



Cranch Committee Reports On Long Range Planning

The report of the Advisory Committee on Long Range Financial Planning at Cornell University which includes 17 recommendations touching virtually all aspects of the future of the University, has been received by Cornell President Dale R. Corson and made public today. (*The report is published in its entirety beginning on Page 5 of this issue of Cornell Chronicle.*)

The report places special emphasis on the need for developing an effective system on long range academic planning and recommends guidelines to control growth in such areas as enrollment, size of faculty and support staff and facilities.

The 15-member committee of students, faculty and administrators, headed by Edmund T. Cranch, associate dean of the College of Engineering, was appointed by Corson in March, 1971. According to the report, Corson asked the committee "to advise him on steps which could be taken to strengthen Cornell in the face of the long range financial outlook for higher education in general and for Cornell in particular. The task envisaged included an assessment of the financial state of the University, the concomitant directions for long range planning, and especially an evaluation of academic consequences of such planning."

In receiving the 125-page report and thanking the committee for its work, Corson reemphasized that this was only a first step in the planning process. He stated that the report will be referred to appropriate faculty committees, the University Senate, and the school and college deans for study and advice. The report will be presented to the Board of Trustees and the Alumni

Council Oct. 13 and 14. Corson has appointed an administrative committee headed by Provost Robert A. Plane to coordinate all responses and reactions. Corson said he hoped to present a "distilled" plan to the trustees in May.

Cornell, with a budgeted deficit for its endowed colleges of \$1.1 million for the current fiscal year, is in the midst of a three-year program to balance the budget by the end of 1973-74. The advisory committee directed its attention to the endowed colleges for the period following the three-year program, "a period which we hope will be characterized as steady state in the sense of financial stability, yet not steady state as regards development of new programs and continued vigor in current educational endeavors," the report stated.

The report, which is divided into four chapters, devotes 85 pages to the 17 recommendations. Cranch urged readers of the report to study the chapters leading up to the recommendations, "since they provide introductory and background information that is vital to a full understanding of the recommendations."

In its introduction, the report noted that 1972 "is the

beginning of a steady decline in the percentage change in enrollment in higher education so that by the beginning of the 1980s a decrease in numbers is predicted ... Cornell must take into account the dynamics of enrollment trends, recognizing that the pressures for growth will diminish with the 1980s being characterized as an era of no growth."

In a chapter called "Unplanned Ubiquitous Growth," the committee detailed how Cornell reached the critical financial period it is in. The report called the 1960s "a tremendous educational boom." "Spurred on by seemingly unlimited public funds at both the federal and state levels few people looked ahead..."

When the rate of increase of financial support began to slacken in 1967, "universities suddenly realized how thin their margins of safety had been," the report stated. "Inflation increased costs rapidly, and the simultaneous slowdown of the national economy combined with a leveling of governmental grant activity confronted higher education with financial realities which it had previously managed to avoid."

In order to meet the deficit at Cornell, which reached a high of nearly \$2 million in 1969-70, a Budget Stabilization Reserve Fund of nearly \$2.7 million was used. The fund was depleted in 1970-71 and since then other special purpose funds have been used to cover the yearly deficit. Although there has been strong growth in the principal of invested funds, "approximately \$2 million in excess of (endowment) investment income is being liquidated annually to help meet operating expenses, a sum which, if retained, would be used to generate
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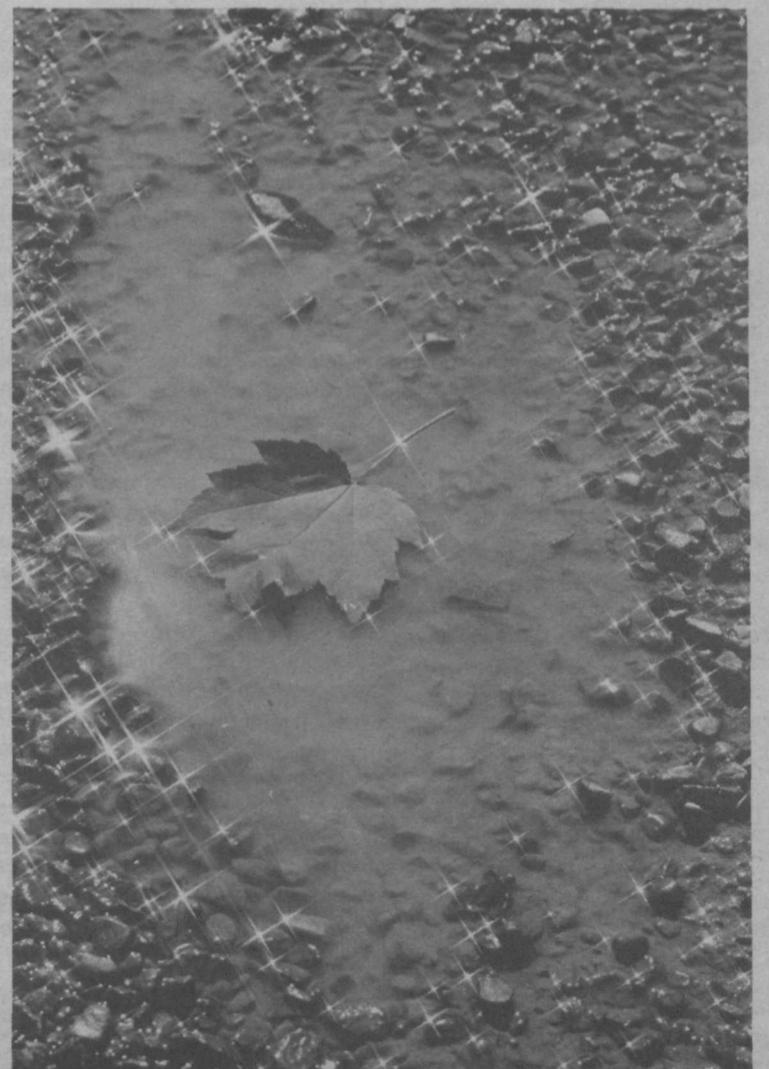


Nursery Program

The University Cooperative Nursery located in the North Campus Union has openings for several pre-school children in its afternoon session. The nursery is open to Cornell student, faculty and employe children. Persons interested should call 256-6342.

It's Fall!

For those who want to admire more of the campus's autumnal wonders than leaves falling on gravel, Cornell Plantations is holding a "Fall-In." (See Page 26.)



Trustee Board, Executive Committee Agenda

The Cornell University Board of Trustees, at its May 25, 1972 meeting, adopted certain recommendations on Trustee-Community Communications. One recommendation was that the agenda for meetings of the full Board and the Executive Committee, in summary form, be released in advance for publication in local news media.

Summary Agenda for Meetings of the Executive Committee and the Board of Trustees of Cornell University to be held October 12-14, 1972, Ithaca, N.Y.

(NOTE: This summary agenda, as released for publication, may not include certain confidential items which will come before the meetings. Also other items may be added to the final agenda prior to the meetings.)

1. The minutes of the Executive Committee meeting held on September 20, 1972 will be presented for approval.
2. The President will present a final budget report for the year 1971-72 for the endowed colleges at Ithaca, the Medical College and related activities.
3. The President will recommend several amendments in the 1972-73 budget for the endowed colleges at Ithaca.
4. The President will recommend, subject to the approval of the Trustees Investment Committee, the rate of per share distribution to be made from the Capital Fund as of June 30, 1973.
5. The President will recommend the acceptance of a grant from the Mellon Foundation to be used in support of the operation of the Cornell University Press.
6. The President will report on a revised operating budget for 1972-73 for the Cornell University Press.
7. The Special Trustee Ad Hoc Committee is expected to report on progress in implementing previous Board decisions pertinent to sale of Cornell Aeronautical

Laboratory, Inc. by the University.

8. The President will report on a proposal which has been submitted to the National Science Foundation to support the Materials Science Center at Cornell for the period July 1, 1973 through June 30, 1974.
9. The President will recommend, subject to the approval of the Buildings and Properties Committee of the Board, authorization to design a chilled water plant to be located adjacent to the University's central heating complex with an initial capacity of 1,200 tons.
10. The President will recommend that the Executive Committee approve for recommendation to the Board of Trustees several amendments in the University Bylaws and Trustee Regulations in keeping with the intent of the Board as expressed at its meeting of May 25, 1972. As indicated by the May Statement of Intent, the proposed amendments to Bylaws and Election Regulations will empower student members of the University Senate to fill mid-term vacancies among student Trustees elected by the student body at Ithaca when such vacancies arise for reasons other than the lack of voter participation.
11. A report of the Buildings and Properties Committee of the Board will be presented to the Executive Committee.
12. The President expects to present for approval and recommendation to the Board of Trustees appropriate amendments to the University Bylaws establishing the Committee on State Relationships as a standing committee of the Board and providing further that the chairman of that Committee become an ex officio member of the Executive Committee.
13. Chairman Purcell will report the Trustees named to the ad hoc committee on Trustee-community communications, in accord with authorization from the Executive Committee at its September meeting, and will ask confirmation of these appointments.

14. The President will recommend for Executive Committee approval and recommendation to the Board that the regular fall meeting of the Board in 1973 be held on Friday and Saturday, October 19 and 20, as a joint meeting with the Cornell University Council.
15. The President will recommend a series of personnel actions.
16. The President will present the recommendation of the Committee on Memorials for the naming of a building on the Ithaca campus.
17. A report of construction contracts awarded from the period August 14 to September 15 will be presented to the Executive Committee.
18. A report of the proceedings of the meeting on September 12, 1972 of the joint Administrative Board of the New York Hospital and the Cornell Medical College and School of Nursing will be presented for information.
19. The University Treasurer will make his annual report to the Board.
20. The President will recommend several individuals to the Board for consideration for election as Presidential Councillors.
21. The Trustee Ad Hoc Committee on the Status of Women expects to report to the Board on its preliminary findings.
22. The President will recommend to the Board election of a number of individuals as Andrew D. White Professors-at-Large for the period July 1, 1972 through June 30, 1978.
23. Professor Edmund T. Cranch will lead a presentation of the report from the Committee on Long-Range Financial Planning. (The presentation by Professor Cranch and several of his committee associates will be for information purposes only. Board action will not be requested at this time.)

