education: An Interstate Survey, by Desmond J. Drinkwater, Faculty of Education, vol. I, no. 5 ..... 70c

A Scale to Measure the Reading Difficulty of Children's Books, by J. Anderson, Faculty of Education, vol. I, no. 6 ..... 60c

The Nature and Resolution of Role Conflicts Among Queensland Primary School Teachers: An Application of Field Theory, by M. J. Dunkin, Faculty of Education, vol. I, no. 7 ..... 80c

Relationship Between Text-Book Orientation and Mathematics Achievement and Attitude, by K. F. Collis, Faculty of Education, vol. I, no. 8 ..... 80c

A Study of Verbal Interaction in Science Classes and Its Association with Pupils' Understanding in Science, by R. P. Tisher, Faculty of Education, vol. I, no. 9 ..... $1.20

A Phonetic System for Middle High German, by G. M. Bonnin, Faculty of Arts, vol. I, no. 3 ..... 20c

Meyer and Mérimée, by K. Leopold, Faculty of Arts, vol. I, no. 4 20c

Ricarda Huch's Der letzte Sommer: An Example of Epistolary Fiction in the Twentieth Century, by K. Leopold, Faculty of Arts, vol. I, no. 5 ..... 20c

Francis Ponge and the New Problem of the epos, by Antoine Denat, Faculty of Arts, vol. I, no. 6 ..... 20c

Dunwich: A Study of Aboriginal and European Integration, by J. A. Keats, Hazel M. Smith, Carole C. Rogers, and G. P. Rowe, Social Sciences, vol. I, no. 1 ..... 60c