

**SIMON FRASER UNIVERSITY
MEMORANDUM**

TO: Senate

FROM: J. Munro, Chair
Senate Committee on
Academic Planning

RE: External Review Report -
Department of Biological Sciences

DATE: December 18, 1990

The external review report of the Department of Biological Sciences was received by the Senate Committee on Academic Planning for information. The report and the departmental response was discussed with the Chair of the Department, Dr. Brian McKeown. Under the procedures established for consideration of external reviews, the report is now forwarded to Senate for information.

REVIEW OF THE DEPARTMENT OF BIOLOGICAL SCIENCES
SIMON FRASER UNIVERSITY
MARCH, 1989

1. BIOLOGICAL SCIENCES AT SIMON FRASER

The Department of Biological Sciences at S.F.U. commands respect throughout the scientific community in Canada. A few members of the Department have gained international stature and have developed strong research programs that are well funded by external granting agencies. Other faculty members have more modest grant support and run research programs that are on a par with average research performance across Canada. A significant number of faculty (20% of the Department based on the list of faculty in Table 1 of the Planning Document) have no grant support and do little or no research. It is noteworthy, however, that in 1988/89 the average NSERC grant in Biological Sciences at S.F.U. was 18.7% above the NSERC national average. This is mainly due to the large group (11 faculty) in Population Biology for whom the average grant in 88/89 was 36.6% greater than the NSERC average in Population Biology, and to the Plant Biology group (5 faculty) for whom the average grant in 88/89 was 24% above the NSERC national average for Plant Biology. [It is a point of concern, though, that if the number of faculty without NSERC grants is factored into this calculation, the average NSERC grant in Biological Sciences at S.F.U. drops below the NSERC average.] Several faculty have been successful in acquiring substantial support for research of a more applied nature. As well, the quality of teaching, particularly at the undergraduate level, is deemed, on average, to be high.

RECOMMENDATION

- 1.1 The stature of the Department would be well served by recruiting additional faculty who are, or are likely to become, world renowned researchers. As this objective is less likely to be achieved if the scope of selection is simultaneously constrained to meet the needs of more than one sub-discipline (eg. recruiting a molecular biologist or a biochemist who would also fulfil a perceived need in Pest Management), the Department should advertise positions without multiple restrictions and select the best candidate for the designated area irrespective of whether he/she has expertise in other areas deemed to be important.

2. UNDERGRADUATE TEACHING

The undergraduate students who met with the Review Committee were impressive. Granted the assumption that the views held by this small group are representative, the students are pleased with the programs offered. In particular, the tutorials, the research courses and the co-op program are viewed very positively.

RECOMMENDATIONS

- 2.1 Core courses in the first three years of the undergraduate program must be staffed with regular faculty members, not sessional lecturers or lab instructors. It is essential that top priority be given to staffing the cell biology course with a qualified faculty member. Sessional lecturers should only be used intermittently as sabbatical replacements.
- 2.2 There are too many specialty courses in the third and fourth years of the undergraduate program. This appears to be a result of allowing faculty to mount courses in their areas of specialization without first ensuring that teaching needs in the core courses are met. The number of specialty courses should be reduced, and attention should be given to mounting a rational progression of core courses. This would: (1) eliminate the need for so many sessional lecturers; (2) reduce the undergraduate teaching loads; (3) reduce the pressure on undergraduate teaching laboratories; (4) allow the Department to run laboratory and tutorial sessions with a lower student/TA ratio; and (5) reduce the work load for lab instructors (some of whom currently lecture in undergraduate courses) and give them more time for upgrading student laboratories. The need to hire sessional lecturers for core undergraduate courses is a reflection of the number of courses taught rather than the recent increase in enrolment. This contention is substantiated by the fact that the FTE students/faculty ratio for biology at S.F.U. is significantly lower than that at many other Canadian institutions. For example, the values for this ratio are 20 for the University of Victoria, 15 for the University of British Columbia, 16 for the University of Toronto, 15 for McGill, 18 for the University of Saskatchewan and only 13 for S.F.U.
- 2.3 Student evaluations should be compulsory for every course. This and other sources of information (eg. peer assessment of lecturing) should be considered in promotion and tenure deliberations and in deliberations on merit increments in faculty salaries.

- 2.4 Courses that are not offered should not be listed in the calendar. As well, it became obvious that there is more flexibility in selecting courses for the various specializations and programs (particularly the co-op program) than is apparent from reading the calendar; this needs to be corrected.
- 2.5 The Review Committee is distressed that there are not more than two required non-science electives in the curriculum. This is exacerbated by the fact that many students apparently take computer science as one of these electives. The Department should consider increasing the requirement for courses offered by the Faculty of Arts. These could be taken on a pass/fail basis so as not to impact on grade point averages.
- 2.6 The Review Committee endorses the intention to implement a first year course for students who have had no previous training in biology. This would allow upgrading of the existing set of first year courses.
- 2.7 The Department needs to give higher priority to ensuring that student laboratories remain current. Lab instructors and technical staff should have time for course development.
- 2.8 The Review Committee deems the needs for new equipment and additional undergraduate laboratory space identified in the Planning Document to be genuine and recommends that the University give high priority to rectifying these deficiencies. The Department should contribute to this objective by using the major proportion of its equipment budget for teaching equipment rather than for research equipment as now appears to be the case (see also recommendation 3.11).
- 2.9 The morale of the technical staff is low. There is a need for more regular communication with staff members concerning job expectations and performance. A real effort should be made to make the technical staff feel more a part of the Department. Release time should be provided to allow technicians to upgrade their skills. The Department should also establish a Technical Services Committee, and the membership of this committee should include representatives from the technical staff and from the lab instructors.
- 2.10 We endorse the Departmental Chairman's intention to reduce the teaching load from 3 to 2 (undergraduate plus graduate) semester courses per year for faculty members who have active research programs. This can be achieved, in part, by reducing the number of specialized undergraduate courses (particularly those with low enrolments) offered in the third and fourth

years (see also recommendation 2.2) and by giving faculty with weak research programs (or no research program) higher teaching loads.

