

SIMON FRASER UNIVERSITY

S.00-85

Senate Committee on University Priorities

Memorandum

TO: Senate

FROM: John Waterhouse
Vice President, Academic

RE: External Review - Department of
Biological Sciences

DATE: 4 October 2000

External Reviews of academic units are conducted under Guidelines¹ approved by Senate. The review process is intended to ensure that the quality of the department's academic programs and research is high, that members of the department participate in the administration of departments, and that the departmental environment is conducive to the department's objectives. Under these Guidelines, Senate is expected to receive advice from the Senate Committee on University Priorities and to provide feedback to the unit and the Dean.

The following materials are forwarded to Senate for consideration:

- The External Review Report
- The response to the External Review Report by the Department
- The comments of the Dean
- The comments of the Vice-President, Academic
- The recommendations from the Senate Committee on University Priorities

The Department Chair, Dr. N. Haunerland will be available at Senate as a resource person.

Motion

That Senate concurs with the recommendation from the Senate Committee on University Priorities concerning advice to the Department of Biological Sciences on priority items resulting from the external review, as outlined in SCUP 00-18a.

¹ The Guidelines can be found at: <http://www.reg.sfu.ca/Senate/SenateComms/SCUP-ExReview.html>.

SIMON FRASER UNIVERSITY
Senate Committee on University Priorities

Memorandum

TO: Senate
FROM: John Waterhouse
Vice President, Academic
RE: External Review - Department of
Biological Sciences
DATE: 4 October 2000

The Senate Committee on University Priorities has reviewed the External Review Report prepared on the Department of Biological Sciences in May 1999, together with the response from the Department and comments from the Dean and the Vice President, Academic.

SCUP recommends to Senate that the Department and Dean be advised to pursue the following as priority items:

1. The Department of Biological Sciences should review the Master of Pest Management program and determine whether to offer:
 - (a) a course-based professional program, possibly with differential fees, for an MPM degree, and/or
 - (b) a research based program with standard fees for an MSc degree

Realistic expectations of requirements for course work and original research, and the role of work experience, should all be considered in relation to the type(s) of program(s) the Department decides to pursue.

2. The Department of Biological Sciences should be encouraged to expand on its initiatives for improving undergraduate student advising and should institute a 3-semester student course plan to enable students to meet their program requirements more efficiently.
3. The Department of Biological Sciences should develop a more systematized process for reviewing course scheduling and other curricular issues and should incorporate periodic surveys of students on these issues into this process.

c. N. Haunerland
W. Davidson

SIMON FRASER UNIVERSITY

Office of the Vice President, Academic

MEMORANDUM

TO: Senate Committee on
University PrioritiesFROM: J.M. Munro,
Vice President, AcademicSUBJECT: External Review, Department
of Biological Sciences

DATE: August 31, 2000

The report of the External Review Committee of the Department of Biological Sciences was submitted in May, 1999 following the review visit on March 15-17, 1999. The response of the Department was submitted on May 17, 2000 and the comments of the Dean of Science on May 23, 2000.

My comments on this external review and the submission from the Department and Dean follow.

1. The report is clear and easy to digest. It is comprehensive in its coverage but the review of the undergraduate program takes 5 of 11 pages and research receives only one short paragraph. There is no discussion at all of the adequacy of resources provided to the Department; the reader is left to speculate on possible conclusions to be drawn from this omission.
2. The Department's governance arrangements are criticized but in my opinion the Department and Dean are correct in their defense of them; Biological Sciences is well within Simon Fraser's norm of collegial participation in departmental administration. The large size and complexity of Biological Sciences means that these processes can be quite time-consuming but there is no evidence that they are unreasonably so.
3. The reviewers praise the undergraduate program's breadth but question the wide diversity of options. They are critical of what they perceive as neglect of the undergraduate program by some within the Department. Certainly, there is an interesting imbalance between the brief treatment given the undergraduate program in the self-study and the lengthy analysis of the review committee. The Department's response defends its record of attention to the needs of the undergraduate program. Its relatively new mentoring program for undergraduate majors is certainly to be commended (and perhaps imitated). The development of more structured and comprehensive information on student experiences and impressions would have helped

considerably in illuminating the situation in this important part of the Department's operations.

4. The establishment of the new Department of Molecular Biology and Biochemistry and the lengthy processes that preceded its formal creation have presented many challenges for the Department of Biological Sciences. The Department's and Dean's comments on the long run impact of DMBB and the interaction between the two departments are sensible.

5. Faculty workload practices are described rather differently by the reviewers and by the Department. The reviewers suggest that workloads are unfair to active and successful faculty members while the Department claims that teaching workloads will be adjusted to reflect different levels of research activity. It is not clear why this hasn't occurred in the past since both the old and new Faculty Workload Policies provide for this type of adjustment.

6. The reviewers raise concerns about the structure and administration of the Department's graduate programs. The Department's response indicates that solutions to problems of program design and co-ordination are under active consideration. The difficulties seem well within the capability of the Department to resolve.

7. Overall, I share the view of the Dean that this is a successful department that operates among the largest undergraduate and graduate programs in the University while maintaining an excellent record of faculty research scholarship. This is also the opinion of the reviewers but it receives more expression in the first and last paragraphs of the review than in the body of the report.



cc. W.S. Davidson
N. Hauerland

SIMON FRASER UNIVERSITY
MEMORANDUM

To: J. Munro, V.P. Academic

From: W.S. Davidson, Dean
Faculty of ScienceSubject: External Review of
Department of Biological Sciences

Date: May 23, 2000

The Department of Biological Sciences was reviewed in March 1999 and the committee's report was submitted in May of that year. The committee found Biological Sciences to have a strong research presence in several areas, particularly behavioural ecology, to be thriving, to be attracting large numbers of undergraduates to a program that was considered one of the most comprehensive in Canada, and to have a reputation for quality. It concluded that this Department is doing a good job in its primary responsibilities: research and education at both the undergraduate and graduate levels.

In the view of D. Gagan, the V.P. Academic at the time, the committee focused their report on problem areas that seemed to require urgent attention to avert a looming crisis in the undergraduate program. He concluded that "Presumably, the Dean of the Department (sic) will address these matters at the earliest opportunity...". C. Jones, the Dean of Science at the time of receipt of this report, indicated that he was "underwhelmed by it", and was disappointed that the review committee did not bring any great vision of where Biology is heading as a discipline and offered no advice as to how Biology at SFU could position itself for the 21st century. C. Jones disagreed with D. Gagan's reading of the report and concluded that the reviewers recognised the Department as having very strong undergraduate, graduate and research programs.

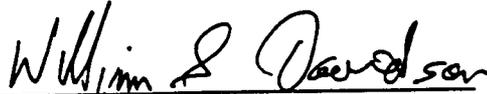
Having read the report in detail myself and having had the opportunity to discuss the review with an external member of the committee, my conclusion is that Biological Sciences is indeed a strong Department with many laudable attributes. The committee highlighted several points that could be improved and this is the spirit in which the recommendations should be taken. I believe that the Department, itself, has taken the comments of the review committee seriously and adopted appropriate measures to improve itself where necessary. I endorse their response to the external review.

I would like to take this opportunity to make some specific comments that arise from the attached documents.