Mackesey, O'Brien Explain Plans for Biology Complex

Two of the principal planners for Cornell's proposed biological sciences complex explained their planning processes and aims Tuesday at a meeting of the University Senate's Planning Review Committee.

Thomas W. Mackesey, vice president for planning, and Richard D. O'Brien, director of the Division of Biological Sciences, discussed the long history of plans for the complex and explained why they felt the need is critical if the University is to maintain its excellence in the biological sciences.

After the discussion, which lasted more than an hour in the Senate's offices, a bill which would have delayed the initial

phase of the project was dropped.

Mackesey said that no other area of planning has had as much discussion as the plans for the biological complex. Biological sciences, he said, has been "fragmented" for many years.

It was back in October, 1963, he said, that a committee of "outside scientists" recommended that a central facility for the biological sciences be created. The next step, he added, was appointment of a presidential committee of faculty members. This committee endorsed in principle the "outside scientists" recommendations including the construction of a central biological sciences facility or facilities.

A number of sub-committees were created by the faculty unit, Mackesey said, and one of these was to deal with spatial requirements.

"The concept (that new facilities are needed) remained remarkably constant," Mackesey said, "but money was lacking."

At the same time, he continued, a site was sought which was centrally located between the College of Agriculture and Life Sciences and the College of Arts and Sciences. The site also had to be able to hold a "very substantial" facility.

"The only possible site that met all the requirements," Mackesey said, "was Lower

Alumni Field."

The Board of Trustees in 1968 designated that field as the site for the biology complex after arrangements had been made with the Department of Physical Education and Athletics. Mackesey pointed out that playing fields had been developed on the North Campus and other places on the main campus to compensate for loss of Lower Alumni Field for sports programs.

Mackesey told the Senate committee that the University's Planning Office has worked with the Division of Biological Sciences and that all agencies of the University have been consulted as the planners trod a "very well defined path."

"There are fewer things more important to the future of Cornell," he said, "than to carry through the biological sciences plan."

O'Brien termed the division's needs as "pressing" and said the biological sciences are now spread out in eight buildings and that 27 professors are now officed five miles off campus. This was a reference to Langmuir Laboratory near the Tompkins County Airport.

Stressing that a cancer institute is not involved in the planning, O'Brien did say that the need for cancer research space, evolving from the Division's cellular biology teaching and research concentration, was the issue. Federal agencies, he said, which not long ago halted capital

United Fund Begins Drive



"INVEST IN PEOPLE" is the theme of the 1973 Tompkins County United Fund campaign which kicks off Oct. 11 and is scheduled to end Nov. 15. Cornell employees have traditionally committed both time and money to the Fund. Shown with Cornell President Dale R. Corson is the Cornell "team" for the upcoming campaign (standing L-R): Olan D. Forker, professor of marketing, Agricultural Economics, who is co-chairman for statutory units, Gene H. Oberly, associate professor of pomology, division chairman, and Anthony C. Treadwell, business manager, Campus Life Division, who is co-chairman for endowed divisions.

grants for science buildings, now separate building or whether have some funds for special such research would be housed purposes. in a multi-purpose building has

Whether or not cancer research would be done in a separate building or whether such research would be housed in a multi-purpose building has not yet been decided, O'Brien

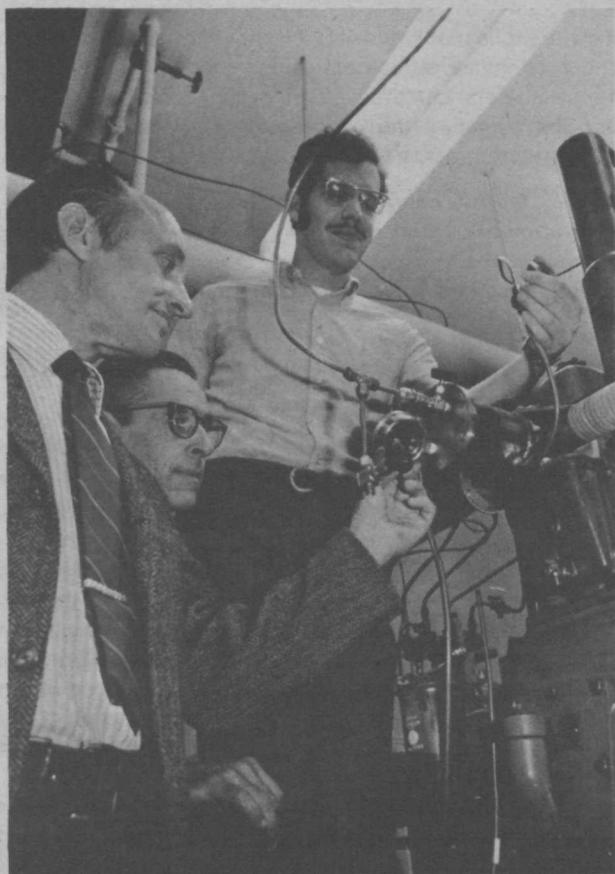
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CORNELL CHRONICLE

Published weekly and distributed free of charge to Cornell University faculty, students, staff and employes by the Office of Public Information, Arthur W. Brodeur, director. Mail subscriptions \$12 per year. Make checks payable to Cornell Chronicle. Editorial office 122 Day Hall, Ithaca, N.Y. 14850. Telephone 256-4206. Editor, Robert W. Smith. Managing editor, Kal M. Lindenberg. Photo editor, Russell C. Hamilton.



Engineers Develop A Non-Polluting Automobile Engine



FOR CLEANER AIR — Edwin L. Resler Jr., professor of engineering, technical associate Bud Tompkins and doctoral candidate Herbert M. Kosstrin (from left) examining non-polluting automobile engine.

A non-polluting automobile engine which combines the good points of both the internal and external combustion cycles has been developed by a Cornell professor and a graduate student.

The engine, which weighs little more than a conventional V-8 engine and is about the same size, was developed by Edwin L. Resler Jr., the Joseph Newton Pew Jr. Professor in Engineering and director of the Sibley School of Mechanical and Aerospace Engineering, and Herbert M. Kosstrin, a doctoral candidate from Valley Stream, Long Island.

Although other non-polluting engines exist, the two researchers said they feel theirs is unique because it possesses the advantages of the proven internal combustion engine but does away with the pollution that engine produces.

"The configuration of our engine," Resler said, "would allow an auto manufacturer to use all his existing tooling. No expensive retooling would be necessary to produce it. The engine block and piston arrangements, ignition and carburetor are essentially unchanged."

Resler also said it is feasible to modify existing engines so that pollution control can be effected in present automobiles. The hybrid engine consists of eight cylinders, six of which are internal combustion and two of which are external types.

The new engine was developed as part of Kosstrin's research work as a doctoral candidate.

Senate Accepts Constitution Univ. Unions Board Approved

The University Senate Tuesday night gave its approval to the constitution of the University Unions Board of Governors and then failed to reach a decision on the holiday decorations bills, falling short of a 50 per cent quorum by one senator.

The senate had debated the holiday decoration issue for nearly a half hour before a quorum was called at 10:15 p.m. Lacking a quorum, the meeting was terminated. The bills will be the first item of business at the next senate meeting Oct. 10.

The senate's approval of legislation creating a University Unions Board of Governors filled a void left following the abolition of the Willard Straight Board of Governors by the Board of Trustees in spring 1970.

The board will have "direct policy-making authority over the Department of University Unions subject to the jurisdiction of the Cornell University Senate." Its functions include coordination of the three individual union boards, approval of the University Unions annual operating budget and of withdrawals from the reserve account as well as review powers over actions of individual union boards.

The 11-member board consists of seven students and one representative each from the faculty, employes and alumni, and the vice president for campus affairs.

The senate also passed legislation "to insure proper procedures for consideration of capital improvements affecting traffic and parking." All University departments whose operation may affect parking and traffic on the campus must now give the Campus Life Subcommittee on Parking and Traffic 30 days written notice except during the summer months when 60 days written notice is required.

In other business, the senate approved Executive Committee nominations for the Trustee-Senate Investment Advisory Committee. Three of the four nominees are incumbents — Jack C. Kiefer, professor of mathematics, Rukudzo Murapa, assistant professor of black studies and political science and Gordon G. Chang, student trustee and a senior in the College of Arts and Sciences. The fourth nominee is Ethel L. Vatter, professor of consumer economics and public policy.

Mary Beth Norton, speaker, announced five faculty, six student and one employe senate vacancies. The seats are to be filled during the senate's upcoming by-election this fall.

Senate Campus Life Committee to View Proposed Budgets Totaling \$16 Million

Proposed budgets totaling approximately \$16 million of Cornell's Division of Campus Life were presented to the University Senate's Campus Life Committee for study in late September by William D. Gurowitz, vice president for campus affairs.

During the next month the committee and its nine subcommittees must re-work the budgets for final senate approval by the first week of November.

Clifford Mass, chairman of the committee and a junior in the College of Arts and Sciences, said the senate's "complete power over budgets and policy in the departments within the Division of Campus Life makes the University Senate unique ... some other universities have senates but they differ both in representation and power."

The Cornell senate, composed of students, employes and faculty, is responsible to the Board of Trustees.

The Campus Life Committee has subcommittees on the Cornell Campus Store, dining services, organizations and public events, parking and traffic, physical education and athletics, religious affairs, student counseling and advising and student housing.

The only budget which does not require senate approval is health services. The health subcommittee — actually the Board on Student Health — reports directly to the University President, Mass said.

Mass "expects a lot of changes in the proposed budgets" for 1973-74.

"The major difference this year is that we can control the distribution of student fees," he said. "In the past, a portion of each student's fee was reserved for certain areas such as health services, University Unions and student activities. This year, however, those allocations are part of 'tuition,' and we can decide where the amount

previously called 'fees' is to be spent."

The subcommittees also have information on departmental reserve accounts which they did not have before this year, Mass said.

The senate is also empowered to approve budget changes made after final senate approval is given in November. "Senate legislation passed in May created a procedure requiring the Campus Life Committee approval on any budget changes over \$3,000 as well as on any 'substantial' policy changes," Mass said. "Previously, there was no senate procedure for dealing with such changes."