3. GRADUATE TEACHING AND RESEARCH PROGRAMS

The Review Committee supports the concept of establishing nationally (and hopefully internationally) recognized areas of research excellence within the Department. We caution, however, that: (1) the number of such areas that can be sustained is limited. [We believe this to be three and certainly not more than four]; and (2) the proposed proliferation of professional Masters Degree programs with their attendant high teaching requirements is likely to dilute efforts to achieve excellence in designated research areas. Based on current strengths, we see viable areas of excellence in Pest Management, Behavioural Ecology and Molecular Biology. In our opinion, Behavioural Ecology and Pest Management have, or will soon achieve, recognition at the national/international level. The Molecular Biology Group is as yet too new and small to have achieved such recognition, but appears to be developing in the right direction. Achieving distinction in this domain will not, however, be a trivial task given the resources being directed to this area by other institutions in North America.

The graduate program appears, on the whole, to be strong, and M.P.M., M.Sc. and Ph.D graduates are well placed. However, in comparison with a number of other Departments in Canada, the number of graduate students holding prestigious awards (eg. NSERC scholarships) is low. In addition, the median time for completion of graduate degrees is seen to be excessive. This is particularly true of the M.P.M. and M.Sc. degrees.

The Departmental and research-group seminar programs appear to be of high quality.

RECOMMENDATIONS

- 3.1 The Review Committee recognizes that new appointments can be seen either as opportunities to build on established strength or as a means of ensuring breadth of coverage at the undergraduate level. In any Department, these goals may conflict -- here the conflict seems magnified by departmental political divisiveness. The Committee feels that criteria for new appointments should be: (1) excellence in research; (2) ability to contribute to a balanced (but not necessarily fully comprehensive) B.Sc. program; and (3) complementarity of interest to those of existing faculty -- in this order of priority. Areas of excellence should neither have, nor expect, any fixed manpower complement. Faculty lost need not necessarily be replaced with new ones in precisely the same

field. In short, areas of excellence should have the opportunity to survive, not the right. It should also be noted that excellence depends heavily upon the particular mix of individuals at a given time. Sustained excellence in an area is the exception rather than the rule. The Department and the University should be alert to this reality and be prepared to reallocate resources if well-defined standards of excellence are not maintained.

- 3.2 The requirements for a balanced B.Sc. program should not be made secondary to the interests or needs of designated areas of research excellence when recruiting new faculty. There is considerable evidence that in the recent past the perceived requirements of these research groups have been given priority over undergraduate teaching requirements to the detriment of the undergraduate program. For example, the need to have a regular faculty member (rather than a sessional lecturer) teaching cell biology was not met in the most recent round of hiring.
- 3.3 No additional professional Masters Degree Programs should be instituted unless: (1) the resources required to sustain these programs are fully met (ie. manpower, space, facilities); and (2) it is clear that these new programs will not dilute the quality of the research degrees (M.Sc. and Ph.D). The Review Committee recognizes that the M.P.M. program has been very successful and that by offering this type of training, the Department occupies a unique niche in Canada. However, we see the creation of additional professional Masters Degree programs as a potential drain on resources that could impact unfavourably on the excellence of both basic and applied research and their further development.
- 3.4 The distinction between the M.P.M. degree and the M.Sc. degree must be clearly defined and rigorously maintained. At present, there is a growing tendency for M.P.M. students to undertake research that is tantamount to the thesis research of an M.Sc. student. This unduly lengthens the time required to complete the M.P.M. and blurs the distinction between the M.Sc. and M.P.M. degrees. The course work basis for the M.P.M. degree should be restored and the research component reduced to allow completion of all degree requirements in a maximum of two years (six semesters) from initial registration. Students wanting a research-based degree in Pest Management should be required to register in the M.Sc. program. In the event of a transfer from the M.P.M. program to the M.Sc. program, transfer of course credits should be limited to no more than 50% of the formal course requirements for the M.Sc.