1. Biological Sciences has embraced the Simon Fraser way of being collegial and democratic in its decision-making process. I would not wish to see this change. Streamlining committees will neither disenfranchise nor overburden anyone.
2. The comprehensive core of the undergraduate program is very important. It should be emphasised more when we are recruiting high school students. The cut back in the number of specialty streams to three with a general biology option is a very positive move.
3. Problems with scheduling and the availability of courses are not unique to Biological Sciences. It more properly reflects the difficulty of maintaining a trimester system in conjunction with the simultaneous offering of a co-op and regular non-co-op option. This must be a nightmare for course coordinators. The Department is doing its best to come to grips with this. I consider the progress being made more than satisfactory.
4. The mentoring program is obviously very successful and the Department is taking steps to improve its approach to advising students in general.
5. The emphasis on practical experiences for undergraduates requires careful coordination of support staff. This is the most important training a student can receive as it pulls together the theory and provides an opportunity for instructors to share their passion for the subject. The Department should strive to make this area of education work more smoothly.
6. The relationship of Biological Sciences and Molecular Biology and Biochemistry is evolving as MBB adjusts to being a Department. There will be much overlap and I am pleased to see a willingness and desire to share courses through cross-referencing and team teaching.
7. The recruitment of more graduate students holding their own external scholarships is an issue for every Department in the Faculty of Science. This is something that I will be discussing with the new Dean of Graduate Studies. The previous Dean of Graduate Studies was very supportive of this and initiated methods of encouraging it. We will build on this in the years to come.

8. The Department has revised its course requirements for graduate students in light of the external review. However, the review committee did not seem to understand what it calls professional graduate programs, namely the MPM and the MET. I, myself, am confused with regard to what one should realistically expect from someone in the MPM program. Professional programs at the graduate level often have substantially higher fees and are more course based than a traditional MSc. There is usually a lower expectation for original research. The latter is often a research paper or a small project rather than a full scale thesis. I have met with the MPM group of faculty and it seems that they are divided in their expectations of students. By and large they want the students to take a large number of courses, complete the equivalent of an MSc thesis, not pay a substantial increase in fees over the regular MSc, and have the degree classified as a professional program. This is not practical. It is time for a revision in how the MPM program is offered. It may be appropriate to have a course based, professional program with differential fees for an MPM degree and an alternative route for a research intensive, non-professional program with standard fees for an MSc degree. The MET is in its second semester and is a co-op/work placement program. It is too early to say how it will develop.

Finally, I would remind everyone to read again the Summary of the review committee. Simon Fraser has good reason to be proud of its Department of Biological Sciences. I am pleased to see the Department adopting strategies to maintain its position of one of quality with an excellent reputation.


W.S. Davidson

Attachments

c: N. Haunerland



**SIMON FRASER UNIVERSITY
DEPARTMENT OF BIOLOGICAL SCIENCES**

MEMORANDUM

To: Willie Davidson
Dean of Science
Subject: External Review

From: Norbert Haunerland
Chair
Date: 05/17/00

A handwritten signature in black ink, appearing to read "Norbert Haunerland", written over the printed name and title.

Enclosed please find the official Department response to the External Review Report, as requested by the VP Academic, Jock Munro.

The document was approved unanimously by the Department at today's meeting. Please forward this report, with your comments, to Jock Munro before the SCAP meeting on June 15.

EXTERNAL REVIEW

DEPARTMENT OF BIOLOGICAL SCIENCES
SIMON FRASER UNIVERSITYDEPARTMENT RESPONSE
MAY 17, 2000

PREAMBLE

The Department of Biological Sciences was reviewed on March 15-17, 1999. The written report of the external reviewers was received in May, 1999. The report was disseminated to all faculty members, representatives of the graduate student and undergraduate student caucus, as well as to technical and office staff members. Following an initial response to the Senate Committee on Academic Planning, the standing committees of the Department considered the relevant sections and recommendations of the report. Following extensive consultation, the Department approved and implemented an array of changes. This report is the official response by the Department and comments on the external review in general and on the specific recommendations.

OVERVIEW

The Department was generally pleased with the overall tenor of the external review, which attests to the high quality of all aspects of our Department. The research performance of the Department and its faculty was seen as outstanding, and both graduate and undergraduate programs were regarded to be of high quality. Based on the written documentation provided by the Department and a three day visit by the Review Committee, several possible improvements were suggested by the Committee, especially with regard to Department administration and undergraduate teaching matters. While these comments are very valuable, it should be noted that due to the brevity of the site visit and discussions with personnel the external referees may not have had a complete understanding of the "corporate culture" at Simon Fraser University, which appears to differ significantly from that of their home institutions. This is especially obvious in the sections that deal with administrative issues, but also in some aspects of undergraduate teaching.

ADMINISTRATION

The review committee noticed that many changes in administrative structures had been implemented in response to the previous external review, which had recommended a more open decision-making process. While realizing the vastly improved atmosphere in the Department, the committee felt that the Department now relies too much on committees, and does not give enough administrative and decision-making power to the Chair. Cited as examples for administrative "overkill" are the Departmental Tenure Committee and the process by which new faculty positions are identified and filled. The committee made the following recommendation:

Recommendation #1: We recommend that the administrative structure be streamlined and

that the Chair move to regain some of the final decision making authority from committees that should more rightly be advisory to the Chair. Decisions should of course be communicated in an open fashion and the rationale for all actions should be explained to the Department.

It is obvious that the committee was not familiar with the democratic decision-making process that is typical for our institution. Some of the committees that were singled out as overly democratic (e.g., Tenure Committee) are regulated by University policies, and not subject to Departmental modifications. Others were especially instituted to aid the Chair in making necessary, but potentially unpopular, decisions. Nevertheless, the point that large and numerous committees contribute to the overall workload of our faculty is a valid one. We will attempt to reduce the membership of committees, where appropriate. This has already been initiated in the current academic year on a trial basis, and if no serious disadvantages emerge, the membership of the Undergraduate Curriculum Committee, the Strategic Planning Committee, and of the Appointments Committee will remain reduced. Specific reference is made to the hiring process:

Recommendation #2: We recommend that the Chair and Dean carefully examine the rationale for the hiring plans put forward by the Department. We present this viewpoint because the democratic procedures now in place in the Department favour maintenance of the status quo and could disenfranchise minority opinions, which, although held by fewer individuals, may have greater merit. The democratic process could impede the deployment of faculty appointments to create new research initiatives, it could impede hiring in areas where there are critical teaching deficiencies, and it could lead to self-propagation of groups. While this point of view may be a contentious one, our collective opinion as individuals who have all had administrative experience, is that there are times at which movement in directions other than those supported by the majority may be a necessary course for a department to follow. Such independent action might be near impossible to achieve under the current administrative system.

These concerns were certainly considered when the specific hiring policies were established. In fact, the Appointments Committee was established specifically to assure that minority opinions are considered and to prevent self-propagation of groups. The composition of the committee (half elected, half appointed by the Chair) gives the Chair significant influence. The committee recommendations, which are developed in consultation with the Department, cover several faculty positions available over a period of a few years, to allow for long-range planning. The envisioned danger of block-voting by strong groups in the Department is reduced, because the recommended hiring plan as a whole is subject to Departmental approval, not individual faculty positions. Provisions also exist to take advantage of unexpected opportunities outside of the hiring plan. Strong departmental support is necessary for such positions, to prevent uncontrolled proliferation into areas that are not consistent with the Department's mandate and long-term vision. Although the current hiring process requires much consultation and discussion, it has the potential to lead to a widely shared consensus. At this time, the Department does not intend to alter these procedures.

