

REPORT ON DIVISION OF BIOLOGICAL SCIENCES

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The minutes of the first meeting of the Biological Sciences Advisory Committee read:

"Biology is due for a review in depth this year, and the Chairman suggested that we might do well to move up MB&B a year so as to consider the two contemporaneously - particularly because of the bearing which both departments have on the broad question of how to organize University Biological Sciences. He described the August visit of Harvard's President with his Medical and Graduate School Deans to discuss this subject, a meeting from which he concluded that things in Cambridge are in worse shape than here in New Haven. It was suggested that this was not only a suitable time for MB&B review, but that it would also be well to cover Forestry as well along with Biology because of the Ecology question. It was felt that the prompt review of that School is in order since a new Dean will be named in the near future."

The Committee was soon convinced that both the Department of Biology and the Department of Molecular Biophysics and Biochemistry were excellent in the sense that as undergraduate and graduate departments they stand well in comparison with the corresponding departments at other competitor universities. However, problems do exist; and this report is based on a further seventeen meetings devoted to unravelling their complexities.

The members of the Committee are Professors: Knox Chandler, Physiology; Marilyn Farquhar, Cell Biology; Dorothy Horstmann, Epidemiology and Public Health; Clem Markert, Biology; Richard Miller, Forestry; Lubert Stryer, MB&B, Ian Sussex, Biology. The Committee interviewed all members of the faculty in the Department of Biology and in the Department of Molecular Biophysics and Biochemistry (except those members on sabbatical, or other prolonged, leave of absence), as well as interviewing some Postdoctoral Fellows and Graduate Students. Most of this report concerns first identifying the problems. Secondly, possible solutions are discussed. Finally, where possible, specific recommendations are made.

Areas of Concern

Several areas of concern were quickly identified, and are discussed separately below. However, it must be borne in mind that most of them are inter-related. These problems are:

(1) The Department of Biology cannot cover its field adequately with the present number of slots.

(2) Partly as a result of this, the Department of Biology is concerned about the amount of undergraduate teaching their faculty members (and Teaching Assistant graduate students) have

to do, about the fact that there are serious omissions from their undergraduate offering, and about the fact that some of the teaching traditionally undertaken by the Department of Biology, namely the area of biochemistry, is now being undertaken by the Department of Molecular Biophysics and Biochemistry.

(3) The Department of Biology has a problem in defining the role of Ecology within the Department. Opinions on its proper role vary considerably. Ecology is also a concern of the School of Forestry and Environmental Sciences.

(4) The Department of Molecular Biophysics and Biochemistry have concerns about the future of their young non-tenured Professors - will any tenured slots become available for them?

(5) Within the Department of Molecular Biophysics and Biochemistry the question of the academic and administrative responsibilities of senior members of the faculty is frequently raised as a problem by the junior non-tenured members.

(6) Related to the just described area of concern is the question of selection of the next Chairman of the Department of Molecular Biophysics and Biochemistry.

(7) Finally, there is general concern over the future of various graduate programs in the Division of Biological Sciences.

I. The Major Problem in Biology

The major problem in the Division is in the Department of Biology; and this problem, as it appears to the Biologists, was early brought to the Committee by Professor Goldsmith. He voiced his and the Department of Biology's concern over the ten or fifteen years of unrelated administrative decisions which lead to a dispersion of resources of the Division of Biological Sciences away from the Department of Biology; resulted in the creation of a Department of Molecular Biophysics and Biochemistry; gave the School of Forestry and Environmental Sciences (via the Gastler bequest) a central stake in Ecology; and, by establishing a Department of Human Genetics and a Section of Cell Biology in the School of Medicine, required the re-organization of many of Biology's graduate programs as well as raising (in Biology's view) interface difficulties between FAS supported and Medical School supported faculty. Where the erosion of Ecology at Yale may have stemmed from inbreeding caused by earlier tenure decisions, the splitting of resources referred to above made it impossible either to organize a graduate program or to attract a critical mass of faculty in this vital area of Biology. The decision to turn over the teaching of biochemistry to the Department of Molecular Biophysics and Biochemistry, legitimized by the Biological Sciences Advisory Committee five years ago, was (according to Professor Goldsmith) a demoralizing action - a theme to which Professor Goldsmith returned time and time again.