- 3.5 The M.P.M. program should be administered in a manner similar to the administration of professional degrees elsewhere. Specifically, with the exception of scholarships inherent to the program, there should be no salary support for M.P.M. students. This would reduce the demands on limited T.A. funds and help to ensure that all M.Sc. and Ph.D. students receive a minimum guaranteed salary (see also recommendation 3.6).
- 3.6 The Department should implement mandatory, minimum financial support in the amount of \$10,000/year for every full-time student registered in the M.Sc. and Ph.D. programs. This support should be guaranteed for two years (six semesters) for M.Sc. students and for four years (12 semesters) for Ph.D. students. ~~Guaranteed salaries would improve the quality of applicants to the graduate program, encourage students to complete their degree requirements on time and eliminate the current problem of low morale among students who are either not being paid or have only partial support.~~
- 3.7 The number of contact hours and the preparation time specified for T.A. units should be more in line with norms in other Universities. In many institutions, a full teaching assistantship entails no more than 10 hours per week (contact time plus preparation time) for two semesters.
- 3.8 The number of graduate students currently registered is, at face value, impressive. However, this is tempered by the fact that students in all programs, but particularly in the M.Sc. and M.P.M. programs, are taking far too long to complete their degree requirements. If students were graduating within time frames considered the norm in most institutions, the number of registrants would be significantly lower. As a target against which to operate, maximum times to complete all requirements should be 2.5 years for the M.Sc. degree and 4.5 years for the Ph.D. degree. In addition, a statutory limit should be placed on the time allowed to complete M.Sc. and Ph.D. degrees. We suggest four years (twelve semesters) for the M.Sc. and six years (eighteen semesters) for the Ph.D. Students exceeding these limits should be required to withdraw and apply for readmission. Specific guidelines should be established for reaching a decision on readmission.
- 3.9 The number and diversity of graduate courses should be reduced. Biological Sciences at S.F.U. offers 1.4 graduate courses per faculty member compared with an average of 0.8 for Biology Departments in ten Canadian Universities (including S.F.U.) We recognize that this is, in part, a consequence of the additional courses required for the M.P.M. program. Nonetheless, it constitutes an inordinate encumbrance against faculty time and should be brought more in line with the norm at other Universities. This could be achieved by placing more

emphasis on independent study at the Ph.D. level. Specifically, the Department should consider eliminating prescribed courses for Ph.D. students, introducing a seminar course in which Ph.D. students would present the results of their own research and introducing a qualifying examination early in the Ph.D. program. The qualifying examination would ensure that Ph.D. students have sufficient depth and breadth in their research areas. Deficiencies in a Ph.D. student's background could be rectified by directed reading. Finally, graduate courses that are not being offered should be removed from the calendar.

- 3.10 In view of the shortage of research space, the Department should re-evaluate the allocation of space to ensure that it is distributed according to real need.
- 3.11 The Department has come to expect more research funds from the University than is usual. In particular, faculty members should be much more aggressive in seeking funds for research equipment from competitive granting agencies. Replacement of obsolete teaching equipment and, as necessary, start-up funds for new faculty should be the top priorities against internal equipment funds.
- 3.12 Some of the graduate students (eg. those in Plant Biology and Environmental Toxicology) are not happy because they feel they do not have the resources (eg. numbers of faculty in their research area, numbers of graduate courses in their research area, equipment) that their fellow students in other areas (eg. Pest Management, Behavioural Ecology) have. This perception is unnecessary and must be corrected. It is undoubtedly a reflection of the mood of balkanization that currently pervades the Department. Faculty, students and staff should view their allegiance as being to the Department first and only secondarily to research groups (see also recommendation 4.1). If this were practiced and encouraged, the 'second-class citizen' mentality that currently assails a number of graduate students would probably disappear. Students should also be actively encouraged to see the Department and the University, not just their research group, as resources to be tapped.

4. DEPARTMENTAL STRUCTURE AND ADMINISTRATION

The level of tension and friction among faculty and, particularly, among research groups is too high, on the verge of being destructive and must be quelled. We sense that as the Department has grown and the research groups have become stronger, these tensions have become increasingly manifested. However, we reject the contention that the tensions have arisen because the Department is too large and diversified to

be effectively managed and integrated. We see this size and diversity as a strength that would be lost if the Department were subdivided. It is also noteworthy that virtually everyone whom we met favours being in a Department of Biological Sciences rather than in a subset of the Department.

We offer the following recommendations as a possible means of restoring a sense of camaraderie, cohesiveness and mutual trust within the Department.

- 4.1 The Department should not be subdivided. Faculty members clearly prefer that the Department remain intact and view subdivision as a last (and undesirable) resort to solving their current problems. Moreover, with the possible exception of Pest Management, the groups are too small to be viable independent entities. The Department has a proclivity to undertake applied research and to mount applied programs in response to economic and industrial needs. This is exemplified by the Pest Management program, and we acknowledge that this applied predisposition is one of the strengths of the Department. However, the Pest Management program has been successful largely because it has been established within a Biology Department. We fear that its separation from basic research and the teaching of basic biology through the formation of one or more new Departments could in the long run lead to weakness. One way to maintain a high profile in the applied arena without endangering the basic research programs would be to expand the co-op undergraduate program.
- 4.2 The Department has too many chiefs, and their numbers appear to be proliferating. This is promulgating balkanization and mixed allegiances. We see this as undesirable from the perspective of both the research groups and the Department. The title 'Director' for the leaders of research groups (eg. Behavioural Ecology, Pest Management) may be desirable as a means of bringing external recognition to the groups and can be supported on these grounds. However, the internal meaning of the title should be severely circumscribed. The title 'Coordinator' would, in our view, more accurately reflect the responsibilities and internal mandates of these positions. We sense that the present tendency to balkanize would diminish if all responsibility for budget, manpower assignment and other duties normally assumed by a Departmental chairman were reserved for that office. [The Institute of Molecular Biology and Biochemistry is probably an exception inasmuch as it was specifically created to bridge disciplines and Departments. Its director likely requires limited budgetary authority for such items as technical requirements and a seminar program. We believe, however, that the concept of faculty appointments and teaching assignments being in line Departments is appropriate and wise].