UNDERGRADUATE PROGRAMS

The Committee praised our philosophy of offering a comprehensive undergraduate program in Biological Sciences that encourages specialization at the upper level, and ranked our program as one of the most comprehensive undergraduate Biology curricula in the country. It recognized the efforts and resources needed to maintain such a program for the large number of students that

choose our Department. Concerns were expressed that undergraduate teaching is not a high priority of the Department, and that this results in organizational difficulties. These conclusions stem from the perceived brevity with which the undergraduate program was covered in the self study, the lack of knowledge about undergraduate matters by some faculty members, and comments from individual students, faculty, and staff. In the report, particular attention is placed on course scheduling and time-table preparation, and it is suggested that students are frequently unable to fulfill their course requirement in a timely manner. The committee recommends:

***Recommendation #3:** The Department should work to streamline the processes of course scheduling and timetabling. The schedule should provide access to the common core courses in at least two out of every three semesters, and the courses required for specific program streams should be offered in at least one semester every year, including a full schedule in the summer semester. The Department should pay particular attention to CO-OP students and students in the Honours program to ensure that they are able to complete their program and course requirements in a timely manner. Revision of the Honours program requirements should be undertaken so that students can complete Honours programs within a normal four-year period. Through a combination of regular course scheduling, flexibility within streams and improved academic advising, all undergraduate students should be assured of being able to complete their degree requirements within four years (eight course semesters).*

Undergraduate teaching is a high priority of the Department, and tremendous efforts have been made since the last review to modernize and improve our curriculum. The stream structure that is seen as very positive by the reviewers was introduced only four years ago. With many options available for the students, it was impossible to anticipate all possible conflicts and problems, but our course scheduling has improved dramatically over the last four years. With the establishment of the Course Planning Group four years ago, a process is now in place by which course offerings are decided primarily based on program needs and student interest, rather than faculty preferences. Summer offerings are a high priority for the Department, but here the selection of courses is especially important to assure that it is worthwhile for students to register. In our opinion, the increasing popularity of our summer offerings can be seen as evidence that we are on the right track. We are committed to offer required courses at least once a year, and to offer less popular optional courses at least once over a two-year period. We publish our course offerings generally two years in advance, so that students can plan their program well ahead of time. Thus, we wholeheartedly agree with this recommendation, and we will continue to work towards improving our undergraduate course offerings and scheduling. All undergraduates can fulfill their degree requirements in a four-year period, with enough flexibility to accommodate several CO-OP terms, if they carry a full course load (15 credits) in all terms. Faculty regulations specify an additional 12 credits for Honours students, who therefore need one additional semester to complete their degree requirements. With a good selection of both core and optional courses available in the summer terms, it should be no problem for Honours students to graduate in four calendar years.

The committee suggested that some scheduling problems may arise from the stream structure, which the Department introduced relatively recently. While generally supporting the streams and the underlying philosophy, the committee questioned the number and selection of the streams and recommends a re-design:

***Recommendation #4:** The Department should review the design of the undergraduate*

curriculum with the aim of reducing the number of streams and rationalizing the overall curriculum. The Committee supports the current scheme of a general core with upper division specialization, but recommends a maximum of three specialty program streams. Specialized courses from discontinued streams could continue to be offered according to demand as part of a general biology stream, or as options within other specialty streams. In designing the revised undergraduate curriculum, the Department should give due consideration to the long-term impact of the establishment of the new Department of Molecular Biology and Biochemistry, and to the potential inclusion of a program stream in environmental biology in collaboration with the new program in Environmental Science. In all revisions, primary consideration should be given to the academic/educational needs of the students rather than the research interests of the faculty. As an end result, a curriculum should be designed that can be efficiently and effectively offered given the current levels of technical/teaching support, laboratory teaching space, and faculty teaching loads.

Again, this recommendation is widely supported in the Department. When the streams were introduced in 1997, it was agreed to evaluate student interest and logistical problems after a period of four years. Potential problems were anticipated especially in the Plant Biology and the Marine Biology streams that could result in the elimination of these streams should they prove to be not viable. The Undergraduate Curriculum Committee has now initiated such a review, and the elimination of these streams and modifications of the remaining streams are now under discussion. Most likely, the outcome will be consistent with the recommendation by the external review committee, with three specialty streams (Cell and Molecular Biology, Physiology, and Ecology/Evolutionary Biology) and the opportunity to complete an individual program in the General Biology Stream.

The committee singled out as a particular strength of our undergraduate program the emphasis on laboratory courses. It recognized that these offerings depend on a high level of support provided by the Department, especially the professional teaching support staff. They felt, however, that the communication between technical support staff and faculty should be improved.

Recommendation #5: Laboratory courses, and therefore technical assignments, must be made well in advance, schedules determined and content of laboratory exercises finalized, with no last minute changes. The laboratory program is large and complex, and the administration of it is not a simple matter. As such, we recommend that the laboratory coordinator be relieved of student advising duties so that full attention can be devoted to the smooth delivery of the laboratory courses. A obvious corollary is that the role of advising students must return to reside with faculty members.

We agree with this recommendation, and already comply with most of its details. All courses are scheduled two years in advance, and "last minute" staff changes are made only in extraordinary situations (e.g., sickness of a technician etc.). After the previous review, the position of a Head Technician was created, especially to improve the communication with faculty and the planning of the laboratory requirements. In some upper division specialty laboratory courses, experiments are regularly updated or modified, to reflect changes in relevant technologies. This certainly requires additional efforts by the instructors and the technicians, but continued updating is necessary if we want to offer a contemporary program.

We agree that the laboratory coordinator should be freed from the day to day duties of student

advising, and devote more of his time to the teaching program. The review committee suggests further that the advising duties should be assigned to faculty members instead:

Recommendation #6: The Department should establish a group of faculty advisors for formal advising of students concerning the undergraduate curriculum. These advisors will provide formal authority for student transfers into programs, course changes, etc. and will interface with mentors to provide general advice on curriculum. All students should be required to consult with an advisor prior to registering in a Majors or Honours Program in the Department. Students should see an advisor to receive detailed information about program choices and course selections early in their second year so that they can plan their final two years to efficiently complete their course requirements.

Such a model has been used by the Department for the last two years, with two faculty members who were no longer active in research serving as part-time faculty advisers. With their retirement, there are no appropriate individuals left in the Department who can provide this service on a long-term basis. Because of the complex curriculum and associated technical details, it is impractical to assign faculty on a rotating basis to these duties. We have therefore decided to create a separate undergraduate advisor position, as a part time staff position similar to those used by many other departments at SFU. This advisor, who will work closely with the undergraduate secretary, will be in charge of providing technical advice to students, checking credentials, course clearances, transfer credits, etc. Individual faculty members will continue to serve as mentors, as suggested by the external report:

Recommendation #7: The Department should maintain and strengthen the faculty mentoring program. Faculty members should be encouraged to participate and should be provided with the necessary information for informal (i.e. nonsigning authority) advising concerning the undergraduate programs, courses, etc.

Faculty mentoring was introduced by the Department 3 years ago, at which time all but three faculty members expressed their willingness to participate. Since then, all students have been assigned a mentor when declaring their Major in Biological Sciences. The extent to which students take advantage of this program varies widely, however, as does the enthusiasm of our faculty members. It is now time to review the various aspects of the program and adjust the procedures so that all interested students have easy access to their mentors.