When the senate is not in session, budget changes must be approved by the chairman of the Campus Life Committee and either the speaker of the senate or chairman of the Executive Committee, he said.

Mass also felt that committee organization had improved since the first senate reviewed two years ago. Robert McGinnis, professor of sociology, is co-chairman of the Campus Life Committee for the budget.

"All subcommittee meetings are public," Mass stated. "Input from non-senators is very possible and has been more of the rule than the exception. The schedule and agenda of all subcommittee meetings are posted in the senate office and each sub-committee is required to have an open hearing advertised in the campus media."

University Senate Elections Coming

Cornell University Senate elections for 10 freshman seats will be held in late October, according to Kay R. Hanna, administrator of the senate secretariat.

Petitions from freshmen wishing to run are due in the senate office by 5 p.m. Oct. 12. Petitioning began Sept. 18, with petitions mailed to each freshman student.

Freshman senators have all privileges of the floor except voting and they are allowed to serve and vote on senate committees, Ms. Hanna said.

The senate by-laws also provide for voting by freshman senators in the upcoming election of the University's student trustees.

Freshmen elected this fall will serve through the remainder of the present senate year ending March 1, 1973.

Two students on the senate's Internal Operations Committee are responsible for conducting on-campus information meetings on the freshman candidates prior to the election. They are Jonathan P. Arfa and Mark I. Lilien, both juniors.

Questions on the elections may be directed to the senate office in 133 Day Hall.

Employe Role in Senate Emphasized

Inquiries regarding employe participation in Cornell University Senate activities should be directed to Diedrich K. Willers, director of the Office of Personnel Services, according to vice provost Robert F. Risley.

In supporting and encouraging employe participation in the senate and its committees Risley said:

"The University senate is an integral part of Cornell and an important factor in its governance. The senate deals with many issues of great importance to the total University community and all segments of the University should be encouraged to participate in its activities.

"Employes serving on a voluntary basis as senators or on Senate committees conduct most of their meetings and activities on their own time outside normal hours of work. Such time is not subject to overtime payment or compensatory time off. In the event that a meeting to conduct Senate business must be held during normal working hours, an employe should obtain permission from his supervisor to be relieved of his employment duties to allow his attendance. Supervisors are expected to approve such attendance in the absence of a compelling need for the employe to remain on the job. In addition, employes should be permitted time on the job to answer telephone calls and perform other necessary Senate business.

"Supervisors or employes who have questions or problems regarding the application of these general guidelines to specific cases should feel free to consult Willers," he said.

New Pancake House Opens

Cornell's newest dining facility — the Pancake House — opened its doors to the public last Saturday.

The Pancake House, located in Noyes Lodge, specializes in pancakes, crepes, waffles and French toast at prices ranging from \$.80 for buttermilk pancakes to \$2.29 for pancakes, steak and eggs.

The cafeteria also offers "muffinburgers" — hamburgers on toasted English muffin served with various toppings — in addition to salad plates, traditional steak and chopsteak platters, chicken-in-a-basket and daily specials with non-meat entrees.

Hours are from 7 a.m. Monday through Friday and from 8 a.m. Saturday and Sunday.



LET 'EM EAT PANCAKES — William D. Gurowitz, vice president for campus affairs, samples the fare at the grand opening

Identification Plan Begun to Cut Thefts

In an effort to discourage campus theft and to facilitate recovery of stolen goods, the Cornell Safety Division has begun "Operation Identification."

"Operation Identification" consists of engraving a non-removable serial number on office equipment and student property such as typewriters, calculators, cameras, stereo systems, clocks, televisions and radios. The owner of the engraved item will also fill out an inventory form and return it to the Safety Division.

Students may borrow engravers from the Office of the Dean of Students, Department of Student Housing, according to Henry Ross, business manager. The engravers, operating instructions and Safety Division inventory forms are available in the housing office, 223 Day Hall.

Cranch Committee Reports on Planning

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additional income. Since the financial viability of the University depends fundamentally on the rise in value of its Endowment, the growth of the Endowment must be protected," according to the report.

In a section titled "Summary of Expenses and Income, Conclusions," the report noted that by the definitions of the recent study sponsored by the Carnegie Commission on Higher Education and the Ford Foundation, during the period 1967-70 Cornell was in the "headed for financial trouble" category.

"Because income growth permitted the University to increase expenditures substantially, the cost-income squeeze is due primarily to a decrease in the rate of income growth," according to the committee report. "Because of the very limited controls available over income, there is great need to affect controls over expenditures ... The cost-income estimates show that the costs tend to exceed income, so reducing costs is important for maintaining a balanced budget."

The committee's first recommendation stated: "The President, Provost, Deans and Department Chairmen must make systematic academic planning their principal responsibility. Planning must be recognized and organized as a high level function, involving a coordinated approach to a whole series of substantive topics ... Equally important, the University Administration must organize itself for the effective implementation of those plans."

The committee said "the importance of the proposed activity requires a professional effort at the vice presidential level." They urged that funds be made available for academic planning and that this will be "a continuing effort which will lead to a 3-5 year Program Plan for the University."

In its second recommendation, the committee said: "Institute unit planning at the smallest academic budgetary program level." The committee defined such units as "usually departments, but centers, special programs, small schools and colleges, or groups of departments could be appropriate subdivisions." The committee said "this recommendation is intended to emphasize the pivotal planning role of the basic academic units of the University. ... The ad hoc procedures of the past will not be adequate for the future. Understanding Cornell surely must begin with the basic units understanding themselves with 3-5 year plans."

The third recommendation said: "Proceed now to develop a modern measurement and information system which will provide: a) An improved system of reporting academic efforts and results. b) The data resource base for program planning and evaluation including cost indices of diagnostic significance.

In commenting on this recommendation the committee noted that "regardless of historical precedent or the seemingly distasteful nature of things quantitative and pecuniary, Cornell must develop measures of program effectiveness and cost indices if it expects to plan rationally for the future. In short, Cornell must understand itself."

Still on the same recommendation, the report stated: "The Committee is mindful that a certain danger lurks in the development of a system of program planning and evaluation. An academic community is justifiably apprehensive that an administration might use the controls, restraints, incentives and centralization which accompany planning in a heavy handed manner and thereby poison the well-springs of academic excellence.

The potential for abuse only emphasizes the very great importance of self-generated faculty responsibility for the effective use of resources."

The fourth recommendation, under the general heading "Orders of Magnitude," stated: "Institute the following overall guidelines of size: 1) The total number of faculty should not be increased. 2) Embark on a program of careful growth in the size of the student body, with the number of students rising to about 17,500 at the end of a five year period." Cornell now has a student body of about 15,500.

In explaining its recommendation on faculty size, the committee noted "the increase in numbers of faculty and support staff in the last ten years has far exceeded the growth of undergraduates." During that time there was a 24 per cent increase in undergraduates, with a 75 per cent increase in faculty and four support staff added for each faculty member.

"The number of Master degrees per faculty member could be substantially increased and a modest increase in the number of Ph.D. degrees per faculty member could be accommodated," according to the committee. "It is in this sense that we believe Cornell has unused academic capacity at the graduate level. Faced with this situation, in broad terms Cornell must either reduce the size of its academic and support staff or increase the number of students."

The report goes on to show that between 1960-61 and 1971-72, the overall student-faculty ratio in the endowed colleges dropped 20 per cent while the national student-faculty ratio showed a definite increase.

"It is now estimated that in the Endowed Colleges (Law and B&PA excepted) about 45 per cent of the courses have ten or less students per class," the committee reported, and "that a relatively small number of students benefit from the great number of small classes. The Committee is mindful that in applying gross indices one slurs over many factors such as the uneven distribution of students and resources, the relative and changing attractiveness of different fields and of course measures of quality. From the respective trends in numbers of students and faculty and the relatively large number of small classes, it seems clear that further faculty expansion is unjustified."

In recommending an increase of 2,000 students, the committee addressed itself to questions associated with the term "campus life." The committee foresaw no problems with classroom space, stating that "a conservative estimate of current classroom underutilization is 20 per cent."

Nor did the committee see any problems for the University dining system which "is operating below capacity and could handle at least another 2,000 students." In health care, "all trends indicate that expansion will have to take place regardless of additional students and their needs will have to be considered in that expansion," the report said. "...rising levels of expectation lead some to conclude that we are already at the threshold of deteriorating quality and accessibility of athletic facilities," the committee wrote.

University union facilities posed problems also. "Willard Straight Hall is crowded, and even without an increase in the number of students it needs to be expanded. ... Additional students would require that early attention be given to renovation and possible expansion of hard pressed campus Union facilities."

An increase in students would mean an increase in parking and transportation "and additional facilities

would be required in advance of such additions."

The committee said there is evidence that additional students could be accommodated in off-campus housing. "The Committee prefers that additional students be housed on campus, but it would oppose such a trend if it meant either subsidization of housing or anything like the burdensome debt service of the North Campus Dormitory complex. There may be several options open to the University in this area: provision for on-campus student housing through cooperative arrangements with private firms is one such....

"Before embarking on major expansion in the number of students, Cornell must face up to a policy on the housing of its students and then allow sufficient time for solid planning before implementation of its policy."

In achieving the increase by 2,000 students, the committee said "upperclass transfer students and attractive one year master's degree programs should be encouraged."

The committee's recommendation "rests on the assumption that the increment of income will appreciably exceed the increment of cost," and noted that the expense of instruction should be controlled. "Faculty size will have to be carefully controlled, not permitted to increase and if possible decreased. The average number of credit hours taught will necessarily rise and in this sense the average teaching loads will rise and a decline in the academic standard of living might result. However, flexibility and discrimination in the assignment of teaching loads should be encouraged. ..."

The fifth recommendation said: "Adopt student financial aid policies which 1) Hold aid from unrestricted funds to a given percentage of tuition income — perhaps using 1970 as a base year. 2) Use increased student employment (summer and academic year) and stricter application of 'need' criteria in the determination of a financial aid 'package.' Consider putting some graduate financial aid on a need basis. 3) Press for maximum possible utilization of State and Federal sources of student aid. 4) Implement an effective student loan plan attractive to middle and lower income families."