Furthermore, not only has Biology lost ground to surrounding Departments, but in addition, the present number of teaching slots is inadequate: undergraduate enrollment has risen (faster than in the other Divisions of the University) at a time when the financial crunch and the Summer Program have reduced the number of Faculty available to do the teaching.

The major issue clearly centers on the belief of the Department of Biology that it should be an umbrella department encompassing all areas of biology, tolerating activity in these areas in other departments only as far as they do not interfere with the thrust within the Department of Biology itself. This view is almost diametrically opposed to that held elsewhere (specifically by most departments in the Medical School and by Molecular Biophysics and Biochemistry), namely that departments should be small enough to be easily administered and need not encompass the whole field.

Holding this belief as it does, the Department of Biology, not surprisingly, disapproves of the very existence of the Department of Molecular Biophysics and Biochemistry. It is wrong, almost wicked, the Department of Biology asserts, that it has had to yield to an outside department the teaching of biochemistry, a field central to modern Biology. When asked why they have not fostered biochemistry within the Department of Biology, the standard reply of the Biologists is that they had been warned by the Biological Sciences Advisory Committee (!) and by the Provost (?) that such appointments would not be looked on favorably. This argument might be more compelling (at least for some members of the Committee) had the alleged ban of the teaching of biochemistry within the Department of Biology been put to the test (specifically by the attempted appointment of an appropriate biochemist of high quality) rather than leaving the argument, as it is now, at a hypothetical level.

However, it seems clear (to the Director anyway) that the problem is probably more general than a specific concern for biochemistry. Given that a department feels on philosophical grounds it has to teach everything conceivably related to the field, given that a department has only so many slots, clearly some area must get short shrift. There has to be competition among the different areas for the limited support; and this in turn engenders an insecurity, a defensiveness, a sectionalism, etc. Indeed, interviews with the various members of the departments indicate that the Department is not a single, happy, coherent unit. Rather, as Professor Margaret Bryan Davis has put it, Biology "is a department with four tracks of warring interest groups." While this latter view is probably somewhat extreme, the philosophy of an umbrella department must necessarily lead to intense competition amongst the various subgroups in the area. The going of the teaching of biochemistry to Molecular Biophysics and Biochemistry ten years ago could well be looked on as a relief of pressure. This seems to be borne out by the fact that none of the Biologists, when asked, have disagreed

with the idea that the problem in Biology would be solved by the provision of a few more slots. No one (to date anyway) has suggested that there is anything wrong in principle with biochemistry being taught in another department - provided it is not being taught to Biology Majors.

11. The Extent of the Teaching Commitment and the Number of Slots

The extent to which the two FAS departments apparently have to teach is also of concern to the Department of Biology. There is a conflict that arises because the University has created two departments with a substantial overlap in teaching role. The conflict is compounded by the fact that one department (Molecular Biophysics and Biochemistry) is (allegedly) more involved in graduate teaching and research than in undergraduate teaching. This leads to a schizophrenic attitude by the Biologists. On the one hand they complain that members of Molecular Biophysics and Biochemistry do not do nearly enough undergraduate teaching; on the other hand, when Molecular Biophysics and Biochemistry do offer biochemistry courses (and ones that are extremely popular) the Biologists cry: "Not fair, that's our bailiwick." The concern is not over the quality of the biochemistry teaching given to the Biology majors. Rather, it concerns the lack of their control over the content of a subject that they feel to be critical for fundamental biological teaching of a Biology major.

There seems little doubt that the number of undergraduate lectures given by the Biology Department is greater than that given by the Department of Molecular Biophysics and Biochemistry. But should the teaching load of all departments be exactly equal? And how does one measure teaching load? If faculty member A decides that his area should be given in two courses where one was given before, should every faculty member throughout the Division double up too? Is the academic necessity for a given lecture course in Biology always be clearly identified? Needless to say, no unanimous answers to these questions emerged in our discussions.

Possible Solutions to the Problems in Biology

Several possible solutions to the two related problems outlined above in the Department of Biology have been discussed by the Committee. These are:

- (i) The status quo can be maintained. This has the advantage of minimal administrative inconvenience as well as leading to little or no interference with the activities of individuals outside the Department of Biology. The disadvantage of this solution is that it does not tackle a serious problem that does exist in the Department of Biology. Rather, ostrich-like, one would be hoping that it would go away.