The Committee questioned the impact of the new Department of Molecular Biology and Biochemistry on the undergraduate program in the Department of Biological Sciences. It sensed conflicting views on this issue, ranging from virtually no changes to a complete transfer of all cell and molecular research and teaching to the new department. The committee recommended:

Recommendation #8: The Department of Biological Sciences should give careful consideration to the effect that the establishment of the new Department of Molecular Biology and Biochemistry will have on its own teaching and research activities in this area. It should work closely with the new department to develop a formal, long-term plan for coordination of curriculum and teaching resources to avoid duplication of courses and programs.

The lack of consensus is not surprising, as important details of the formation of the new Department are still unclear, among them the exact faculty complement. Molecular approaches are used increasingly in most disciplines of the Biological Sciences, and it is safe to predict that

their use will increase in the Department, even after some molecular biologists have elected to join the new Department. It is widely recognized that there will be a great overlap between the two departments, much more so than with any other unit on campus. Although the administration has discouraged joint appointments, all faculty members who will transfer to the Department of Molecular Biology and Biochemistry are committed to retain strong ties to our Department. The departments recognize the shared interest in various courses, and propose to cross-reference the core Biochemistry, Molecular Biology, and Genetics courses. A motion was passed by the Department of Biological Sciences that specifies close coordination of course offerings between our Course Planning Group and the Chair of the new Department of Molecular Biology and Biochemistry. Furthermore, a formal agreement has been reached that faculty members of each unit will receive full teaching credit for appropriate courses taught in the other Department, when assigned by mutual agreement of both Chairs. This will allow the departments to use faculty teaching expertise optimally, independent of their Departmental affiliation. Biological Sciences majors enrolled in our Cell and Molecular Biology stream have many options in their program, including several MBB courses. Similarly, several BISC courses are recommended as options for Molecular Biology and Biochemistry Majors. Because of this flexibility it is conceivable that occasionally students will select a mixture of courses that could meet the graduation requirements of both, the BISC B.Sc. and the MBB B.Sc., but this will not be the norm. In spite of all similarities between the research and teaching programs one should recognize that the focus of the Department of Biological Sciences lays more on function, while the Department of Molecular Biology and Biochemistry is concerned primarily with structural aspects.

GRADUATE PROGRAMS AND RESEARCH

We noted that the Committee found our graduate program to be of very high quality. The reviewers concluded that its size is well in line with other research intensive departments, and that the quality of our students is very good. The committee voiced strong disagreement with the suggestion by senior administrators that the Department should seek a smaller graduate program with students of higher standards. Although the proportion of students funded through external scholarships was seen as very good, the committee recommended a more aggressive strategy to attract scholarship holders:

Recommendation #9: The Department, through the Graduate Scholarships Committee, should be more aggressive in pursuing graduate students who hold major scholarships and should ensure that eligible scholarship holders are aware of the availability of top-up funds.

While the Department is in full agreement with this recommendation, it feels somewhat constrained by current University policies. Unlike the home universities of some of our reviewers, who award significant top-up scholarships to any NSERC scholarship winners, SFU currently offers top-up funds only for the first year of graduate studies, and only for students who have an admission offer from a competing institution. In our view, it seems to be counter-productive to ask students who have already decided to work here to seek competing offers, in order to have access to these funds. One possibility, currently under discussion in the Faculty of Science, is to alert all NSERC scholarship winners of graduate studies possibilities at SFU via individual e-mail messages. Nevertheless, with only minor financial incentives it may be impossible to effectively compete with other Universities employing this strategy (e.g., Alberta) who have access to large endowment funds for this purpose.

The review panel valued our research and scholarly activity highly, and found that the Department ranks very well against other Biology Departments in the country. While research productivity varies between individuals, the Committee was not concerned about the few individuals who no longer maintain an active research program, as these are generally close to retirement. The Committee strongly endorsed the intention of the Department to assign increased teaching or administrative duties to those individuals who contribute significantly less in the area of research and graduate supervision:

***Recommendation #10:** The Committee supports the efforts being made by the Department to adjust work loads appropriately by assigning increased teaching and service duties to individuals whose research programs have become inactive, as judged by a lack of quantifiable evidence of productivity, lack of external grant support, graduate student supervision and directed research project student supervision. The Chair with the support of the Dean should take decisive action in this regard.*

In the current process of course and teaching assignments the workload policy is followed closely, and faculty members without graduate students and/or undergraduate research supervision will be assigned one or two additional courses per year. Further adjustments will be made in future years. Provided that these efforts are supported by the senior administration, more balanced workloads for all faculty members will be achieved.

The review committee found that the number of graduate courses required for our graduate students is higher than usual in Biology programs, and noted the difficulties of offering sufficient numbers of relevant graduate courses. They recommend:

***Recommendation #11:** The Department should take steps to alleviate the problems being encountered by graduate students as they try to fulfill the course requirements of their programs by making more graduate course offerings available. These graduate courses should not necessarily be specialty content courses, unless student numbers warrant. Rather the Department should offer a small number of general interest graduate courses. As an example, a graduate seminar course (or small number of seminar courses) could be offered in which all graduate students participate for each year that they are in the program. The course should emphasize seminar presentations by the graduate students with an audience of both graduate students and faculty, and should be graded with feedback and evaluation provided by the academic staff. The Department could also consider introducing a 'core' course for graduate students which could stress scientific writing, development of graduate research proposals, preparation of grant proposals, preparation of poster presentations, slides etc. Additional graduate course offerings could be designed as special topics courses involving discussion of subjects reflecting the research programs of small groups of academics. These special topics courses would provide a useful means to introduce graduate students to the research being conducted by other staff members in the Department, an area which graduate students felt they had little appreciation of, at present.*

We generally agree with these assessments, and have initiated steps to address the problems mentioned. The creation of graduate courses of broader interest is currently under consideration by the Graduate Studies Committee. The high course requirements and the lack of relevant courses is particularly problematic for students with only a B.Sc. degree who enter directly into the Ph.D. program, or those who transfer from an M.Sc. to the Ph.D. program, since they must

complete 8 more credits beyond the M.Sc. before graduation. These requirements are seen as excessive, and we have now reduced the requirements by 5 credits. For some areas, courses jointly offered with other departments (e.g., Kinesiology, MBB) can be advantageous, especially if neither Department alone has enough interested graduate students to justify such a course. In such cases, team teaching is often required. This causes some administrative problems (e.g., who will get teaching credit) that are especially difficult to solve when different Faculties are involved. The Department encourages these efforts and hopes that Faculty boundaries will become more permeable to allow for increased team teaching efforts.

The committee addressed communication as another area of concern of our graduate students. They felt that many deadlines are not communicated well, and that graduate students are not made aware of the various support available to them in case of conflicts. Thus, they recommended:

Recommendation #12: The Department should deal with the various issues relating to communication with graduate students by preparing a graduate student handbook outlining Departmental policies or procedures and covering issues such as funding levels for students, scholarship opportunities and application procedures, and conflict resolution procedures. If resources permit, a Departmental newsletter would also improve communication throughout the Department as a whole.

Effective communication is certainly of utmost importance, and we strongly support these suggestions. In fact, our measures already include most of these suggestions, and go well beyond. A graduate handbook is handed out to all new graduate students, and annually we have a half-day orientation for new graduate students that introduces many of the relevant topics. All graduate students are alerted by repetitive e-mail messages of important events and deadlines. Two graduate students represent the graduate caucus in the Department Graduate studies committee, and are thus aware of all important developments. Graduate students also serve on faculty search committees, and meet separately with all potential candidates.