"... Cornell is having difficulty in maintaining economic accessibility for all students admitted and this can only result in the eventual reduction in the numbers of middle and low income students," the report stated. Except for COSEP (Committee on Special Educational Projects) students, "Cornell is in a period of scholarship retrenchment for the overwhelming majority of its student constituents.

"The Committee sees no way to alleviate this situation without further use of unrestricted funds which would put additional pressure in the direction of an increased deficit. Thus, its recommendation for holding the use of unrestricted funds to a given percentage of tuition income." In recent years, that percentage has been between 5.5 and 6 per cent of tuition income.

In calling on the Cornell administration to develop greater governmental student aid, the committee observed "that the need for financial aid is a reflection of a much larger societal state of affairs whereby public forces are at work in the direction of universal higher education, but as yet the necessary supporting financial resources have not been provided."

The committee stated that a principal means of determining financial need, the Parents' Confidential Financial Statement, "has loopholes ... we advise that

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Full Text of the Cranch Report

The Advisory Committee on Long Range Financial Planning last night released the text of its report. The members of the so-called Cranch Committee are: Barry B. Adams, Nyle C. Brady, David L. Call, Elizabeth V. Corrigan, Edmund T. Cranch (Chairman), H. Justin Davidson, Arch T.

Dotson, Donald F. Holcomb, Alfred E. Kahn, Ronald N. Loomis, Wayne P. Merkelson, Robert S. Morison, J. Saunders Redding, Louise I. Shelley and Stanley A. Strauss. Here is the text in its entirety:

PREFACE

It is ironic that the decade of the 1960s, an era of unprecedented prosperity, closed with a financial outlook for higher education that can only be described as very serious for most institutions and of crisis proportions for some. Cornell, certainly one of the leading universities in the country, with an educational responsibility of worldwide scope, emerged from the decade in a financial position which, while better than most, required stern measures. In the face of mounting deficits the University adopted a three-year program of budget cuts designed to bring its operating expenses into line with its income by the academic year 1973-74. It was clear from the outset that this program, even if it were successful, could provide no more than temporary relief. What was called for was a long-range planning effort, one that would help to chart Cornell's course far beyond the moment of a balanced budget. With this in mind, President Corson appointed an Advisory Committee on Long Range Financial Planning and gave it the task of assessing the financial state of the University, establishing guidelines for long-range planning in the light of this assessment, and evaluating the academic consequences of such planning.

The Committee gave most of its attention to the Endowed Colleges in Ithaca. Although the role of the Statutory Colleges is vital to the University's educational program, their "pay-as-you-go" budgetary operation effectively precludes deficits. Where the Committee found it advisable to consider factors which cut across State-Endowed boundaries, however, it did so freely.

The initial scope of the Committee's investigation covered a broad range of topics, but the range narrowed as it became clear that some topics were either beyond the capabilities of the Committee or were already being examined by other University committees. For example, testimony made it quickly apparent that full-scale studies of both Computer Services and the University Library System should be left to experts, and that in any case they fell within the province of committees already at work. Special in-depth studies of other areas commissioned by either the University Senate or the Faculty Council of Representatives were also under way, and our Committee saw no need of duplicating these efforts. Thus the Committee finally identified five areas and set up a sub-committee for an intensive study of each. A list of sub-committees and their members follows:

Academic Affairs

- Barry Adams
- Thomas Dyckman
- William Gurowitz
- Donald Holcomb, Chairman
- Wayne Merkelson

Educational Goals and Priorities

- Arch Dotson, Chairman
- Malden Nesheim
- Saunders Redding
- Richard Seebass
- Louise Shelley
- Stanley Strauss

Academic Productivity

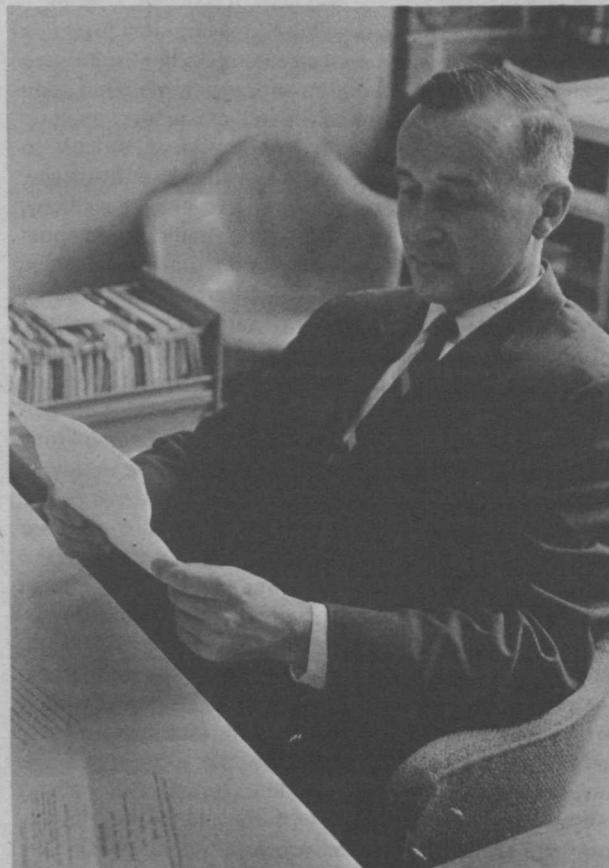
- Nyle Brady
- David Call
- Justin Davidson, Chairman
- Arch Dotson
- James Gaylor
- James Maas

Nonacademic Affairs

- Jon Anderson
- George Brooks
- Elizabeth Corrigan, Chairwoman
- Eugene Cramer
- Paul Eldridge
- Ronald Loomis

Tenure and the Reward System

- Douglas Ashford
- Jean Blackall
- David Call, Chairman
- Justin Davidson
- Tucker Dean



Edmund T. Cranch

- Paul Feeny
- Edward Kramer
- Bernard Stanton
- David Wilson

Each sub-committee, while bearing in mind the financial state of all areas, concentrated on discovering ways of vitalizing its area's contribution to the overall University program through a more effective use of faculty and staff resources, in spite of the limit on funds. The chairmen of the sub-committees were in continual communication with each other and provided liaison with the parent committee, whose overriding concern was the general welfare of the University. Meetings of the parent committee were marked by an open exchange of ideas focusing upon the working papers and reports submitted to it by the sub-committees. Differences of opinion there certainly were — and counter opinions appear in this final report — but a cooperative spirit prevailed, and those who read this report should bear in mind that it represents the Committee's consensus that the financial constraints on Cornell are real and must be taken constantly into consideration as the University assesses its existing programs and attempts to develop new ones.

Finally, two things need statement here. First, though the University Administration was always cooperative when approached for information, it played no role in the ongoing work of the Committee. And, second, many groups and individuals gave the Committee the benefit of information, ideas and insights and lent moral support to a task that sometimes seemed overwhelming. It was support the Committee sought, even while it was determined to keep its independence — and particularly its independence of the planning effort required by the Regents of the University of the State of New York, which was being made during the same period. In a word, though this report is the Committee's alone, it owes thanks to those who responded to its requests, and especially to the following individuals:

- Donald Berth
- James Bezdek
- Lisle Carter
- Alexander Cheney
- W. Donald Cooke
- Noel Desch
- Endowed College Deans
- George Green
- Alan Greenwood
- Lance Haus
- Howard Howland
- Gary Lee
- Paul Leurgans
- Jack Lowe
- Thomas Mackesey
- John McManus
- Porus Olpadwala
- Robert Plane
- Arthur Peterson
- Edwin Roberts
- Thomas Rogers
- Katherine Sinko

- Delridge Hunter
- David Kaser
- Samuel Lawrence

- R. Neilan Teague
- Anthony Treadwell
- Henry Vaughan

INTRODUCTION

Trends and Expectations

Cornell of the 1960s was part of a tremendous national educational boom. Enrollments more than doubled, until almost 9,000,000 students were enrolled in our colleges and universities; income almost tripled, as did expenditures; the level of financial support from government contracts and private foundations reached new heights. By 1970, 2.4 per cent of the GNP (amounting to some \$24 billion) was devoted to higher education, as compared with about 1 per cent in 1960 — a gain which exceeded that of any other sector of the national economy for this same period. The nation's demand for higher education seemed insatiable. Hundreds of new institutions were established and building programs flourished. Higher education was extended to whole new social and economic groups as the nation moved rapidly toward a system of mass higher education.

This period of unprecedented growth has led us to a turning point in the history of higher education in the United States. Over the past 100 years, enrollment in institutions of higher education has, on the average, doubled every 15 years. Assuming the results of that process to be irreversible, it is clear that it can never be repeated. The following table, which is based upon projections of population trends for the remainder of the century (6) (numbers in parentheses refer to References cited at the end of the report.), suggests the new dynamics of growth with which we must now contend:

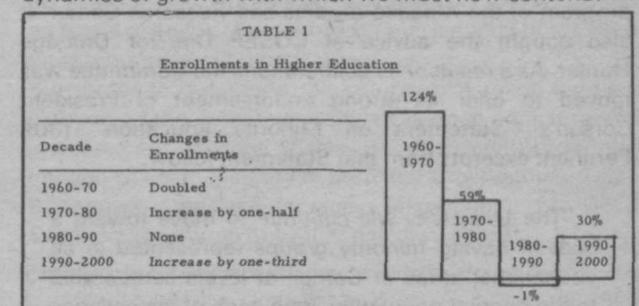


Figure 1 of the appendix shows more detailed projections for the period 1970-1990. We know that higher education grew much faster than the population as a whole during the last hundred years: enrollment rates increased from about 2 per cent of the college-age group in 1870 to about 35 per cent in 1970. While predictions of future enrollments are not entirely certain, it is expected that the percentage of the college-age population in college will level off at about 50 per cent by the year 2000. Table 2 shows this prediction (6).

Table 2
Percentage of Population Aged 18-21 Enrolled in Degree-Credit Programs in Higher Education

Year	Percentage
1940	11
1950	15
1960	23
1970	35
1980	45
1990	51
2000	54

In planning for the future Cornell must take into account the dynamics of these enrollment trends, recognizing that the pressures for growth will diminish, especially as we approach zero growth in the 1980s.