(ii) The clock can be set back nine years. In other words, the situation that pertained before the setting of the Department of Molecular Biophysics and Biochemistry can be restored. The main difficulty with this solution is that it is not clear what to do with most, if not all, of the present members of Molecular Biophysics and Biochemistry. They could not under this plan be returned to and assimilated into the Department of Biology since none of them belonged to this department in the first place. It seems important to recognize that the act of forming the new Department of Molecular Biophysics and Biochemistry was not the immediate mechanism whereby the Department of Biology lost its biochemists. The biochemists in the Department of Biology were lost several years after formation of the Department of Molecular Biophysics and Biochemistry - by retirement or by resignation. It was at this much later time that the Department of Biology felt unable to replace them with other biochemists because of the University sanction (which they perceived) against such appointments, and because the slots were needed to fill gaps elsewhere in the Department.

(iii). Various components of the Division of Biological Sciences can be fused into a larger, more coherent unit. This has been the most discussed possibility, involving several of our Committee sessions and as well as many individual conversations with faculty members. There are four variants of this plan which ought to be considered separately.

The first variant is that originally suggested by the Chairman of the Biology Department, namely that all the present components of the Division of Biological Sciences (specifically, the Department of Biology, the Department of Molecular Biophysics and Biochemistry, the Department of Physiology, the Department of Pharmacology, the two Sections of Cell Biology, and parts of the Department of Human Genetics and of the Department of Epidemiology and Public Health) should be fused. This would mean that the Department would probably consist of over 100 full-time faculty members. Several tracks, streams, sections would exist within this Division to make it administratively more feasible. These Sections would be formed from groups of individuals of similar research and teaching interests. In the plan suggested by Professor Goldsmith (See Appendix A) five such sections might be: (1) Molecular Structure and Function (essentially Biochemistry); (2) Molecular Genetics; (3) Cell Biology; (4) Organs (essentially Neurobiology and Behavior); (5) Organisms (Evolution and Ecology). These groups would each consist of about 20 individuals and would function more-or-less independently except for budgetary matters and appointments. The latter would be solely in the hands of the Departmental Chairman, who would presumably be advised by the Heads of the Sections. The advantages for such a plan are: First, it would give a unity (at least on paper) where none exists at the moment. Secondly, it would allow the biological sciences to make decisions and move in directions that were in the best interests of the biological sciences as a whole and not just

-serving parochial departmental interests. Thirdly, the grouping into sections recognizes the natural divisions within the biological sciences as far as Postdoctoral training is concerned. The sections could, therefore, serve as foci for the various interdepartmental Graduate School programs referred to elsewhere.

The disadvantages of this scheme are equally obvious. First, the Chairman of such a department would clearly be extremely powerful, with the ability to set the direction taken by the whole area of the biological sciences at Yale. Whereas this was listed above as an advantage, it can also be a disadvantage. Thus, concerning its Chairman the question has repeatedly been asked: Where can we find such a wise man? Most senior biologists consulted outside the Department of Biology feel that the answer to this is: "Nowhere" - perhaps reflecting their senior wisdom or perhaps their parochial interests. The second disadvantage is the sheer size of the unit. It was pointed out that two universities recently established Divisions of Biological Sciences: Brown University and the University of La Jolla. According to our spies, the division in La Jolla is a shambles; and after trying the experiment for a few years, because of severe administrative problems, Brown discontinued it and returned to a conventional departmental organization. Finally, there is a difficulty inherent in any merger between a Medical School department (with its 11-month year, soft money salary support, and requirement to remain competitive with other medical schools) and a purely FAS department (with its 9-month year, totally hard salary support, and its requirement to remain competitive with corresponding departments of Biology in other institutions).

A second variant of the total fusion plan that would meet some of the objectives above is that not all elements of the Medical School be integrated into the new Division. If Physiology, Pharmacology and Human Genetics were dropped from it, the faculty in the proposed Division of Biological Sciences would fall to about 60 individuals, certainly a more manageable number (Appendix B). The disadvantage of this scheme is that it splits the Basic Sciences departments of the Medical School. And the problem of the differing financial basis of the Medical School and FAS would remain.

A third variant is that none of the Medical School components be included, so that the Division would be formed solely of the two FAS Departments of Biology and Molecular Biophysics and Biochemistry. This has the advantage of further decreasing the numbers in the Division. It also recognizes the difficulty mentioned above in combining Medical School and FAS departments stemming from their different financial and academic structures.