The report continues with a note about professional programs. The committee feels that the commitment to the M.P.M and M.E.T. program should be revisited. It alerts the Department that resources, including qualified faculty, will be required to maintain these programs, and that this may be difficult to balance with our commitment to research excellence. It anticipates strong disagreements about this in the Department, and cites this as another reason for adopting a less democratic leadership style.

The Department is well aware of the difficulties in reaching a consensus on these issues. However, we believe that the proper balance is achievable through open discussions in good faith. This approach has served us well during the past and has contributed to the current stature of our Department. Indeed, the current deliberations about future hiring address the concerns raised by the reviewers. We anticipate that we can hire within the next few years at least three additional faculty members that will strongly contribute to the two professional programs and establish vigorous, well funded research programs. It is obvious that conflicting interests require the willingness to compromise, but the current climate in the Department gives ample reason to be optimistic. The Center for Environmental Biology was created to coordinate the needs of the two professional programs and to strengthen areas of mutual importance. It is anticipated that the impact on the undergraduate teaching program will be minimal, because of the development of partially overlapping curricula and the commitment of the founding faculty of the M.E.T. to contribute initially to some of the new courses in addition to their regular teaching. From the

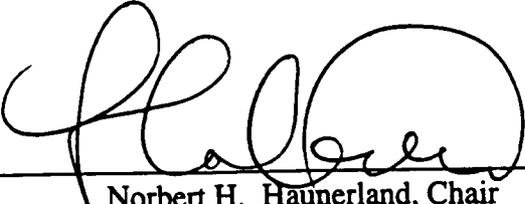
recent experience in planning teaching assignments, both professional programs can indeed be mounted without the addition of excessive resources. It is essential, however, that the CEB faculty members show strong commitment to the professional programs, by teaching the required courses and supervising professional graduate students. Continued success of these programs relies on both the addition of new faculty and increased efforts of existing faculty.

CONCLUSIONS

In their final summary, the reviewers reiterated their highly positive impressions of the Department, in all major areas of our mandate, namely research, undergraduate teaching, and graduate teaching. They stressed that the recommendations should be seen as suggestions to strengthen the Department, and not as an indicator of a "*problem-plagued Department*". As detailed above, we appreciate this review and feel that many of these suggestions are indeed helpful in maintaining or improving the quality of our programs.

The Department was troubled, however, by the synthesis of this review issued by Dr. David Gagan, Vice President, Academic, on May 10, 1999. In his assessment, the report is focused on "*serious problems*" "*that appear to require urgent attention*", and "*the perception... that undergraduate teaching is not a priority of the Department*". In our view, these statements are not supported by the report. In contrast, the review offers reassurance that the general quality and overall direction of the Department is very good. While improvements are indeed possible, we believe that the Department is certainly on the right track, and that radical changes are not desirable. This should be clear from the external review itself and our response given in this document. Building on this review document the Department will, in the Fall of 2000, develop the next Academic Plan. This will address the future directions for the Department, including our teaching programs and faculty hiring plans, and other emerging opportunities.

This document was unanimously approved by the Department of Biological Sciences at the Department Meeting on May 17, 2000.



Norbert H. Haunerland, Chair
Department of Biological Sciences

EXTERNAL REVIEW - DEPARTMENT OF BIOLOGICAL SCIENCES - SIMON FRASER UNIVERSITY

An external review of the Biological Sciences Department at Simon Fraser University was conducted on March 15-17, 1999. Members of the Review Team were:
Dr. Susan Jensen (Chair), Department of Biological Sciences, University of Alberta;
Dr. Daphne Fairbairn, Department of Biology, Concordia University;
Dr. William Driedzic, Ocean Sciences Centre, Memorial University;
and Dr. Michael Wortis, (Internal Member), Physics Department, Simon Fraser University.

OVERVIEW

As an overall impression, the Committee found the Department of Biological Sciences to be thriving, with a strong research presence in several areas, most notably behavioural ecology, a high quality group of graduate students, and an undergraduate program that attracts large numbers of students.

DEPARTMENTAL ADMINISTRATION

The Committee heard repeated references to the atmosphere in the Department, and how much it has improved since the time of the last review. This appears to be a tribute to changes that were instituted since the last review, in particular in opening up the administration of the Department to rely on more democratic, committee-based decision making processes as opposed to the previous system, which was seen to be top-down, secretive and prone to favoritism.

However, the Review Committee questions the possibility that the Department may have "overshot the mark" to some extent in its present heavy reliance upon committee-based decision making and the need for majority support from the Department as a whole before actions can be taken. The need for consultation and communication are paramount, but the Department faces a number of challenges in the near future, and it may prove difficult to respond rapidly and effectively in an administrative environment which relies so extensively upon majority approval.

The democratic, but heavily bureaucratic, administrative structure within the Department may also be overburdening the academic staff with administrative duties and taking up time that could be better spent on teaching and research. Finally, this system may prevent the Chair from making decisions that are in the best interest of the Department but may not necessarily represent the majority view. As an example of how there may be too many committees with too many members, the appointments committee consists of the Department Chair, four additional staff members appointed by the Chair, and the four members of the strategic planning committee. The membership of the appointments committee is subject to ratification by ballot of the Department, their

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recommendations for hiring priorities are subject to ratification by the Department via secret ballot, and ultimately, any decision to hire a new staff member must again be decided by a vote of the Department as a whole. Another example of administrative "overkill" is the departmental tenure committee that evaluates faculty members for contract renewal and takes much if not all of the responsibility for decisions away from the Chair. As a result, the position of the Chair has been reduced to one of a Departmental administrator with little scope to provide real leadership.

- Recommendation #1: We recommend that the administrative structure be streamlined and that the Chair move to regain some of the final decision making authority from committees that should more rightly be advisory to the Chair. Decisions should of course be communicated in an open fashion and the rationale for all actions should be explained to the Department.

A related issue that speaks to the potential for a "tyranny of the majority" can be seen in the number of research groups that have emerged in the Department. Some of these have formal administrative structures whereas others are self-defined with only informal status. Each of these groups either wants to sustain or to increase the number of individuals in their unit. Some of the research groups link directly to undergraduate or graduate teaching programs whereas others are quite separate. There is no question that large critical masses of faculty members with common research interests can achieve world class stature such as the Behavioural Ecology Group. However, there is a trade off between the establishment of high-powered research foci and the maintenance of the necessary person-power required to deliver breadth in an undergraduate biology curriculum. The route that the Department pursues should be consistent with the University's goals as a whole.

- Recommendation #2: We recommend that the Chair and Dean carefully examine the rationale for the hiring plans put forward by the Department. We present this viewpoint because the democratic procedures now in place in the Department favour maintenance of the status quo and could disenfranchise minority opinions, which, although held by fewer individuals, may have greater merit. The democratic process could impede the deployment of faculty appointments to create new research initiatives, it could impede hiring in areas where there are critical teaching deficiencies, and it could lead to self-propagation of groups. While this point of view may be a contentious one, our collective opinion as individuals who have all had administrative experience, is that there are times at which movement in directions other than those supported by the majority may be a necessary course for a department to follow. Such independent action might be near impossible to achieve under the current administrative system.

It should be noted that the Internal Member of the Committee, Dr. Michael Wortis, did not share with the External Members the concern that the level of departmental democracy might be excessive. Rather he felt that the administrative system described above is quite typical of that seen in many departments at Simon Fraser University. As

such, this may represent a question of University culture which, while atypical elsewhere in the country, is quite in keeping with practices at Simon Fraser University.