The period of growth following World War II also witnessed a fundamental transition from an era in which higher education was an expectation of the privileged to one in which mass education was the norm. The movement toward mass higher education was accompanied by a change in the division of enrollment between the private and the public sectors. Figure 2 shows that in 1900 our private institutions accounted for

about two-thirds of the student population, but that by 1950 each sector enrolled about 50 per cent, and that by 1970 the private sector enrolled only about 25 per cent. This change is a significant one, and as we move toward a situation in which 95 per cent of the population will be within commuting distance of a community college, the ultimate configuration becomes obvious: mass higher education is to be in the public sector, with private institutions playing a relatively small but vital role.

Although Cornell occupies a distinctive position by virtue of its ties to both the public and the private domains, we prefer in the present analysis to regard it as an essentially private institution, with its Statutory units and their special-purpose programs contributing a welcome diversity. Thus we believe that Cornell must define its mission not as meeting the demand for mass higher education but as providing the unique opportunities for excellence in teaching and research which have been traditionally associated with private universities.

We believe it is possible to align Cornell with the private sector without ignoring the legitimate claims of those groups which have in the past been denied access to higher education because of their economic status, their sex or their race. It is obvious that youth from low-income families face serious financial obstacles in seeking a college education, and we note as well that enrollment rates for women are distinctly lower than those for men in the same age bracket (6). Our greatest concern, however, must be with providing educational opportunities for members of racial minorities. Although the number of black students enrolled in institutions of higher education rose from 234,000 in 1964 to 522,000 in 1970, this latter total represents only about 23 per cent of the black population in the college age group, as compared with a corresponding proportion of 36 per cent for whites. In the 22-24 age group likely to be enrolled in graduate schools, only 7 per cent of the black population in 1970 was in fact enrolled, compared with 15 per cent of the white population. Cornell has played a major role in improving this state of affairs, primarily through its COSEP program and its Africana Studies and Research Center.

In studying the problem of providing educational opportunities for minority students the Committee consulted with Professor Lisle Carter, who is currently chairman of a committee charged, with reviewing the program of the Africana Studies and Research Center. It also sought the advice of COSEP Director Delridge Hunter. As a result of its deliberations the Committee was moved to offer its strong endorsement of President Corson's "Statement on Minority Education" (30). Pertinent excerpts from that Statement follow:

"The University will continue to move toward a goal of having minority groups represented in all educational areas at Cornell at levels comparable to the general population, with each of the colleges and schools contributing to the implementation of the goal in accordance with its respective policies on four-year, transfer, and graduate students emphases.

"Because of this institution's relationship with the State of New York, through the statutory colleges, and the need to coordinate our efforts with expanding State programs, the term 'general population' will be considered to be that of the State of New York, and encompass all sectors of the educationally disadvantaged minority population therein.

"However, it must be made clear that attainment of the goal of proportional representation is dependent upon a more balanced participation in the attendant costs. Cornell University is committed to maintaining the program at present funding levels for entering students which, for the current year, resulted in a minority student population of undergraduates (including transfer students) and graduate students of 8 per cent of the total incoming students. Because of the societal nature of the problem, our statutory unit composition, and the outlook for continued severe financial operating conditions, moving to a proportional representation level will depend upon the availability of substantially increased public funds...

"Too often, programs to assist minorities have been conceived with noble purposes in mind only to become the first to be cut back in periods of financial stringency. Although this is such a period of time, these efforts must not suffer such a fate. To do so would be to impose a disproportionate share

of retrenchment costs on a group that did not share significantly in earlier periods of budget expansion. More importantly, it would be retrogressive at a time when more than ever is needed a reaffirmation of commitment to American ideals of opportunity and equality. It is for this reason that there must be a commitment of students, faculty, trustees, and friends of Cornell everywhere to support a development program which can make this plan a reality."

The complexity of Cornell as a living institution is reflected in its organizational structure. As the Committee examined the elements of this structure in detail, it soon realized that a comprehensive and exhaustive analysis was beyond its powers. It has therefore striven to understand the main forces at play within the University, to describe these at an appropriate level of specificity, and to identify those characteristics that seemed most pertinent to its charge. In presenting the results of its work it is painfully aware that much remains to be done. Even where it has analyzed some part of the University's complex organism to its own satisfaction, it has sometimes been forced to admit that there is precious little opportunity for deliberate choice between alternative responses to a given problem. Like any firmly established institution, Cornell is often at the mercy of forces beyond its control.

Yet the recommendations that follow are not the counsels of despair. Despite the many and powerful constraints placed upon its actions, the University can, we believe, make some important choices. In order even to make a beginning, however, it is essential that we set aside the overly literal reading of the Founder's most memorable saying, for it has become inescapably clear that no institution can possibly offer "instruction in any study." We cannot afford to use the comfort of the University's motto to avoid the difficult task of identifying priorities and making the hard decisions that follow. Only by understanding itself more fully and defining its special role more consciously than it has in the past can Cornell hope to remain a vital force in American higher education.

UNPLANNED UBIQUITOUS GROWTH Introduction

The impact on Cornell of more than a decade of growth has been pervasive. From 1960 to 1972 the number of Endowed Division undergraduate students increased 24 per cent and graduate students 108 per cent, resulting in a total increase of 42 per cent in the enrollment of the Endowed Colleges. In the Statutory Colleges undergraduates increased 65 per cent, graduate students 32 per cent, so that the total Cornell enrollment increase was 46 per cent. The number of faculty members in the Endowed Colleges increased 75 per cent while the Statutory faculty rose by 17 per cent. Support personnel grew in numbers at a rate essentially proportional to the total faculty, with a ratio of four support employees to each faculty member. The physical plant grew at a prodigious pace, with the cost of physical plant additions or major rehabilitations completed from 1960 to 1972 reaching about \$100 million for the Endowed Colleges in Ithaca. Tuition and fees increased 110 per cent while student financial aid increased about 300 per cent. Faculty salaries doubled. Income from restricted fund grants and contracts increased 360 per cent. Figures 3-7 and Tables 6, 11, 16, 19, 22, 26, 36 of the Appendix describe this unprecedented growth statistically.

It was a wonderful period — filled with enthusiasm, flexibility and new programs. Spurred on by seemingly unlimited public funds at both the federal and state levels, few people looked ahead and pondered the future. Beyond the increase in numbers, what were the consequences of this growth to be? Was the financial base sound? Did projections of society's manpower needs correlate in any consistent way with those being educated? What degree of control over their own destinies did the universities possess?

Growth conceals defects, and the symptoms of vulnerability began to appear about 1967. The amount of funds directed toward higher education could not possibly continue to increase indefinitely at the rates of the 1960s, but national economic growth coupled with a greatly expanded level of government and foundation grant activity masked the need for close scrutiny of the financial commitments which were undertaken. However, by 1967 governments at both the state and national levels were beginning to show signs of strain in meeting educational commitments and the public mood began to

stiffen as expansion continued unabated. Driven upward by program expansion and the influx of federal funds, the annual increases in expenditures had far exceeded the historic rate of about 4.5 per cent (see Figure 3). When the rate of increase of income faltered, universities suddenly realized how thin their margins of safety had been. Inflation increased costs rapidly, and the simultaneous slowdown of the national economy and a leveling of governmental grant activity confronted higher education with financial realities which it had previously managed to avoid. Only then did we begin to realize that the 1950-1970 era was one of transition, rather than one whose happy trends could simply be extrapolated into the indefinite future. At first, rather than face the unpleasant prospects, many universities plunged onward, hoping that the financial specter would somehow vanish. Cornell was one of the earliest to perceive the dangers; in "Study of Rising Costs in Ten Universities" (24), published in 1967, it reported that "From 1961 to 1966 the group operated in the black with a constantly decreasing margin. About January 1, 1967, they crossed into deficit operation. Based on a cost and income projection the group showed an increasing deficit for the next five years." Trouble lay ahead, but it was not until 1970 that most universities, on the threshold of rapidly mounting deficits, realized that the future would be quite different from the past.

Deficits and Endowments

During the 10-year period 1956-65 the Endowed Colleges of the University at Ithaca showed an annual surplus in current operations, averaging about \$433,000 annually. Beginning with fiscal year 1965-66, however, the Endowed units entered a period of substantial recurring deficits, as shown in Table 3.

TABLE 3

Endowed Colleges Deficits**

Year Ending June 30	Deficit in \$Millions
1966	0.247
1967	0.644
1968	0.587
1969	1.687
1970	1.976
1971	1.856
1972	1.431*
1973	1.097*
1974	0*

*Estimated Targets

**These deficits are from Current Fund operations, including net impact for related activities, 1971-74.

During the surplus years a Budget Stabilization Reserve Fund was established to cover possible future deficits. In 1966 it had a balance of \$2,699,000. This was used to cover the deficits through fiscal year 1969-70, but was depleted during fiscal 1970-71. The total deficits shown in Table 3, both actual and anticipated, amount to \$9,525,000.

The invested funds of Cornell University reside in three fund pools known as the Endowment Fund Pool, the Capital Fund Pool, and Separately Invested Funds. The aggregate of these pools is called the Invested Funds. Of these funds, the so-called "Restricted" portions can be used only for certain specified purposes; the balance are unrestricted. Table 4 below shows how the value of the Invested Funds principal has grown since 1965.

TABLE 4

Invested Funds

Year	Year End Market Value Principal in \$ Millions	Yearly % Change in Market Value
1965	192.9	
1966	204.6	6.1
1967	219.2	7.1
1968	240.1	9.6
1969	240.2	0.0
1970	206.3	-13.7
1971	259.2	25.7

Table 4 shows that the trend averaged over this period has been a persistent drive upward as investments appreciated in value and gifts were added to the principal. The average rate of increase for 1965-68 was 7.6 per cent while for 1969-71 the average dropped to 4.0 per cent, reflecting the marked decline and partial recovery of the stock market. Although Table 4 shows strong growth of the Invested Funds, it should be noted that the principal of these funds has also been used to meet annual operating expenditures, as shown in Table 5.