- 4.3 We do not recommend the establishment or recognition of research groups beyond those already formalized. This would lead to further balkanization and probably result in eventual dismantling of the existing Department. Moreover, we deem the grouping of Plant Biologists, Marine Biologists, Environmental Toxicologists and Animal Physiologists identified in the Planning Document to be largely artificial. We presume it is mainly a response by other members of faculty to the perceived growing autonomy and political strength of the formalized research groups. Every effort should be made to de-emphasize the autonomy of the existing groups. They should operate as, and be viewed as, loose amalgams of faculty with common research interests. This is the only way to avoid a 'second-class citizen' mentality among faculty who are not members of groups and a 'special status mentality' among those who are.
- 4.4 All appointments should be made to the Department, not to research groups. If new appointees have a natural affinity to established groups, it should be made clear at the outset that their primary allegiance must be to the Department.
- 4.5 In our view, the greatest gains could be achieved by hiring initially in the area of Cell Biology and then in Behavioral Ecology. Given the present constraint on resources, we submit that the aspirations of those promoting new professional programs in Environmental Toxicology and Aquaculture should be accommodated through research degrees. Formalized structures such as the professional masters programs are a heavy drain on resources (especially faculty time) and build in unnecessary inflexibility that could inhibit response to future needs.
- 4.6 It became obvious during our interviews that there has been a growing tendency for some faculty members to indulge in destructive rhetoric in a public forum. We deem this to be inappropriate and self-defeating, and recommend that senior administrators take vigorous steps to curb it.
- 4.7 Given the present level of dissension within the Department, we sense that it will be very difficult to find an inside candidate for the position of Chairman when Dr. Srivastava steps down. We recommend, therefore, that the next Chairman be appointed from outside the Department.

W.F. Doolittle
R.F. Frindt
W.C. Leggett
J.E. Phillips
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DEPARTMENT OF BIOLOGICAL SCIENCES EXTERNAL REVIEW
NOVEMBER 28, 1990

I. INTRODUCTION

In January 1989, the Department prepared a Planning Document which highlighted the Mission and Goals of the Department, and described the faculty and staff complement, Departmental organization, Undergraduate and Graduate programs, strengths and weaknesses of the areas represented in the Department and aspirations of the various constituent groups in terms of their future development.

This Planning Document provided the framework for an External Review which occurred in April 1989.

The present document incorporates the Department's response to the various points raised by the External Review.



II. RESPONSE TO EXTERNAL REVIEW COMMITTEE (ERC) REPORT

The Department considers the Report objective and fair, despite some inaccuracies, and contains many constructive suggestions. In this section the major points raised by the ERC are addressed. Cross references to the ERC Report are provided as necessary.

1. General

- 1.1 We are pleased at the assessment that our Department commands respect throughout the scientific community in Canada, that some members have gained international stature, and that in 1988/89 the average NSERC grant in our Department was 18.7% above the NSERC national average with significantly higher averages in Population Biology and Plant Biology (ERC #1).

Regretfully in the opening paragraph of the ERC there are some factual errors which cast a negative image and must be corrected:

a. line 8-10. the reviewers stated that "...20% of the Department based on the list of faculty in Table 1...have no grant support and do little or no research." This statement is incorrect. Of 35 faculty listed in Table 1 at the time of review, six held no NSERC grants (17%). One of these, a new appointee, has since received a 3 year NSERC grant. Three others have viable research programs and other substantial research monies. Dr. Geen, though very active in the past, had been disabled for some time and was on long term disability. Only one faculty had neither research funding nor research program. The Department would like to point out that NSERC is only one measure of research activity. Many faculty members have substantial grant support from other sources (eg. Science Council of B.C., Federal Drug Administration, B.C. Health Care, Forestry Canada, Fisheries and Ocean, Agriculture Canada, etc.)

Since the review and including the results of the last NSERC grants competition our average NSERC grant for all committees are 23.8% above the national average. With respect to specific NSERC grant selection committees our Department NSERC grants, as a percentage of the national average, are now as follows: Animal Biology (108.8%), Cell Biology and Genetics (134.4%), Earth Sciences (108.4%), Plant Biology (115.3%) and Population Biology (135.2%).

b. line 19. It is not correct to compare the Departmental average (based on the total number of faculty) with the NSERC average (based only on the number of successful applicants). There is no complete information available from other Canadian universities

indicating the percentage of faculty in Biological Science departments that have no NSERC grants. Thus, no valid comparison can be made without this statistic.

c. Our Department was encouraged to learn that the ERC rated the quality of our undergraduate teaching as high. The Department points out that our graduate program is also outstanding.

- 1.2 The Department accepts the principle stated in ERC 1.1 to select the best candidate for new faculty positions and not try to find applicants from multiple sub-disciplines. Our last three searches in Cell Biology, Microbiology and Developmental Genetics and the present search for an Evolutionary Biologist follow this principle. However, in the past this was not always the case and so the potential pool size of applicants was smaller and the chances of attracting an excellent candidate were reduced.

However, it would be naive to think that in a multi-disciplinary Department such as ours, any appointment can or should be made without regard to teaching needs in peripheral areas and complementarity to existing faculty research strengths. The trimester system and the need to offer some courses 2 or 3 times per year dictate that we have some overlap in faculty teaching expertise, and strong research groups are built by interaction among faculty.

2. Undergraduate Program

2.1 Program Evaluation

We are pleased at the Review Committee's assessment that students like the programme offered and that the tutorials, undergraduate research and Co-op are all viewed positively. We consider these aspects of our programme as major strengths and, in a large measure, responsible for the steady increase in our undergraduate enrollment and quality of instruction.