UNDERGRADUATE PROGRAMS

The Committee commends the Department for the quality and popularity of its undergraduate programs. Many of the recommendations of the previous review have been implemented, and the Department has worked diligently to maintain standards in the face of increasing enrollments and static funding levels. It is a large undergraduate program, with 628 declared and intended Majors and Honours students, which represents 55% of all undergraduate science majors at Simon Fraser University. All students are required to complete a core curriculum that includes nine biology courses, ranging from "Introduction to Biology" in the first year, to "Evolution" at the 400-level. This stands out as one of the most comprehensive required core curricula currently offered in biology in Canada. It reflects a philosophy that all students of biological sciences require a broad knowledge of the major fields of biology before specializing in a modern research discipline. The Committee commends the Department for providing this view of biology to students in an age of increasing specialization and division.

However, the Committee did identify several problem areas that may jeopardize the continued success of the undergraduate program. Most of these problems stem from a perceived lack of attention on the part of the Department to undergraduate education. Throughout the three-day review process, the Committee was struck by the emphasis on research, and particularly on promotion of the needs of various research groups. This emphasis was manifest in our schedule of appointments, which included interviews with no less than six research groups as well as a number of individuals associated with the Department primarily in a research capacity. The issues raised by these groups and individuals focussed on research facilities, hiring priorities and graduate training. Issues concerning undergraduate programs were clearly of lower priority. Although we met with representatives of the Undergraduate Curriculum Committee and the Course Planning Group, no individual or group came before the Committee specifically to discuss problems with the undergraduate curriculum or with undergraduate training in general. When the Committee raised particular issues, many faculty and senior staff seemed unaware of problems, or dismissed student-raised concerns as having no foundation. However, informal discussions with other faculty members revealed a recognition that the undergraduate curriculum needed attention. Lack of emphasis on the undergraduate program is also evident in the Self Study Report which devoted only five of 63 pages to undergraduate teaching/programs and provided no quantitative information on student quality or success of the program. Issues such as retention rates, time to completion of degrees, employment outcomes for B. Sc. graduates, high school averages for entry into programs, etc. were paid scant attention. This is in sharp contrast to the lengthy presentation of statistics for graduate programs. Because of this general lack of emphasis on undergraduate issues, the Committee is concerned that several problems are not being adequately addressed and may impair the development of undergraduate education in the Biological Sciences.

The undergraduate students informed the Committee that "many students" are unable to complete their degree requirements in four years (eight semesters) because required courses are not scheduled frequently enough, or are scheduled in conflict with other courses required for their degrees. The CO-OP coordinator indicated that this was also the case for Biology CO-OP students who must generally take at least one extra semester of course work because insufficient course offerings are available in the summer terms. It was estimated that only half of biology CO-OP students complete their CO-OP requirements; many drop out because they are unable to complete their program requirements in a timely manner. In order for CO-OP students to graduate on time, they must be able to attend school full time over at least one summer semester, and yet the Department of Biological Sciences offers relatively few courses in summer. A review of the course schedules for 1997 and 1998 exemplifies the difficulties that students face. Only half of the core courses, and very few of the courses required within specific program streams were offered in summer. Although there are problems of this sort in all of the program streams, the Plant Biology stream is particularly remiss. This stream has five required BISC courses, in contrast to two for the other streams. One of these was not offered at all over the six semesters in 1997-98, and two others, were offered only once. Clearly, it is nearly impossible for students in this program to complete their upper division requirements in two years.

Department officials seemed unaware of the problems that students have been encountering. They suggested that few students actually experience these difficulties, and that when they do it is because the students choose to work part time or full time during at least one school semester. (The students argued that they worked because they could not get the courses they need to graduate!) The faculty members also seemed ill informed about the processes of timetabling (during what hours and in what rooms the courses are taught) and scheduling (which courses are taught in which semesters), often stating that the timetabling was done by the registrar's office. In fact, the Chair schedules BISC courses on the recommendation of the Course Planning Group, and the Departmental laboratory coordinator constructs the timetable in consultation with the Chair. However, setting the timetable does also involve working within the constraints imposed by the limited availability of classroom space. There was also resistance to our suggestion that more courses could be offered in the summer semester because of a perception that enrollments are low in summer. However, a review of statistics for 1997-98 reveals an average class size of 67 for core courses and 60 for non-core courses offered in summer. For the core courses, this represents 43% of enrollment in comparable courses offered in the fall or spring semesters, but for non-core courses the comparable percentage is 115%: enrollments are higher in summer! Clearly the demand is there for summer courses.

- Recommendation #3: The Department should work to streamline the processes of course scheduling and timetabling. The schedule should provide access to the common core courses in at least two out of every three semesters, and the courses required for specific program streams should be offered in at least one semester every year, including a full schedule in the summer semester. The Department should pay particular attention to CO-OP students and students in the Honours program to ensure that they are able to complete their program and

course requirements in a timely manner. Revision of the Honours program requirements should be undertaken so that students can complete Honours programs within a normal four-year period. Through a combination of regular course scheduling, flexibility within streams and improved academic advising, all undergraduate students should be assured of being able to complete their degree requirements within four years (eight course semesters).

The Committee recognizes that the six upper division program streams have only recently been introduced. However, the design of the streams indicates little planning for a coherent undergraduate curriculum. Some streams reflect an organism bias (i.e. Plant Biology), while others focus on levels of organization (i.e. Cell and Molecular Biology, Ecology), or on particular biomes (Marine Biology). The distribution of students among streams is very uneven, and supports our view that the streams were designed to suit the research interests of faculty members rather than to meet student demand. Plant Biology again stands out, having more required BISC courses than any other program stream, but only three students enrolled, and a schedule of courses that is inadequate to allow students to complete their degrees in a timely manner.

Offering six streams at the undergraduate level has major resource implications for the Department because each stream includes a minimum of two required advanced laboratory courses (with the exception of the general biology stream). In total, 13 advanced laboratory courses must be offered every year just to satisfy the core requirements of these streams. To avoid conflicts and allow CO-OP students to take these courses, at least some must be offered in the summer semester, as well as in fall and spring. In addition to scheduling difficulties, offering this plethora of required laboratory courses strains Departmental resources with respect to space, technical assistance, supply budgets, teaching assistance, and faculty teaching loads.

- **Recommendation #4:** The Department should review the design of the undergraduate curriculum with the aim of reducing the number of streams and rationalizing the overall curriculum. The Committee supports the current scheme of a general core with upper division specialization, but recommends a maximum of three specialty program streams. Specialized courses from discontinued streams could continue to be offered according to demand as part of a general biology stream, or as options within other specialty streams. In designing the revised undergraduate curriculum, the Department should give due consideration to the long-term impact of the establishment of the new Department of Molecular Biology and Biochemistry, and to the potential inclusion of a program stream in environmental biology in collaboration with the new program in Environmental Science. In all revisions, primary consideration should be given to the academic/educational needs of the students rather than the research interests of the faculty. As an end result, a curriculum should be designed that can be efficiently and effectively offered given the current levels of technical/teaching support, laboratory teaching space, and faculty teaching loads.