TABLE 5

**Capital Used for Operating Expenses
Invested Funds Principal****

Year	\$ in Millions
1969	0.829
1970	1.313
1971	2.420
1972	2.280*
1973	2.280*

*Estimated
**Excludes funds liquidated to finance deficits

The most important point to note from Table 5 is that approximately \$2 million in excess of investment income is being liquidated annually to help meet operating expenses — a sum which, if retained, would be used to generate additional income. Since the financial viability of the University depends fundamentally on the rise in value of its Endowment, the growth of the Endowment must be protected.

Cornell is a well endowed university, but this brief account of its recent financial history shows how easy it is for even such an institution to slip into deficit financing. The Tables further reveal that once having slipped into this mode, sudden remedies are not available. The academic and financial momentum of universities makes rapid response to a deterioration of revenues impossible.

As Table 3 indicates, Cornell is currently committed to a program of deficit reduction designed to produce a balanced budget for the year 1973-74. It is important to bear in mind that the process of deficit elimination has required a 10 per cent reduction in the base of the academic budget and a 15 per cent reduction of the base of non-academic budgets. This program, if repeated again and again, would do serious damage to academic and support activities, further starve deferred maintenance, and make the initiation of new educational programs impossible. Thus, we must try to forge a new academic-financial balance which will obviate the need for continued deficit reduction.

The analysis of expense and income trends which follows is made for the period 1967-70. While this choice is somewhat arbitrary, the 1967-70 period was chosen partly because it coincided with that used for a national study by the Carnegie Commission, and partly because it was the most recent three-year period prior to initiation of the current program of deficit reduction. It suffers from the disadvantage of being a period of relatively high national inflation and one in which the rate of increase of income slackened off, and it does not reflect the relative improvement in the relation of income to expense that has taken place since 1970. The point is, however, that that improvement has been made possible in large measure by a series of program reductions — an effort that we hope will not be necessary to repeat. The purpose of the analysis is to compare the rates of increase of key Cornell expense and income categories with national and historical trends, and on the basis of that analysis to estimate reasonable target rates of increase for the future that offer the hope of avoiding deficits *without* having to repeat the 1970-74 across-the-board program cuts. In so far as national conditions change after 1974, or the modifications made at Cornell during the 1970-74 program fundamentally alter the prospects, the projections given in this report would have to be re-evaluated. Thus, it will be important to follow both the experience of the current deficit reduction program, and national trends, in order to test the reasonableness of our projections. In our judgment, the targets we have set are reasonable, achievable, and can do the job.

Once the budget is balanced, the critical requirement is to match the annual rate of increase in expenditures to the annual rate of increase in income. If the rate of increase of expenditures exceeds that for income, then we will again sink into deficit financing and again be forced to engage in further cutting of budgets. To avoid this development, Cornell must adjust its academic program to create a sound fiscal base for its operations. Continued deficits would impair the vigor of current operations and, more important, undermine the basic fiscal structure on which generations of future Cornellians must rely. A necessitous university can not long remain free and independent — free to seek and speak, independent to choose its unique programs. It is essential that we take steps to insure the financial preconditions for preserving that freedom and independence.

Expenditures

The purpose of the examination of expenditures and income which follows is to ascertain the likely rates of growth of both; only by keeping them equal can the budget be kept in balance. The methodology adopted is not highly sophisticated, and the results are not always as precise as one might wish. However, this kind of analysis does set forth the major parameters, it attaches orders of magnitude to them, and it highlights the nature of possible trade-offs.

In analyzing the trends in major expenses and income, we have tried to use categories that will not only help us to understand what has happened but also lay a base for prescribing remedies. We have also tried to aggregate the statistics in ways that would permit us to compare the Cornell experience with that of other colleges and universities. It is necessary to bear in mind, however, that our analysis has been dictated in part by the ways in which Cornell's financial records are actually kept and classified, and the result has been a series of compromises: the information is not always available in the most useful form, and sometimes the way in which we treat it appears not entirely rational. We will note some of these limitations below.

Table 6 in the Appendix shows selected Endowed Colleges (Ithaca) Current Fund Expenditures for the period 1960-71 broken down by major functions. The bottom row gives the percentage increases in the 11-year period since 1960. The growth is seen to be large indeed, even if one extracts the 44 per cent increase that might be attributed to inflation in the economy at large as measured by the rise in the GNP deflator. (Since this is the price index applicable to the entire gross national product, it is generally regarded as the best measure of inflation in the economy at large. The consumer price index, as its name implies, measures the trend in the prices only of goods and services sold to the final consumer. Its increase was 40 per cent in the same period. Any economy-wide measure will of course either exaggerate or underestimate the impact of inflation on any single industry, company, or household; as we will see, the impact on universities has been unusually severe.) These increases all exceed 200 per cent, with "Organized Research," "Student Aid," "Safety Division," and "Libraries" all exceeding 300 per cent. During this same period, as Figures 4 and 5 show, the Endowed Colleges experienced the following increases: "undergraduate students 22 per cent, graduate students 110 per cent, and professors 75 per cent. The corresponding trends in student to faculty ratios are depicted in Figure 6. It is difficult to rank the activities accounting for this general expansion. Expanded research and graduate activities were clearly fundamental driving forces, but a general enrichment, diversification, and proliferation of programs also contributed to the final result.

Table 7 reduces the data of Table 6 to a per-student basis in order that enrollment increases may be taken into account and comparisons made with other institutions. In addition, the yearly percentage increases are shown in order to allow the reader to trace more easily the rates of change and to estimate the effects of inflation, which played a major role in the late 1960s. The average annual rates of expenditure increase per student for selected categories are shown in Table 8, which is the basic table for examination of expenditures. Included in Table 8 are comparative data from a study jointly sponsored by the Carnegie Commission on Higher Education and the Ford Foundation. This study, conducted by Professor E. Cheit of the University of California at Berkeley, resulted in a book entitled "The New Depression in Higher Education: A Study of Financial Conditions at 41 Colleges and Universities" (29). Although Cornell was not among the 41 institutions referred to in the subtitle, the Cheit study does include detailed information about such schools as Stanford, Harvard, Berkeley, Chicago, Michigan, Minnesota, Texas, NYU, Syracuse, Tulane and North Carolina.

The data in Table 8 are interesting because they show that no single function is responsible for the growth: growth permeates the system to such an extent that no simple explanation will suffice to explain its cause. The fact that "Instruction" and "Student Aid" had high rates of increase per student for the decade indicates that the increasing costs in these areas far exceeded the growth in numbers of students or faculty. Notice that while the three-year period 1966-69 was one in which serious deficits arose, at Cornell there were already indications that the rate of growth was being slowed down. But not until the year 1970-71, when the Board of Trustees decided to bring this growth under control, was there

anything approaching a full realization of the University's dilemma. The critical question remains whether Cornell can keep its future rate of expenditure increase within manageable limits.

Examination of the Cheit study (29) shows that Cornell falls between the categories "Schools headed for financial trouble" and "Schools in financial difficulty." Although the definitions of these categories are necessarily not precise, both their written descriptions and the data in Table 8 place Cornell in this position. Notice that in three categories, schools "not in financial trouble" have higher rates of increase than those "headed for financial trouble." As Cheit explains, this apparent anomaly represents a decision of the former group to put more resources into management and support activities than into personnel. Furthermore, the Cheit study shows that the two categories "Instruction and Departmental Research" and "Student Aid" do display a diagnostic difference in comparisons of those "not in financial trouble" with the other two groups. As noted above, these two categories had the largest rates of increase at Cornell. "Instruction and Departmental Research" is directly related to faculty salary levels. Cheit found from the 1969-70 AAUP grading of average compensation (31) that "...the schools not in financial trouble are approximately one-half a grade below those of the other institutions in the study. The difference in salary scales has apparently not had an effect on retention of faculty and has had only a limited effect on recruitment." Cornell is now in the highest AAUP grading of average compensation.

Table 8 also shows that "Student Aid" is a critical category for distinguishing those who are "in" from those "not in" financial trouble. The large average increase shown for those "schools in financial difficulty" is in part a reflection of the fact that such schools are overwhelmingly urban schools. On the other hand, Student Aid accounted for about 8 per cent of current fund expenditures at three schools, while at Cornell the figure is about 10 per cent. It should be pointed out that the definition of Student Aid at Cornell is not without ambiguity. The values of Table 6 are derived from the official Financial Reports, but the \$9 million figure given there differs markedly from the \$12 million figure for "aid to undergraduates" given by the Office of Scholarships and Financial Aid (8). The point to emphasize is that, although the Cornell figures for Student Aid in Table 8 may represent the rate of increase reasonably well, the background data of Table 6 provide at best a lower bound on funds used for "Student Aid," and the total funds used for this purpose are much larger.

In order to determine the contribution made by each category to the Total Expenditures average annual rate of increase per student (Table 8), one must know the fraction of each category in the Total Expenditures. Table 9 shows the percentage distribution of Total Expenditures (Table 6) by functional category.

Function	Percentage		
	1960	1967-68	1971
Support Activities	48.1	35.8	39.7
Instruction & Dept. Res.	26.5	29.0	29.5
Student Aid	7.6	9.7	10.0
Organized Research	13.7	20.3	16.8
Safety Division	0.7	0.6	1.0
Libraries	3.4	4.6	4.8

While Support Activities accounted for 48 per cent of the expenditures in 1960, they accounted for only 40 per cent by 1971. All the other categories of expenditures increased their share. Notice that except for the conglomerate category "Support Activities," "Instruction and Departmental Research" (non-sponsored) is the largest category.

Before we embark on a detailed analysis of this information, it is necessary to consider the overall effect of inflation on University outlays. Table 8 shows that for the three-year period 1967-70 the average annual rate of total expenditure increase at Cornell was 7.5 per cent. During this period the Consumer Price Index measure of inflation was about 4.2 per cent. Thus, if we take the viewpoint that *all* categories were equally influenced by inflation, then 4.2 parts of the 7.5 increase in the aggregate were due to inflation — i.e. inflation accounted for 56 per cent of the dollar value increase in total University expenditures during that period. National inflationary influences, which are beyond the control of

Cornell, have a manifestly preponderant influence on our financial well being.