A fourth variant is that the Department of Biology fuse with only that part of Molecular Biophysics and Biochemistry that is

biochemically and biologically oriented. Five individuals in the Department were provisionally identified as belonging to this group (SBl1, Morowitz, Garen, Lengyel, J. Steitz).

Almost any of these variants of the fusion plan is acceptable to most of the Biologists. Some strongly prefer the first plan of an integrated division of all the biologists at Yale, sheer size being no objection. Brown's experiment failed (it is argued) not because its comprehensive Division of Biology was too big to manage, but rather on the contrary because it was not big enough. On the other hand, outside the Department of Biology there is virtually no strong support for any of the fusion proposals. This is not to say that the problems in the Department of Biology have gone unrecognized on the outside. Rather, the most frequently expressed opinion is: Granted that the Department of Biology has a serious problem, why wreck existing departments of proven excellence to cure the internal problems of another department - especially when it is not at all clear that the cure will take? If there is already some degree of unpleasant jostling among the existing groups in the Department of Biology, is an increase in number (of both groups and individuals) going to dissipate this and promote peace?

(iv). A fourth solution, in which the Department of Biology remains as a separate identifiable unit of the Division of Biological Sciences, has two variants.

The first variant, which I believe to be impractical to say the least, is that the Department takes the number of slots it currently has (35 1/2) and totally restructure itself over the next ten years by refusing to promote, by encouraging 'turn-over', by insistence on impeccable standards of excellence in appointments, by replacing resignations and retirements in such a way as to obtain the optimal thrust in Biology, so that at the end of the ten year period the whole structure of the Department would have been radically changed, with all dead wood and dead fields appropriately disposed of. In this scheme, if biochemistry teaching really is so vital to the teaching of Biology, clearly many biochemists will be hired - but at the expense of other fields. However, this plan would take a long time to implement. And it is not clear that the number of faculty currently available to Biology is sufficient; nor whether a "gardener" to do the pruning would be available.

The second variant of the plan would be to accede to Professor Goldsmith's request in his letter to the Provost of October 29th. In this letter Professor Goldsmith asks that in the coming year the Department of Biology be allocated five positions (4 tenure and 1 non-tenure). Of these positions only two are incremental since three tenured positions are already available (Boell, Davis, and, in 1977, Merriman). The advantage of such a move would be that it would certainly relieve the competitive pressures within the Department of Biology, coping with both the department's biochemical and ecological problems. This plan is the one that makes most sense to the Committee. The

disadvantage is that it brings no guarantee that the pressure will not be at the dangerous level again, in another five years say.

However, there is a resurgence of interest in the Biological Sciences amongst the undergraduates of Yale College, partly but certainly not entirely reflecting their egregiously large registration as "pre-meds." Since 1968, the total enrollment in courses in Biology has nearly doubled; the number of majors in this field has increased nearly five-fold, doubling during the last three years. The conclusion to the Committee seems inescapable: either the Department of Biology 'had it soft' before (which seems a priori unlikely and, anyway, no evidence has so far been adduced to suggest this), or some adjustment in the number of faculty assigned to the Department must be made. The alternative is for the Department to wilt under an excessive load, its dissatisfaction being a cancerous sore of discontent in the Division of Biological Sciences.

(v) The final possibility is, of course, that there is some other solution about which we have not yet thought (See Appendix C).

General Discussion and Recommendations Concerning the Department of Biology

It is difficult to give a single unified recommendation of the Committee because: the problems are not simple; and a central question is essentially philosophical (namely whether a department should be large or small, limited or comprehensive in scope), and is one to which there is no unique, simple answer based solely on logic. Nevertheless, the Committee feels that prompt action by the University is required. The Committee rejects recommending doing nothing. It also rejects recommending a Departmental reorganization (though at least one member of the Committee (including the Director) feel that the *raison d'être* of the Department of Molecular Biophysics and Biochemistry is well established. It stands well in relation to its competitors at other institutions where similar departments exist (Harvard, Stanford, Berkeley, Princeton).