2.2 Teaching of Core Courses

The Department subscribes to the view that core courses in the first 3 years of the undergraduate program be taught by regular faculty and that sessional instructors (or lab instructors) be used only intermittently (ERC #2.1). In the last few years several factors contributed to a greater than normal use of sessional or lab instructors for core undergraduate teaching: a) increased number of courses offered in summer semesters commensurate with an increase in the Co-op program; b) four replacement positions that were vacant for 1 to 2

years; c) our long-standing need for more faculty with expertise in Cell Biology, Developmental Biology, Animal Physiology, Evolutionary Biology and Microbiology; d) assignment of a large number of our regular faculty - 8 to 10 at any one time - to serve on various University/Faculty/Department initiatives and offices with attendant teaching relief; e) sabbatical leaves.

The Department has now hired a Cell Biologist, Microbiologist and Developmental Geneticist and is currently advertising for an Evolutionary Biologist. With these new positions and with the four replacement positions now completed as well as the appointment of Dr. Brandhorst, a Developmental Biologist, the pressure to use sessional and lab instructors has been reduced. The Department hopes to further reduce the use of sessionals by adhering to the philosophy that each faculty member will normally be expected to teach one of our core or required courses each year. Also, faculty with small or no research programs are expected to teach more than an average load. These facts notwithstanding, the exigencies of the trimester operation, offering some courses more than once a year (due to Co-op program and lack of large lecture halls), involvement of a quarter of our regular faculty in various initiatives and increased undergraduate student enrollment, may still require the occasional use of sessional and lab instructors. For some lab instructors who wish to do so for professional reasons, the Department encourages the practice of assigning them to teach a lecture course occasionally. However, unless the lab instructors and teaching technicians increase in number, this objective will be very difficult to accomplish.

2.3 Changes in the Undergraduate Program

a. Specialty Courses - The Departmental Undergraduate Curriculum Committee (DUCC) and the Departmental Graduate Studies Committee (DGSC) are examining the specialty courses at the 300/400 level and graduate courses at the 800 level with a view to rationalizing these courses and reducing their overall number. Several courses have already been eliminated (ERC #2.2, 2.4, 3.9, 3.12).

The overall student/faculty ratio in our Department appears low (ERC #2.2). However, it should be mentioned that this statistic includes graduate courses and lab courses. Furthermore, our Department's lab courses are a heavy workload as they include full lecture and full laboratory components. Also contributing to this low ratio is the fact that our department has many specialized courses, many of which have low enrolments. In addition, a number of courses are offered frequently. Therefore, in order to change this ratio, in addition to

dropping some specialized upper levels courses, some courses will be offered less frequently.

b. Introductory Biology - An ad hoc committee under the supervision of the DUCC has developed a detailed outline of BISC 100 (ERC #2.6) and upgrading of BISC 101 and 102, with implementation of these changes in 91-2.

c. Arts Courses - The Department and Faculty of Science agree with the ERC #2.5) that more non-science electives be included in our curriculum. To this end, the Faculty of Science has passed a motion to double the non-science requirements (12 semester hours credit) for Science majors. Science students can take non-science courses on a pass/fail basis if the courses are so described in the calendar and all students take the course on the same basis.

The Department also supports the idea that Arts majors be required to take an equivalent number of credit hours in the Faculty of Science. Current calendar lists no such requirement. It only specifies that 30 semester hours be taken in five departments outside the Arts major or honors Department. In theory these five departments need not include any in Science or Applied Sciences.

Flexibility in course selection - the ERC felt that the calendar did not reflect the actual degree of flexibility in selecting courses for the various specializations and programs (ERC #2.4). This misconception will hopefully disappear with the increased efforts of our Departmental Academic Advisor.

2.4 Technical Support

The Department recognizes the need for improving the morale of the technical staff and providing release time for both technicians and lab instructors for upgrading lab exercises, provision of lab materials and supplies, and improving the skills of the technical staff (ERC #2.7 and 2.9).

A Technical Services Advisory Committee, with representation from faculty, lab instructors, technical staff (both teaching and research) and the Lab Coordinator was set up in July 1989. The Committee is advisory to the Chairman. It does not consider matters that are covered in the Collective Agreement between AUCE and the University.

The Committee has been very active and has suggested some specific recommendations for improving the morale of the technical staff, greater interaction among faculty and staff and fostering of team spirit with regard to lab-

related courses, and technician assignments to various courses.

The provision of relief time for technical staff and lab instructors on a more or less regular basis, say one relief semester/9 semesters and associated costs is being examined and has now been implemented in a number of cases. Nevertheless, such a policy creates a problem of replacement for the lab instructors or technicians while they are on a relief semester. The university would have to budget extra funding for these replacements.

2.5 Student Evaluation (ERC #2.3)

The Department currently has in place a student questionnaire which is conducted for most undergraduate courses. However, this questionnaire is voluntary. Most faculty members use it regularly, others sporadically, and still others have chosen not to use it. For faculty members not wishing to use the questionnaire the Department is considering alternative ways for teaching evaluation, such as visits by faculty colleagues. The Department is of the opinion that, although evaluation of teaching effectiveness is a University requirement, the responsibility for the type of evaluation of teaching effectiveness rests with the individual faculty member.

2.6 Space and Equipment

The Department considers the needs for additional space, including undergraduate laboratory space (see also ERC #2.8), and funds to replace old and obsolete equipment as its most urgent requirements. This year's Departmental capital budget was allocated 28% solely to teaching and 29% to a teaching as well as research function. The Department unanimously passed a resolution that it "agrees strongly with ERC #2.8 that additional funds should be provided for the purchase of equipment for undergraduate and graduate teaching." Office space for faculty, PDFs, Sessionals and Graduate Students is in extreme need.