In the analysis which follows, we will determine the fraction each category contributes to the 7.5 per cent average annual rate of total expenditure increase per student. The analysis is based on averages over the three-year period 1967-70.

Instruction and Departmental Research — To estimate the contribution of this category to the total 7.5 per cent increase, one multiplies the 8.4 per cent of Table 8 by the 29.0 per cent of Table 9 to yield 2.4 per cent. Thus, of the 7.5 per cent total increase, Instruction and Departmental Research accounted for 2.4 percentage points, or $2.4/7.5 \times 100 = 32$ per cent of the total increase. That is to say, while this category accounted for 29.0 per cent of total expenditures, it accounted for 32 per cent of the increase, because its rate of increase (8.4 per cent) was somewhat greater than that of the total.

Student Aid — Similarly for this category, one multiplies the 8.7 per cent of Table 8 by the 9.7 per cent of Table 9 to give 0.8 per cent. Thus, of the 7.5 per cent total increase, Student Aid accounted for 0.8 points, or $0.8/7.5 \times 100 = 11$ per cent of the total increase. So Student Aid, amounting to 8.7 per cent of total expenses, accounted for 11 per cent of their increase in this period.

Safety Division — Although it now contributes but 1 per cent of the expenditures, this is shown as a separate category because Cheit (29) attributes special significance to campus disruptions as a factor in both expense and income. Campus disruptions cause added expenses for insurance, property replacement and repair, legal fees, damages and defacement, losses of time due to building closure, diversion of staff time and the costs of disciplinary hearings. However, we have not attempted to break out these expenses for Cornell. The "Safety Division" category includes safety services, and the like; while it is not synonymous with "campus disturbances" it is the closest budgetary category and is certainly related to this problem. Table 8 shows that the 1967-70 average annual increase was 32 per cent, so using the 0.6 per cent from Table 9 one gets about 0.2 per cent. Thus, of the 7.5 per cent total increase, the Safety Division accounted for 0.2 points, or $0.2/7.5 \times 100 = 3$ per cent of the total increase. These figures are of the same order of magnitude as the lower bound estimate of Cheit (29) which resulted from a detailed analysis of campus disruptions at one university. The upper bound was about three times the lower bound figure; and if we were to take into account the other costs of campus disturbances mentioned above, the share would be significantly greater.

Remainder — with respect to the remaining total expenditures, we will follow the procedure of Cheit in order to get results comparable with those issuing from his study of other universities, even though his method in some ways appears irrational. We will try to point out those irrationalities as we go along. First, we aggregate the three remaining categories of Table 9, "Libraries," "Organized Research," and "Support Activities" as one unit, and determine the portion of their increase attributable to inflation, which averaged 4.2 per cent during this period. (We use the consumer price index here because that is what Cheit used. Actually, the use of the GNP deflator would not produce a significantly different result.) These remaining categories constitute 60.7 per cent of the total; hence, inflation in the Remainder accounted for 2.5 points, or $2.5/7.5 \times 100 = 34$ per cent of the total increase. (If one recognized that inflation was a factor in the growth of "Instruction and Departmental Research," "Student Aid," and "safety Division," as well, then this 34 per cent figure could be viewed as a lower bound on the contribution of inflation. The real contribution of inflation lies someplace between 34 per cent and the previously calculated value of 56 per cent.)

Following Cheit's procedure, we now estimate how much of the 7.5 per cent rise in Total Expenditure was accounted for by what he terms "growth of responsibilities and enrichment." Table 10 shows the results and gives comparative data from the Carnegie Commission study. Column I shows the results of the previous analysis, listing the contribution of each category of expenditure and of inflation to the 7.5 per cent. The "New Responsibilities" category was determined simply by subtracting the sum of the first four categories from the total, 7.5. (See Appendix III, Note 1, for a commentary on Cheit's method of accounting for inflation and necessary "enrichment.")

Column II shows a possible projection for Cornell on the assumption that general inflation in the economy at large is reduced from 4.2 per cent to 3.5 per cent. The annual rate of increase in Instruction and Departmental

Research is reduced from 8.4 per cent to 5 per cent, the Safety Division increase is reduced by one-half and the rates of increases in Student Aid and "New Responsibilities" left unchanged. This looks like a very stringent projection because it projects a decrease in the discrepancy between the rates of general inflation and of increase in Instructional and Departmental Research expenditures from 4.2 (8.4 minus 4.2) to 1.5 (5.0 minus 3.5) percentage points. This expectation, standing alone, would almost certainly be unrealistic, but the appearance is somewhat deceiving, because of the peculiar measures Cheit uses. See our alternative computation in Appendix III, which produces a similar final estimate of a realistic goal for the increase in total expenses. In any event this set of assumptions still results in a 6 per cent annual increase in expenditures. The only leeway present in this projection is in the "New Responsibilities" contribution of 1.6 per cent, and if this were removed entirely a kind of minimum austerity projection is obtained which results in a 4.6 per cent increase.



David L. Call



H. Justin Davidson



Arch T. Dotson



Donald F. Holcomb

Column III shows the comparable results from the Carnegie Commission study of "schools in financial difficulty." Cornell's experience (Column I) is similar to these schools in the first two categories, but was considerably more favorable in the last three categories of expenses. Column IV shows a "best" judgment projection of Cheit. It maintains the 4.2 per cent inflation rate but trims the other categories to prudent levels. It results in a 6.4 per cent rate of increase. Except for the inflation rate, it is essentially the same as Column II our "possible Cornell projection."

The totals shown in Table 10 together with the preceding discussion indicate that probable rates of growth of expenses fall between 6 and 7 per cent per student per year. If inflation decreased to 3.5 per cent then Cornell could hold to a 6 per cent increase, but if inflation is not reduced the increase could approach 7 per cent. These results can be compared with a figure of 7.5 per cent found by Bowen (28) by averaging over much of United States history. Thus anything less than 7.5 per cent is below the historical trend.

In conclusion, we believe that Cornell should press for holding the rate of growth in expenses per student to 6 per cent. To do so it will be necessary to continue to hold a tight rein on expenditures. Furthermore, unless inflation rates are reduced, this 6 per cent will provide only a slim margin of safety. (See Appendix III, Note 2, for a commentary on the degree of stringency involved with various assumptions.)

Income

The analysis of income parallels that given for expenses. The major income categories are identified and their likely rates of increase ascertained. Best-judgment projections are then made and compared with the expenditure values obtained previously.

Tables 11 and 12 present the basic data for income from the Cornell Financial Reports; they are analogous to Tables 6 and 7 for expenditures. The income statistics reveal some relatively large fluctuations from year to year,

reflecting the receipt of major gifts, initiation or termination of sizeable sponsored projects, or changes in national economic conditions. Because of these relatively large fluctuations, projections are based on experience averaged over a number of years.

As with expenses, the first thing to observe, in the bottom row of Table 11, is how large the percentage increases have been over the 11-year period. The 202 per cent increase in Total Income should be compared with the 208 per cent increase in Total Expenditures (see Table 6). This difference over the 11-year period is but 6 per cent and reflects the fact that in a given year the differences are relatively small — of the order of one-half to 1 per cent of the total operation. But, as Mr. Micawber observed, in such small discrepancies lies the difference between happiness and misery.

The category Student Fees includes income primarily from tuition and fees and net accessory instruction income derived from providing endowed college instruction to students in the Statutory Colleges. It accounts for about one-third of the total income, and it is the main category of income over whose magnitude Cornell can exercise some measure of control.

Gifts income of Table 11 includes both Unrestricted and Restricted gifts which come to Cornell each year and are used for operating purposes, but it does not include gifts added to endowment funds. An important component is annual alumni giving to the Cornell Fund, which recently has had the best record in the country and has enjoyed amazing success (35), even in times of adversity. The annual campaign now brings in over \$3,500,000, from 30,000 loyal alumni.

Investment income comes from three separate groups of investments. The Endowment Fund Pool is a balanced fund in the sense that it is selected with an eye to optimum annual income and only modest gains in appreciation. The Capital Fund Pool consists of money unrestricted as to the use of either income or principal, and is managed under a total return concept — emphasizing both dividends and appreciation. The Board of Trustees' authorized distributions rate from the Capital Fund is 8 per cent of the Fund's average market value over the past five years but may be adjusted downwards to 6 per cent to more closely match distribution rates used by other universities. Hence, distributions in the future may well be expected to decrease. Examination of the annual reports of the Treasurer of the University reveals that Cornell's record is good (36). We fared relatively well in the market drop of 1969-70 and the overall record compares quite favorably with market indices. Table 12 shows that over the 1960-70 decade our total investment income increased at an annual average rate of 11.6 per cent. However, it is doubtful that we or the securities markets will do as well in the next five years or so, and the 12 per cent average increase of the 1967-70 period cannot safely be projected because that showing was heavily influenced by two unusually strong years (see Table 12). The third category, Separately Invested Funds, contains some real estate, mortgages and trust funds invested in accordance with terms of gifts.

Table 12 also shows the income from public funds. Sponsored research contract monies account for about 77 per cent of this category. Also included is overhead and salary recovery on sponsored research as well as New York Bundy funds. While the 1960-70 average annual rate of increase of income was 14.7 per cent, the greatly reduced average rate of increase in recent years indicates it is difficult to project very substantial increases in this source of income in the near future.

The category "Other" includes income from such related activities as housing, dining, athletics, University Unions, WHCU, University Press, etc.

We now proceed to analyze the rate of increase of income per student in a manner similar to that performed for expenditures. Table 13 shows the contribution of each category to the Current Income and how these shares have changed with time.

Function	Percentage			
	1960	1967-70	1971	Projected
Student Fees	37	31	30	34
Gifts	11	7.5	12	10
Investment Income	8	9.3	10	10
Fed. & State Government	22	35	32	30
Other (housing, dining, ..)	22	17	16	16

Table 13 shows that over the decade Student Fees declined in their relative contribution, while income from Federal and State governments rose appreciably. (The

column "Projected" will be considered shortly.)