In the light of the above, therefore, the Committee unanimously, and strongly, recommends that more slots be made available to Biology in the coming year (specifically 2 incremental appointments, 1 tenured and 1 non-tenured) in addition to the three replacement tenured slots (for Davis, Boell and Merriman). Furthermore, the Committee recommends that the Department of Biology be strongly encouraged to put its house in order, to determine the areas in which it wants to put its slots, and put them there. Strong leadership by the Chairman, and great wisdom on the part of the departmental search committees, are clearly essential for ensuring both the excellence of the candidates and the relevance of their areas of expertise to Biology.

The Next Chairman of Biology

Professor Goldsmith's term as Chairman ends in 1977, and it is perhaps premature to raise the question of his successor at this time. However, a special situation now exists, which the University may well wish to take advantage of. Normally the expectation in favor of an internal appointment is strong - because of the individuals who are already on the spot, and because of financial pressures. The Committee is by no means recommending an external appointment. However, the fact that so many senior appointments in Biology are now turning over at least raises the possibility of looking outside for an individual: who because of his excellence would further enhance the thrust in the Department; who, being a stranger, would not already have been 'assigned' to any departmental faction; and who might in consequence be better able to foster a spirit of co-operation between the two FAS departments. Whereas Professor Goldsmith cannot be blamed as the sole (or even major) cause of the present unhappy situation, there is no doubt in the Director's mind (nor in those of many of the other Committee members) that he has to some extent contributed to it. Professor Hutchinson is not blameless either. The next Chairmen of both departments have to be able to work with each other in an amicable way. The Committee recognizes that the University has a very difficult (? impossible) task in selection of the next Chairman of Biology. Clearly, a strong leader of great scientific excellence is required: it would be monstrous if either he or if any of the impending new appointments in Biology, particularly those in biochemical areas, were of a quality less than that of excellent junior people in Molecular Biophysics and Biochemistry (specifically Moore and Engelman) who may well have to leave because the Committee is unable to recommend tenure appointments at this time for them. Whereas the new Chairman may be appointed too late to influence all of the appointments, some must be expected to be still vacant at the time of his appointment so that he can provide the appropriate leadership. Anyway, even before his official appointment the new Chairman, once designated, ought to be able to influence the direction of the Department.

The difficulties normally operating against making an external appointment are: a pre-existing unified and happy department; all areas in the field being already filled with excellent individuals; an absence of slots both for the incoming Chairman and for any crucial outside appointments that he might want to make. These considerations do not apply at this particular time.

III. Ecology

Ecology seems to be a necessary component of any broad spectrum Department of Biology. Ecology, until 15 years ago, was the jewel in Biology's crown: now it feels abandoned. Considerable discussion with members of the Department, and with outside consultants, convinced the Committee that the erosion

of the strength of Ecology in the past few years must be reversed. This problem, furthermore, concerns not just the Department of Biology but also the School of Forestry. The problem, however, cannot be resolved by creating a single focus in Ecology, in the Biology Department for example. The missions of the Ecologists in the Department of Biology and those in the School of Forestry are quite different, although, naturally, a considerable degree of overlapping and cooperation must necessarily occur. Two separate groups in the two locations seem necessary. Cooperation between the two groups in course offerings, graduate student supervision and research would, of course, be strongly encouraged.

Recommendations

The Biological Sciences Advisory Committee has already outlined the problem and made a definite, and strong, recommendation concerning the School of Forestry. The letter to the President embodying its recommendation is appended to this report (Appendix D). The Committee remains concerned that with the appointment of the new Dean in the School of Forestry its recommendations were not followed. It is emboldened again to express strongly its recommendation by the fact that the University Council's Committee on the Biological Sciences apparently thinks similarly. We therefore recommend that:

- (1) Two slots in the School of Forestry and Environmental Sciences should be underwritten (until endowment funds can be raised by the School of Forestry) to provide support (even at a tenured level) for Mr. Bobkin and another Ecologist. These positions would be incremental.
- (2) A tenured faculty member in the Department of Biology should be appointed to replace Professor Margaret Bryan Davis, and in addition another senior appointment (preferably tenured) should be made. These positions would not necessarily be incremental.

These appointments would be of outstanding individuals, and the Committee has discussed possible candidates. One way that Yale could make clear its commitment to Ecology would be to appoint a high-level search committee for these two positions (and not leave it just to the Department of Biology, which is somewhat 'turned-off', having searched for Ecologists for the last three years). The Committee therefore further recommends that:

- (3) A search Committee with a high proportion of outside members be formed in the Ecology Search. Outside members of this committee might be Wilson and Lewontin at Harvard, and May at Princeton.