3. Graduate Program

3.1 Areas of Excellence

a. The Department is pleased to note that the ERC feels that the graduate program appears to be strong. Biology is a vast field which in many universities is spread over several Departments and Faculties. The Department has achieved national and international recognition in Entomology and Pest Management and, more recently, in Behavioural Ecology. With the establishment of the Institute of Molecular Biology and Biochemistry such

recognition is also present and should continue to increase rapidly. The ERC notes that areas of excellence change over time. The Department also recognizes this and as specific areas of excellence change, they will experience appropriate growth or reduction as the case may be. Since these areas are always in a state of fluctuation, the Department would be well served to be flexible and thus be in a position to react to possible new opportunities as they may arise.

b. We think that the present level of excellence can be maintained only by adhering to a broad-based Undergraduate program and maintaining the current complement of faculty in the core areas of animal biology and plant biology. The ERC also recognized the need for a balanced B.Sc. program (ERC #3.2).

3.2 Quality of Graduate Students and Degree Completion Time

The ERC noted that the graduate program, on the whole, is strong and the M.P.M., M.Sc. and Ph.D. graduates are well placed. However, the ERC felt that in comparison with many other Departments in Canada the number of graduate students holding prestigious awards (e.g., NSERC scholarships) appeared low and median time for completion of graduate degrees, especially M.P.M. and M.Sc. degrees was excessive (ERC #3, 3.8). The first statement ignores that our Department is relatively young and that we should be compared to other Canadian Universities of comparable size and age. This situation should improve as the reputation of the Department spreads and will get better as a result of commitment to attaining excellence and other initiatives concerning the graduate program that are outlined below.

The second judgement is probably incorrect. According to the data compiled by the Senate Committee on Graduate Studies, Biology students, as a rule, do not take any more time to complete M.Sc. and Ph.D. degrees than their counterparts in other departments. The graduate student completion times are all within senate guidelines even though several graduate students hold full or part-time jobs. As to quality of our graduate students it is worth pointing out that of the 9 Ph.D. students that the Department recommended for NSERC Postdoctoral Fellowships last year, 5 were awarded these Fellowships.

The Department nonetheless would like to strive for even greater excellence and has taken the following measures:

- 1. To attract a larger number of outstanding graduate students:

- a) an attractive graduate studies brochure describing the various programs and faculty strengths has been prepared for distribution across Canadian and American universities as well as to those enquiring as potential graduate students; and
 - b) steps have been taken to provide guaranteed support to students for two semesters in the first year by a combination of Teaching Assistantships and University GRFs.
2. Statutory time limits for completion of M.Sc. and Ph.D. degrees are set by the University Senate. Within these limits but to more carefully monitor and, if indicated, reduce the average residence time:

- a) The Annual Progress Report (for each student) will now contain a statement of the progress in required course work, research accomplished, a projected completion date for the program, and an assessment by the Supervisory Committee of the progress of the student in order to identify any potential problems.
- b) For students still enrolled, the accumulated progress reports of Master's degree students in their seventh semester of study, and Ph.D. students in their thirteenth semester of study will be reviewed by the DGSC in order to counsel the graduate student and supervisory committee as to potential means of expediting completion of the degree program.

3.3 Graduate Courses and Course Requirements for Ph.D.

The following steps have been taken:

- a. A rationalization of graduate courses and specialty undergraduate courses at the senior level with the intent to reduce the total number of these courses and the frequency of offerings.
- b. Provision of eight Special Topics graduate courses in each of the major areas of research in the Department. Approximately two of these courses are offered each semester.
- c. An umbrella course, Directed Studies, has been approved for students with specific deficiencies.

NOTE: The ERC recommendation #3.9 that course requirements for Ph.D. degree be eliminated is in conflict with the Faculty of Science course requirements for the Ph.D. degree.

d. Graduate courses that are not offered are removed from the Calendar.

e. ERC recommendation (#3.9) that Ph.D. students undergo a qualifying examination early in their Ph.D. program has now been acted upon. The DGSC has drawn up a recommended format for a candidacy examination which will be taken to the Department in due course.

3.4 Professional Masters Programs

a. The Department notes the concerns of the ERC about 1. proliferation of professional Masters degree programs and 2. their possibly having an adverse effect on the quality of the research degrees M.Sc. and Ph.D. (ERC #3.3, also Introductory paragraph in #3).

The Department does not fully agree with these concerns and recognizes that professional Masters programs, if appropriately balanced, can be a major asset to a Department, especially in a University such as ours where there are no professional Faculties of Agriculture, Forestry, Medicine, etc. They provide employment opportunities for graduands and valuable contacts with industry and government, promote a balance between basic and applied research, and permit access to research dollars from industry as well as provincial and federal agencies which otherwise would not be available.

The reference by ERC that the needs of the Pest Management program having been given priority over undergraduate teaching requirements in recent appointments (ERC #3.2) is not accurate. The last three appointments to the Department (Cell Biology, Microbiology and Developmental Genetics) as well as the three present searches (Evolutionary Biology, Environmental Toxicology and Animal Physiology) have all been advertised broadly and without multiple restrictions. The Department has been searching and will continue to search for the best qualified scientist and continue to fill positions where the greatest need is in the teaching core or required courses in our undergraduate program. Even though some appointments have been made in specific research areas, teaching contributions have been made to the general Biology program.

b. Additional Programs - In the above spirit the Department has reaffirmed its support in principle for additional professional programs and specifically reaffirmed its support for the Master in Aquaculture program, with the proviso that the resources required to sustain this program, i.e., manpower, space, facilities, will be fully met by the University (see also ERC #3.3). If these additional resources are not forthcoming, this,

or additional professional programs, will likely be dropped.