Within the Biological Sciences Department, all students are required to take two laboratory or field courses at the 300-level, and two at the 400-level, in addition to the labs included in the core curriculum. To accommodate this, the Department offers many intermediate and advanced laboratory courses; at least 24, 300- and 400-level laboratory courses are listed in the current calendar. In addition, an average of eight students enroll in directed research projects each semester. This emphasis on practical, hands-on experience is a clear strength of the curriculum and should prepare the students well for employment or post-graduate research. However, in a strongly research-oriented department where tenure-stream faculty members have relatively low teaching loads, this emphasis on practical experience for undergraduates is possible only because of strong support from non-research staff and graduate teaching assistants. The Committee was impressed with the level of teaching support provided within the Department. This includes 5.5 Laboratory Instructors who teach in the labs and assist in course revision and design, as well as 4.5 laboratory technicians who prepare laboratory materials. Graduate teaching assistants lead tutorial sections, demonstrate in laboratory sections, and assist with grading. This high level of qualified, professional teaching support is clearly one of the strengths of the Department. However, the communication channels between the technical support staff and academics, which are necessary to co-ordinate such a major laboratory program, appear fragile. For instance, there seems to be a lack of advance planning and clarity in terms of what laboratory exercises are to be conducted in certain courses, and an inefficiency in the deployment of laboratory resources with respect to the timetabling of courses.

- **Recommendation #5:** Laboratory courses, and therefore technical assignments, must be set well in advance, schedules determined and content of laboratory exercises finalized, with no last minute changes. The laboratory program is large and complex, and the administration of it is not a simple matter. As such, we recommend that the laboratory coordinator be relieved of student advising duties so that full attention can be devoted to the smooth delivery of the laboratory courses. A obvious corollary is that the role of advising students must return to reside with faculty members.

The Department is large and the undergraduate program is extremely diverse. Under these conditions, undergraduate students rely on one-on-one or small-group interactions with faculty and staff. Such interactions provide students with a sense of identity, and provide a much-needed source of advice and guidance through the complex curriculum. The Department recognizes this need and has several programs in place to foster close contact with the undergraduate students. Small-group tutorials have long been a feature of the undergraduate courses and seem to be greatly appreciated by the students. Given the complexity of the undergraduate curriculum and the constraints implied by integration with the CO-OP Program, undergraduate students in Biological Sciences also require regular contact with an undergraduate advisor. The current system of advising seems inadequate. At present, due to recent faculty retirements, the laboratory coordinator is doing all of the advising although he does not teach in the curriculum and is not a member of the Departmental undergraduate curriculum committee or the course planning group. As such, the knowledge and insights to be gained from discussions with

students and from timetabling activities are not necessarily available to the academic faculty members making decisions about curriculum and scheduling, and vice versa. Shortcomings in this advising process may be responsible for failure of students to complete their degree programs in the prescribed time. Furthermore, a lack of appropriate feedback between the advisor and the faculty committees may perpetuate inefficient curricula and schedules.

- Recommendation #6: The Department should establish a group of faculty advisors for formal advising of students concerning the undergraduate curriculum. These advisors will provide formal authority for student transfers into programs, course changes, etc., and will interface with mentors to provide general advice on curriculum. All students should be required to consult with an advisor prior to registering in a Majors or Honours Program in the Department. Students should see an advisor to receive detailed information about program choices and course selections early in their second year so that they can plan their final two years to efficiently complete their course requirements.

More general advice is provided by the newly instituted "mentorship" system, which assigns a faculty mentor to meet with each program student once or twice per year for informal guidance. Students spoke highly of this program, and the Department should be encouraged to continue and expand it. General advertising of the mentorship program as well as improved communication with individual students to advise them of their mentor assignment are essential to ensure that all students are able to take advantage of the opportunity of interacting with a mentor.

- Recommendation #7: The Department should maintain and strengthen the faculty mentoring program. Faculty members should be encouraged to participate and should be provided with the necessary information for informal (i.e. non-signing authority) advising concerning the undergraduate programs, courses, etc.

The Committee detected a considerable disparity of opinion concerning the potential impact of the new Department of Molecular Biology and Biochemistry on undergraduate programs within the Department of Biological Sciences. Some faculty members and research groups were of the opinion that there would be no effect whatsoever; the Cell and Molecular Biology stream in Biological Sciences would remain unchanged, and students wishing to study molecular and cell biology would continue to enroll in Biological Sciences. Other faculty members predicted that all research and teaching in cell and molecular biology would soon be transferred to the new department, leaving the present Department of Biological Sciences essentially as a Department of "whole organism" biology and ecology. Still others assumed that cell biology would remain in Biological Sciences but that molecular biology would be split between the two departments. To further confuse the issue, the Self-Study Report states that, at a Departmental retreat in February 1998, "there was near unanimous agreement that division into smaller departments would be counterproductive." During the course of our visit to the Department, we were unable to discern any actual plan for dealing with the emergence of the new department, nor any consensus about the final structure of the

Department of Biological Sciences. Will it be feasible or even desirable to maintain a stream in Cell and Molecular Biology within the Department of Biological Sciences? If so, will molecular biology continue to be offered as a joint program between departments, or will separate programs evolve within each department?

- Recommendation #8: The Department of Biological Sciences should give careful consideration to the effect that the establishment of the new Department of Molecular Biology and Biochemistry will have on its own teaching and research activities in this area. It should work closely with the new department to develop a formal, long-term plan for co-ordination of curriculum and teaching resources to avoid duplication of courses and programs.

GRADUATE PROGRAMS AND RESEARCH

The Committee judged the quality of graduate education offered at Simon Fraser University to be of a high standard. This impression was reinforced by our discussions with graduate students. We found them to be generally well satisfied with their graduate studies although some specific concerns were raised which will be addressed later in the report. At the outset of the review, both the quality and number of graduate students in the Department, were "flagged" as areas on which the Committee might wish to comment. A graduate student population of about 140 students for 45 faculty members is well in line with what might be found at other research intensive universities. This is especially true in biological sciences departments that have strong ecological programs such as that at Simon Fraser University, since numbers of graduate students per faculty member in ecology tend to be higher than in other areas of the discipline.

The Committee understands that the vagaries of provincial government funding formulae in British Columbia mean that there are no financial rewards associated with having increased graduate student numbers. Furthermore, the numbers of graduate students per faculty member may be higher in Biological Sciences than in other Departments in the Faculty of Science. However, these factors do not take away from the basic finding that the numbers of graduate students are not unusually high. Furthermore, the Departmental policy of requiring guaranteed funding for all graduate students puts a practical limit on the numbers of students accepted and helps ensure that the quality of students remains high. The proportion of graduate students holding scholarships that provide the majority of their financial support averages about 30%, which seems quite in line with what would be expected for a University of this size and situation (proximity to UBC). In this regard, the Dean of Graduate Studies is to be commended for taking aggressive measures to ensure that external scholarship levels are topped up to keep them competitive with those being offered by UBC. Despite the availability of these measures, the Department of Biological Sciences has been slow to take advantage of these top-up funds to attract scholarship holders. In part, this is because some of the Department's stronger researchers have no trouble attracting as many scholarship students as they can supervise, and so recruitment bonuses are not necessary. However, the numbers (30% major scholarship holders) indicate that this cannot generally be the case, and regardless, the graduate student scholarship holders could no doubt put these extra funds to good use.

- Recommendation #9: The Department, through the Graduate Scholarships Committee, should be more aggressive in pursuing graduate students who hold major scholarships and should ensure that eligible scholarship holders are aware of the availability of top-up funds.