IV, V, VI. Problems in the Department of Molecular Biophysics and Biochemistry

The Department of Molecular Biophysics and Biochemistry has been extraordinary successful since its foundation nine years ago. It is nationally recognized, has an excellent graduate student program, and possesses first rate faculty. Many of its problems, however, stem from its recent birth.

First, as an infant, growing department, the Department did not appear to suffer the same cut-back in numbers during the recent financial crunch (although staying still under the circumstances could be regarded as a cut-back). As a result, it is viewed with jaundiced eyes by members of the Department of Biology. Why should Biology have been cut from 42 to 35 1/2 members when Molecular Biophysics and Biochemistry has not (apparently) been cut back at all - and may indeed have increased?

The second problem stems from the fact that having decided to form a department of reasonably young, bright, scientifically aggressive, individuals the University has ended up with a department where all the tenure faculty fall in a very narrow age-band. What then is the future of young non-tenure faculty members? Can Yale continue to provide more tenure slots for these young individuals? If not, does Yale really want to set the stage for a department whose future is "dying at the top"?

The third area of concern in the Department of Molecular Biophysics and Biochemistry, expressed more-or-less unanimously by the junior faculty, concerns the unwillingness (alleged) of the senior members of the Department faculty to undertake their administrative responsibilities. Difficulties in finding a Director of Graduate Studies and a Chairman were cited in nearly all the letters from the junior faculty members. Surprisingly (?), the tenured members of the Department professed themselves to be largely unaware of any such problem.

The next Chairman

The next Chairman of the Department of Molecular Biophysics and Biochemistry could be: (i) the present Chairman; (ii) another faculty member from the Department; (iii) a faculty member from another department; (iv) an external appointee. Whoever is chosen must be able to foster a spirit of cooperation with Biology.

Possibility (i) seems excluded by the expressed wish of Dr. Hutchinson not to be re-appointed. Furthermore, there is a feeling in both FAS departments involved that such a re-appointment would tend to exacerbate the tension between them. Possibility (iv) would appear unjustifiable in view of the existing strength of the Department, would not ameliorate the problem of top-heaviness, and anyway would be costly. Possibility (iii), brought to us by a faculty member of Molecular Biophysics and Biochemistry, is that a Biologist be appointed as Chairman of Molecular Biophysics and Biochemistry, and that next year the

honors be reversed: specifically, Gall, from Biology, was nominated for the next Chairman of Molecular Biophysics and Biochemistry and Lengyel, from Molecular Biophysics and Biochemistry, as the future Chairman of Biology. This is an interesting possibility. An alternative suggestion, to meet the same point of fostering interdepartmental understanding, is that the two Chairmen be given "ex-officio" joint appointments, so allowing each department some input to, and information about, the affairs of the other.

Finally, an internal appointment (Possibility (ii)) may be made; and this seems to make most sense to the Committee. During the interviewing process most of the faculty were sounded on their views on a future Chairman. Clearly, important qualifications are candor, ability to avoid polarization of groups, and the respect of the department, particularly of its junior members. The overwhelming consensus of the department was in favor of Coleman. Morowitz was suggested frequently. Stryer was also frequently suggested as the 'man of choice', being disqualified only by the fact that for some time now Stanford has been trying to persuade him to leave Yale.

Recommendations

We have three recommendations concerning the Department of Molecular Biophysics and Biochemistry:

- (1) Since so many members of the Department (rightly or wrongly) feel that the senior members have not been pulling their weight, the Committee recommends that the President explain to the tenured faculty members of the Department (or, perhaps better, to all tenured faculty members in general) what the responsibilities of tenured Professors are. The overriding presumption must surely be that when such a tenured faculty member is asked to do one of these jobs which has a limited term (DGS, Chairman, Director of Division) he or she must accept unless there is some overwhelming (and good) reason for not doing so.
- (2) The consensus of the Department was clear in favor of Coleman as the next Chairman. I would certainly agree with this view; and I think the Committee would too. Lengyel, Morowitz and Stryer would all be excellent too.
- (3) In the light of the discussion concerning more slots in the Department of Biology, the Committee feels unable to recommend the allocation of 2 tenured slots for Moore and Engelman. This decision in no way reflects a lack of excellence of these individuals, who are generally recognized to be of the highest quality. Rather, it seems that the present distribution of slots within the Division does not warrant the requested increase.