3.5 MPM Program

a. Degree requirements - The ERC while acknowledging that the Pest Management program has been a success and is recognized nationally and internationally (ERC #3.3), nonetheless was critical of the program because the distinction between M.Sc., a research degree, and M.P.M. a professional degree is based more on prescribed course work, and has been changing over the years (ERC #3.4). The Department recognizes the need to redefine the MPM program and steps are being taken by the DGSC in concert with the Director, Centre for Pest Management, to do this.

b. ~~Financial support to MPM students~~ - The ERC noted that M.P.M. students are eligible for and receive support from TAs to the possible detriment of M.Sc. and Ph.D. students (ERC #3.5). The Department has examined this issue and found no evidence that M.Sc. and Ph.D. students with suitable qualifications and who wanted Teaching Assistantships were deprived of one because it was given to an M.P.M. student. Moreover, M.P.M. students have proven to be good Teaching Assistants and they have similar financial needs to the M.Sc. and Ph.D. students.

Since the review the undergraduate student/Teaching Assistant ratio has been reduced. This, in combination with increased undergraduate enrolments, has created many more Teaching Assistant positions. If there are more Teaching Assistant applications than positions available, the question of M.P.M. students taking Teaching Assistantships will have to be addressed by the Department. It should be noted that the Department considers it more appropriate to consider the academic qualifications of a potential Teaching Assistant rather than degree program.

3.6 Financial Support and Teaching Assistant Work Load

Financial support for graduate students comes from 1. Teaching Assistantships, 2. scholarships and fellowships from various sources, national (NSERC, MRC) and international (ICOD, World Student Service), provincial (GREAT), University (e.g., GRF), 3. research assistantships from faculty research grants and contracts.

Of our present graduate student population, some 24% do not have any funding. However, these students are either on leave or have taken employment outside the University before completing degree requirements. Those that receive teaching Assistantships comprise 40% of the

funded graduate student population. Some of the Teaching Assistants also receive Scholarship or Fellowship funds. The average salary for the funded graduate students is approximately \$13,500/year. None of these students receive less than \$10,000/year. The ERC recommended that we implement a minimum financial support for graduate students of \$10,000/year (ERC #3.6). The DGSC has now guaranteed support during the first year for new graduate students by providing two semesters of Teaching Assistantship and Graduate Research Fellowship support. Since all other funded students are already above this amount, the Departments needs to advertise this fact more broadly to prospective new graduate students.

Our Teaching Assistants work far too many hours/week than do their counterparts in many comparable departments across Canada. The ERC recognized this and recommended that the Teaching Assistants' work load be reduced to 10h/week (contact hours plus preparation time) as opposed to our current load of approximately 18h/week for a full TAship (ERC #3.7). The Department strongly urges that the University take steps to reduce the TA work load by at least 25% to about 14-15h/week. It is recommended that a graduate student Teaching Assistant should receive the average annual remuneration of \$13,500, if the student holds a full Teaching Assistantship for two semesters.

Since the review, the University has increased the Teaching Assistant budget by almost 27% and at the same time reduced tutorial and lab student numbers required for a full Teaching Assistantship. How much these class size reductions decrease the work load of Teaching Assistants remains to be seen. In order to reduce the time graduate students spend as Teaching Assistants, the Department recommends that the University increase this number of Graduate Research Fellowships at least by 25%.

- 3.7 ERC Recommendation #3.10 that research space be allocated according to real need is done as far as possible.

Since the review the research space of a number of faculty has been reduced so as to provide more space for faculty with an increased research program.

- 3.8 The ERC recommended that faculty should be more aggressive in seeking funds for research equipment from competitive granting agencies. They also recommend that internal equipment funds first be used to replace obsolete teaching equipment and to provide start-up funds for new faculty (ERC #3.11). To encourage more equipment grant applications, the Department now guarantees partial funds for equipment as leverage to granting agencies. Since the review, replacement equipment for teaching has been purchased. However, more University funding for

teaching equipment is still required in order to meet the recommendation of the ERC. The last three faculty appointments have received substantial start-up funds from internal Capital Budgets. The Department hopes to be able to continue this practice with its next faculty appointments.

- 3.9 The ERC felt that there were significantly high levels of negative feelings amongst graduate students with respect to disparity of resources and polarization between groups (ERC #3.12). Either the ERC did not poll a large enough group of graduate students or such feelings have changed since the review because a recent meeting with the graduate students did not indicate these feelings.

4. Departmental Structure and Administration

- 4.1 The ERC made some general observations about perceived friction among the constituent groups and proliferation of Directorships of professional degrees and/or research groups, with the attendant danger of the Department breaking up into several units (ERC #4 preamble).

The Department has considered these points.

a. Ours is a large and diversified Department which could be split into several administrative units but for efficiency of undergraduate teaching, an appropriate balance between basic and applied research, and ease of interdisciplinary research collaboration, it is highly desirable that it stay as a unified Biological Sciences Department (see also ERC #4.1).

To maintain this unity it is essential that:

1. the legitimate research and teaching interests of the constituent groups be recognized and fulfilled,
2. the senior administration recognizes the diversity of the Department and respect it by not putting undue impediments or directives from above supporting or impeding the growth of one group or another,
3. in Departmental matters, the Dean and the Vice-Presidents deal through the Chair of the Department and not directly with individual faculty or program Directors reporting to the Chair.

b. The ERC noted (#4.2) that there are "...too many chiefs..." in the Department with obvious reference to Directors of CPM, IMBB, BERG, CERG, IAR, etc.