Scholarly activity within the Department, as reflected through the usual means of peer reviewed publications, presentations, external grant support, etc., is on the whole, very good. The Department as currently structured would rank very well against other Biology/Biological Science Departments across the country. As with all departments there are some individuals whose productivity falls below the norm. However, a number of the individuals who fall into this category will reach retirement age in the near future. As such, with appropriate hiring the overall research productivity of the Department should remain strong in the coming years.

As is common in all universities, faculty members come under ever increasing pressure to participate fully in the research, teaching, and administration activities of the University. This can result in inequities in workload among faculty members because of the variable success rates that they achieve in their research activities. There is a danger that the most active researchers can end up being "rewarded" for their success by carrying the lion's share of duties related to graduate student supervision, undergraduate student project supervision, and management of large externally funded research programs, with no compensating reduction in formal teaching assignments. The Committee recognizes that the Department's 3-year plan dated Nov. 29, 1997 states "faculty whose research programs are no longer productive should expect to assume a greater teaching and service load until their research programs are revitalized". Furthermore, the University as a whole has just adopted a new policy, A30.03 Tenure-Track Faculty Workload Policy, which specifically reinforces this principle. However, the current practice in the Department of Biological Sciences is that all faculty members have almost equivalent formal teaching loads regardless of their activities in other areas. While efforts are underway to move in the direction of equitable workloads rather than equal teaching loads, this is apparently meeting with stiff resistance from some of the faculty members affected.

- Recommendation #10: The Committee supports the efforts being made by the Department to adjust work loads appropriately by assigning increased teaching and service duties to individuals whose research programs have become inactive, as judged by a lack of quantifiable evidence of productivity, lack of external grant support, graduate student supervision and directed research project student supervision. The Chair with the support of the Dean should take decisive action in this regard.

The numbers of required courses for graduate programs in the Department, as specified by the University/Faculty, seem on the high end of normal for graduate programs in Canada. In Biological Sciences, in particular, this situation is exacerbated by the existence of one, and soon to be two, course based Masters programs that have even

heavier course load requirements. The conventional Masters program requires a minimum of four graduate courses, the Ph. D., a minimum of three graduate courses, while the professional Masters programs specify a minimum of ten graduate courses. Graduate students find it a burden fulfilling the course requirements of their programs because of the few graduate courses of relevance to their programs that are offered regularly. Graduate course offerings relevant to the professional Masters programs are quite specifically directed to students of those programs, and so are of little use to the general graduate student population. However, they do tax the teaching resources of the Department, and mean that few broadly based and more widely accessible graduate courses can be offered. As a result some students appear to have been forced to take courses with little or no relevance to their studies, leading them to question whether they were taking "courses for courses sake".

- Recommendation #11: The Department should take steps to alleviate the problems being encountered by graduate students as they try to fulfill the course requirements of their programs by making more graduate course offerings available. These graduate courses should not necessarily be specialty content courses, unless student numbers warrant. Rather the Department should offer a small number of general interest graduate courses. As an example, a graduate seminar course (or small number of seminar courses) could be offered in which all graduate students participate for each year that they are in the program. The course should emphasize seminar presentations by the graduate students with an audience of both graduate students and faculty, and should be graded with feedback and evaluation provided by the academic staff. The Department could also consider introducing a 'core' course for graduate students which could stress scientific writing, development of graduate research proposals, preparation of grant proposals, preparation of poster presentations, slides etc. Additional graduate course offerings could be designed as special topics courses involving discussion of subjects reflecting the research programs of small groups of academics. These special topics courses would provide a useful means to introduce graduate students to the research being conducted by other staff members in the Department, an area which graduate students felt they had little appreciation of, at present.

Another area of concern identified by graduate students relates to issues of communication of information, and these concerns were echoed by other groups of Department members as well. In an example specific to graduate students, they felt that opportunities for scholarships were being missed because of insufficient notice of competition deadlines and inadequacies in the application process. They also felt that incomplete, lost or late applications were jeopardizing their ability to compete successfully for these scholarships. In part, this may reflect the increasingly diverse workload of the office staff responsible for graduate student scholarship applications and so it may be necessary to adjust job assignments to put greater resources in support of this activity. A second area of potential concern for graduate students was that, when disputes

arise between students and supervisors or others, appropriate means for conflict resolution are not well understood.

- Recommendation #12: The Department should deal with the various issues relating to communication with graduate students by preparing a graduate student handbook outlining Departmental policies or procedures and covering issues such as funding levels for students, scholarship opportunities and application procedures, and conflict resolution procedures. If resources permit, a Departmental newsletter would also improve communication throughout the Department as a whole.

The present and future commitment of the Department to professional course based Masters programs also needs to be revisited, and if upheld, it needs to be recognized as a commitment requiring resources. The Department already appears to be experiencing difficulties in delivering sufficient numbers of courses at both the undergraduate and graduate level with adequate frequency to meet student needs. The course based Masters programs add to this burden. The need to service these programs will also require a Departmental commitment to appropriate academic hiring in coming years. This need may be difficult to balance against the current "research excellence above all" approach to hiring. While the existing complement of academic staff may insist that they can offer the required courses with no additional burden on the Department, it follows that there must be an ongoing commitment to replace all academic vacancies associated with these programs with new, full time faculty members who can teach the necessary courses. If a decision is taken to continue these professional Master's programs, then the Department must follow through by providing operating and academic resources to make this possible. In terms of hiring new academic staff, it may mean that the current practice of letting the Department as a whole set priorities for hiring will be unworkable unless there is clear support from the majority for maintenance of these programs.

SUMMARY

In closing, the Review Committee would like to restate our overall finding, that the Department of Biological Sciences is doing a good job in all three of its main areas of endeavour, research, undergraduate and graduate education. A review, almost by definition, focuses on problems and areas of concern, and so this report necessarily draws attention to changes that we believe could strengthen the Department. However, we do not want to leave a mistaken impression that we found a problem-plagued Department. In contrast, Committee Members came into this review process with a high opinion of the quality of the Department, and our experiences during the course of the three-day review served only to reinforce that impression.

SUMMARY OF RECOMMENDATIONS

1. The administrative structure of the Department should be streamlined to remove some of the final decision-making authority from committees, and restore it to the Chair.
2. The Chair and Dean should examine carefully the rationale for the hiring plans put forward by the Department because the need to obtain majority approval from faculty members could impede hiring in areas of critical importance to the Department.
3. The Department should work to streamline course scheduling and timetabling to ensure that all undergraduate students are able to complete their degree requirements within four years (eight course semesters).
4. The Department should review the design of the undergraduate curriculum with the aim of reducing the number of streams to three, and rationalizing the overall curriculum.
5. Laboratory courses should be scheduled, and the content of laboratory exercises should be established, well in advance of the courses being offered.
6. The Department should establish a group of faculty advisors for formal advising of students concerning the undergraduate curriculum.
7. The Department should maintain and strengthen the faculty mentoring program.
8. The Department should work closely with the new Department of Molecular Biology and Biochemistry to coordinate teaching efforts and avoid duplication of courses and programs.
9. The Department should be more aggressive in pursuing graduate students who hold major scholarships and should ensure that all of their eligible scholarship holders are aware of the availability of top-up funds.
10. The Department should proceed with its plans to adjust workloads appropriately by assigning increased teaching and service duties to individuals whose research programs have become inactive.
11. The Department should offer more general interest graduate courses to alleviate the problems being encountered by graduate students as they try to fulfill the requirements of their programs.
12. The Department should deal with the various issues relating to communication with graduate students by preparing a graduate student handbook.