VII. Doctoral Programs

Intellectually, it is becoming more and more difficult to defend the idea that Ph.D. programs should always be run along department lines. It is convenient, however, to administer them in this way. And the existence of departmental programs seems to contribute to the concept of departmental independence. However, most of the money supporting graduate training programs does not come from the departments per se: it comes from the Graduate School, or from NIH from whom currently the pressure is strong to mount interdisciplinary programs. Since the areas circumscribing any particular facet of Biology are extremely tenuous (with everyone working in everyone else's field), the theoretical case for interdepartmental graduate programs seems strong. Such programs need not, and ought not, weaken the departments. Indeed, letting new interdisciplinary programs lead to the setting up of new departments would be self-defeating. The form of such programs can vary considerably depending on what the faculty concerned think best. One example is the 'federation' of programs in Cell Biology. Different formats may (or may not) be more appropriate for other areas (for example, in Neurobiology, Immunobiology, Endocrinology). A flexible approach would seem essential. The directors of such programs (who would, of course, belong to one of the Departments) would be responsible to the Dean of the Graduate School, rather than to a departmental Chairman. The need for such programs, and the designation of the areas, must clearly first be established by the faculty concerned. If after consideration such a program were to come into existence, it would be the responsibility of the DGS (and his Executive Committee) to produce a coherent program acceptable to the Graduate School, together with a brochure succinctly describing it for distribution to prospective graduate students. This group would also be responsible for seeking training grants for support of the program. The Committee recognizes that there are difficulties, even dangers, in setting up any interdisciplinary non-departmental program; and it cautions against basing decisions on the availability of Federal funds in a particular area at a particular time. Nevertheless, the Committee feels that these are not insoluble problems. These problems, and other questions such as the mechanism of admission of the students, the question of their reverting to the departmental programs after starting on an interdisciplinary track, the question of remuneration, the question of their teaching requirements, etc., clearly need settling by some specifically charged committee.

The Biological Sciences Advisory Committee recommends that the Dean of the Graduate School form such a committee. The general charge to this committee would be to determine if there are indeed areas that substantial groups of faculty feel to warrant the setting up of interdisciplinary graduate training programs. When such areas are identified, the committee would encourage the appropriate faculty group to submit specific proposals for such programs to the Graduate School for consideration. Neurobiology seems to be one area for early exploration.

In the above report the major problems perceived, and discussed, by the Committee are set out. Various other problems were brought to the Committee's attention, but not discussed in any detail. These are listed below so that the University is at least aware of them.

1. There is a problem in Molecular Biophysics and Biochemistry arising from the medical disability of one of its tenure faculty members. Professor Gaston Schmir is unfortunately afflicted with Parkinson's Disease which has meant that he is unable to participate in the more formal undergraduate and graduate student teaching. This is an extremely difficult situation; and there is great sympathy for Professor Schmir. But the problem cannot be ignored if it appears that non-tenured faculty of proven excellence (such as Engelman and Moore) who form an integral part of an established, thriving field in the Department, are denied tenured positions.

2. There is a lack of laboratory teaching space in the Department of Molecular Biophysics and Biochemistry.

3. The question was raised about the use of "soft" money to support positions in the two departments, enabling some of the existing GA money to be used for tenure appointments which could relieve some of Biology's problem of lack of teaching slots, and Molecular Biophysics and Biochemistry's problems of tenure slots for its current junior faculty.

4. The question of Affirmative Action was raised only once - by a female faculty member and then not strongly.

5. Concern was expressed over the fact that since the fusion of the old Botany and Zoology Departments into the new Department of Biology, the botanical contingent has dwindled from an original eleven to seven and one-half. No one is working in the area of photosynthesis. The competence of the Department as a center of botanical research and teaching was questioned.

6. The Committee did not systematically investigate the relationship of the Museum to the Department of Biology. This was partly because other committees are currently, or have been, examining this.

7. The increasing amount of student teaching that was required of graduate students, particularly in the Department of Biology, was often raised. The large number of course offerings by the Department of Biology necessarily requires large numbers of graduate student teaching assistants. This problem does not seem to apply to the Department of Molecular Biophysics and Biochemistry except insofar as the proposal is made (by Biology) that they be required to do some of Biology's teaching.