First, there is some confusion here. Behavioural Ecology Research Group (BERG), Chemical Ecology Research Group (CERG), Institute of Aquaculture Research (IAR), are interdisciplinary associations of research groups which report to the Vice-President, Research, and which have little direct role in Departmental policy, administration or graduate programs. Centre for Pest Management, by contrast, is another research group within Biological Sciences that is charged also with responsibility for the MPM program and has a limited budget for purposes of instruction and field trips. Institute of Molecular Biology & Biochemistry is an interdisciplinary institute between Biological Sciences and Chemistry with membership from both departments and is charged with promoting graduate instruction and research in the areas of molecular biology and biochemistry. While the Director of CPM reports to the Chair of Biological Sciences, the Director of IMBB reports to the Dean of Science. Both CPM and IMBB have some graduate teaching responsibilities which separate them from the purely research associations such as BERG, CERG, IAR. The recently established Master of Aquaculture program is housed in Biological Sciences, the Acting Director reports to the Chair of Biological Sciences and there is a limited budget to initiate the M. Aquaculture program. Faculty involved in this program are a loose amalgam of faculty in Biological Sciences, Business, Economics, Natural Resource Management and belong to IAR, but otherwise have no formal association.

Second, the presence of these Directorships is not a problem per se. They could be called Coordinators, but some of the positions are essential for teaching programs, for promotion of graduate training, and for the application for and administration of large collaborative research grants or contracts.

Third, the responsibility for budget, manpower assignments, and other duties referred to in ERC #4.2 rests with the Chair, Biological Sciences for MPM and M. Aquaculture programs. The IMBB, however, has special funds for faculty recruitment (faculty which are hired either in Biological Sciences or Chemistry) and a small operating budget, but the graduate admissions and manpower assignments rest with the Departmental Graduate Studies Committee and Chair, respectively.

- 4.2 Appointments in all subunits are made to the Department (ERC #4.4). However, in the case of IMBB certain faculty positions that have been assigned IMBB are tenured in Biological Sciences or Chemistry.

With such a large and diverse Department, officially identified and appropriately managed subunits within it lessen the burden to the Chair and enable the Department

to operate overall more efficiently. As long as cooperation and mutual respect prevail, the present departmental structure will work.

- 4.3 The Department had identified the following positions as priority: 1. Cell Biology, 2. Microbiology, 3. Environmental Toxicology, 4. Evolutionary Biology. The first two positions have been filled. The last two positions have been authorized and are being filled. The Environmental Toxicology position is urgently needed for the existing post baccalaureate diploma and Minor programs in Environmental Toxicology, not for a new professional program as the ERC misunderstood. A replacement position due to the untimely death of Dr. G.H. Geen has been authorized. The Department feels that this position should be in the area of Animal Physiology.
- 4.4 ~~The ERC recommended that the next chairman be appointed from outside the Department (ERC #4.7). A search was initiated which included external, as well as internal, candidates. However in the final analysis, an internal candidate was recommended by the Search Committee and was ratified by the Department.~~

5. Plans and Directions for the Future

The Department of Biological Sciences thanks the ERC for its analysis of our Department. We also appreciated this opportunity to respond to the many comments and recommendations. After having responded to the External Review, our Department will now embark on developing the next Five-Year Plan. Included in this Five-Year Plan will be the finalization of many issues raised by the ERC. Although the Department has discussed all of the External Review Report, a number of recommendations have not yet been fully implemented or fully evaluated in the light of the prevailing circumstances. There are multiple reasons for this, including: change of chairman, delay in committee or group reports, timely departmental discussions, etc. Over the next few months the Department specifically will be addressing the outstanding issues.

G.H. Geen

**SIMON FRASER UNIVERSITY
MEMORANDUM
DEAN OF SCIENCE**

To: J. M. Munro,
V.P. Academic

From: C.H.W. Jones
Dean of Science

Re: External Review
Biosciences - the Department's Response

Date: December 13, 1990

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The response by the Department of Biosciences to the External Review appears to adequately cover the major points. I would make the following additional comments:

1. The delay between the review itself (April 1989) and the Department's response (November 1990) arose in part because the incumbent Chair, Dr. Srivastava, was nearing the end of his term as Chair. With the initiation of the Chair search process, the Department could not be encouraged to respond more quickly to the Review.
2. The Chair search included external candidates, as recommended in the review. However, in the final analysis an internal candidate, Dr. Brian McKeown, was appointed as Chair. His appointment was strongly endorsed by the Search Committee and the Department.
3. The Report referred to "destructive rhetoric" and "dissension" within the Department. I am pleased to report that the friction which existed between individuals and groups within the Department has greatly diminished over the last 18 months and there is now a greater sense of collegiality and common purpose.
4. The Department in its response has requested that the senior administration "not support or impede the growth of one group or another within the Department". I would hope that the Department would recognize the benefits to the Department and the University as a whole of the initiatives taken by Dr. George Ivany in establishing the Institute of Molecular Biology and Biochemistry, and in securing funding for the Institute and funding for a major, new building. Without Dr. Ivany's leadership this very major development would never have come to pass.
5. The Department's response refers to a new, senior faculty position in Environmental Toxicology. I believe that the position which has been approved is the senior position in Environmental Science.

CHWJ:rh
cc: B.A. McKeown

CH.W. Jones
C.H.W. Jones