Table 14 summarizes the average annual rates of increase per student for each of the categories of income and also reproduces the total expenditure data from Table 8. The discrepancy between the 8.4 per cent figure for Total Income and 8.6 per cent for Total Expenditure over the entire decade shows the emergence of the deficit even though the earlier years were years of budget surplus. It is the experience of 1967-70, when expenses increased 7.5 per cent, and income only 6.8 per cent annually that depicts the emergence of deficits in recent years and the problems that now face us. Thus, the slowing down of the rate of growth of income was the primary cause of the financial squeeze.

Table 14 also includes comparable data for the decade from the Carnegie Commission study. Since the difference between income and expense for those schools "not in trouble," those "headed for financial trouble," and those "in financial difficulty" were -0.4, -0.7 and -1.1 per cent respectively, while the discrepancy for Cornell was only -0.2 per cent, it would appear that we are in a situation of virtual affluence. But any such conclusion, based on the experience of the entire decade, would be misleading. It is clear that our deficit in recent years would have been far worse but for the extraordinary success of our expense curtailment, income enhancement and fund-raising effort, it is equally clear that we cannot count on a continued 29.1 per cent average annual rate of growth in our receipt of gifts!

Having developed estimates of feasible annual percentage increases in expenditures per student, in Table 10, we now proceed to examine under what conditions these can be balanced by income. The approach is similar to the one for expenditures. For the period 1967-70 we take the percentage of income by functional categories from Table 13 and multiply by the corresponding percentage growth figures in Table 14, and in this way calculate the contributions of each income category to the 6.8 per cent average annual increase in the total. For example, for Student Fees we multiply their 5.4 per cent annual increase by their 31 per cent share of total income, and so discover that Student Fees contributed 1.7 percentage points, or $1.7/6.8 \times 100 = 25$ per cent of the total increase. That is to say, while this category accounted for 31 per cent of the total income, it accounted for but 25 per cent of the increase. The results of these calculations for all categories are shown in Column I of Table 15. Thus, Gifts contributed the most (2.2 per cent) to the rate of increase, with Student Fees next (1.7 per cent), and with the other three categories roughly equal. The role of Gifts is distorted here because of its unusually large average annual rate of increase, 29.1 per cent, during 1967-70.

In order to construct a plausible projection one must assign some feasible best estimates for each category and choose a Total Income annual rate of increase per student to balance what we think is an achievable rate of increase in expenses. The projections are shown in the third row of Table 14: these represent "best judgments" of the achievable rates of increase in each category of income.

The following comments will give some perspective on the "best-judgment" choices of the third row of Table 14. *Gifts*: as previously mentioned, fluctuations in this category can be quite large, making projections rather difficult. Certainly, one could not expect the 29.1 per cent rate of increase of 1967-70 to continue and even the 14.1 per cent rate of increase for 1960-70 seems too optimistic for the future. The 10 per cent choice is believed by the Development Office to be within reach, although it would be a welcome condition if the estimate is too conservative! *Investment Income*: the 10 per cent value chosen is somewhat less than the ten year 11.6 per cent average rate of increase, thus reflecting certain reservations on the future strength of investment markets. *Federal and State Government*: the 14.7 per cent rate of increase for 1960-70 is clearly far greater than anything that can be expected in the foreseeable future, while the 3 per cent value for 1967-70 is probably too low. A value of 4 per cent was selected to indicate a rate of increase lagging somewhat behind the general rate of inflation expected in the economy as a whole. *Other*: this category is a collection of assorted support functions the vast majority of which are programmed to either break even or return a small profit; hence, a 5 per cent rate of increase should be the target for such activities. The annual rate of increase of Student Fees, shown in parentheses as 5.9 per cent will be determined as a result of later calculations.

In addition to these rates of increase, one must make projections for the percentage of Total Income

contributed by each of the functional categories; see the "Projected" column of Table 13. The category *Federal and State Government* is projected to decline to 30 per cent in its fractional contribution. The following discussion describes the factors at play: (1) shifting governmental priorities away from university research and the concomitant support of graduate students; (2) a tendency toward regional equalization of federal research funds, thus diverting some monies from the traditionally strong Northeast sector; (3) while Cornell is the largest recipient of NSF funds, the competition for limited resources will be severe.

Oposing these trends is the potential for increased income from salary recovery on sponsored research. Table 16 shows the volume of sponsored research during the period 1960-71. The growth was prodigious. But notice the small percentage of salary recovery. Although it is assumed that faculty appointments involve a 50 per cent commitment to research, Table 16 shows that nearly 100 per cent of this effort is being supported by "instructional" funds. In a comparative study of nineteen institutions, the NSF found that Cornell was at the bottom of the list in percentage of funds retrieved from salary recovery. If this situation were altered, additional net income could be obtained. The category *Other* in Table 13 is assumed to stay at about 16 per cent. The *Gift* and *Investment Income* categories are projected to contribute 10 per cent each to the total, although this does assume a slight rise over previous averages. In summary, the projected contributions are shown in Table 13 and the balance of 34 per cent must be furnished by *Student Fees*.

We are now in a position to estimate the average annual rate of income in Student Fees per student and to determine the change in the size of the student body. Following the procedure used earlier, we multiply each of the fractional projected contributions shown in Table 13 by their corresponding average annual rates of increase of income from Table 14 to obtain the contribution of each to the rate of increase of total income. The results for Gifts, Investment Income, Federal and State Government and Other are shown in Table 15, column II; their sum is 4.0. Next, we require that the rate of increase of total income equal that for expenditures, namely 6 per cent. This leaves Student Fees with a contribution of 2 per cent, shown in parentheses in column II. If Student Fees is to share 34 per cent of the total income, then the appropriate rate of increase of income per student is about 5.9 per cent if Student Fees are to produce 2 per cent of the rate of increase of total income per student. The value 5.9 per cent is recorded at the appropriate place under Student Fees in Table 14.

With the fraction of total income accounted for by Student Fees rising from 31 per cent to 34 per cent, and the rates of increase per student known, we can now estimate the required increase in the number of students. *The increase in the number of students required is about 1000 students in the Endowed Colleges.* (The details are given in Note 3, Appendix III.) This analysis is of course subject to criticism because of the estimates made along the way and possible interactive effects between income and expenditures. A brief discussion of the sensitivity of the results to various limiting assumptions is given in Note 4 of the Appendix III.

In conclusion, this analysis of expense and income is not so much intended to result in precise estimates, such as 1,000 more students, as it is to make visible the orders of magnitude involved, the rates of change, and above all else the interactive and complex nature of the system. Trade-offs are indeed inescapable and no amount of wishful thinking will obviate them. Although the above approach provides a quantitative overview of the University, it should be kept in mind that the University's goal is education, and financial matters only enable the University to pursue that goal. However, academic needs are coupled with financial necessities and the ability of a university to achieve its educational goals is certainly dependent on its financial well being.

Summary of Expense and Income, Conclusions

1. By the definitions of the Carnegie Commission Study, Cornell was in the "headed for financial trouble" category.

2. Because income growth permitted the University to substantially increase expenditures, the cost-income squeeze is due primarily to a decrease in the rate of income growth.

3. During the decade of the 1960s, all educational costs rose at record rates and no single expense category can be singled out as the cause; however, graduate studies, research, and program enrichment were major causes.

4. The pervasive nature of all cost and income factors, together with likely public policy trends and decisions, lead one to conclude that the basic financial problems will plague higher education for a considerable length of time.

5. It is imperative that the budget balancing plan in force be pursued vigorously, and that once achieved, deficit financing not be permitted to reestablish itself as a mode of operation. Continued deficit operation produces a demoralizing reaction leading to a psychology of retrenchment and helplessness. Further, deficit financing reduces the University endowment, thus eroding earnings of future income.

6. Because of the very limited controls over income, there is great need to effect controls over expenditures and to raise the general level of consciousness with regard to them. The cost-income estimates show that the costs tend to exceed income, so reducing costs is important for maintaining a balanced budget.

7. Inflation in the national economy is a critical element in increased costs. If inflation is not reduced below its recent relatively high rates, then educational expenditures are likely to rise at an average annual rate of at least 7 per cent per student. With a high inflation rate, Cornell would have to initiate very stringent measures to keep the average annual rate of expenditure increase per student to 6 per cent.

8. If national inflation falls to a level of about 3.5 per cent, then Cornell should be able to achieve an expenditure growth rate per student of about 6 per cent and balance this with a 6 per cent rate of increase per student in income. This would require careful controls on expenditures, but would allow for modest resource allocation for additional responsibilities.

9. A 6 per cent rate of increase of total income per student should be possible provided that on a per student basis

—Gift income increases of 10 per cent can be maintained.

—Investment income increases can be maintained at their long-time rates.

—The University administration and faculty maximize income from public sources i.e. federal and state governments, sponsored research.

—A greater fraction of income be derived from Student Fees, thus requiring an increased enrollment and higher fees.

10. The growth of Financial Aid to students must be carefully managed in order to meet both educational objectives and financial realities.

11. The greatly increased resources devoted to the Safety Division must be brought under control.

12. Cornell should not expect rescue from public sources. The best interests of the University will be served if we learn to stand on our own base and by the intelligent use of resources maintain a stable academic and financial program.

13. The cost-income margins at Cornell are sufficiently small that with determination and understanding by the University community, a stable financial operation can be achieved. To do this requires the cooperation of all members of that community — undergraduates, graduate students, faculty, library staff, research personnel, administrators, support staff, alumni and members of the wider Cornell fellowship.

RECOMMENDATIONS

The Need for Planning

1. The President, Provost, Deans and Department Chairmen must make systematic academic planning their principal responsibility. Planning must be recognized and organized as a high level function, involving a coordinated approach to a whole series of substantive topics such as:

- 1) Size and composition of the student body
- 2) Size of the faculty
- 3) Allocation and reallocation of resources
- 4) Levels of student support services
- 5) Size of support staff
- 6) Role of graduate education and research
- 7) Financial aid
- 8) Faculty and support staff salaries and benefits
- 9) Generation of income
- 10) Academic and support buildings and facilities
- 11) University versus contract services;

Equally important, the University Administration must organize itself for the effective implementation of those plans.

1.1 Higher education is now emerging from an era in which academic planning in most instances has not been an activity consciously performed or understood by the

University community. Cornell presently depends on the accumulated knowledge, intuition and good judgment of its administrative staff. But the pressures of the staff's daily responsibilities prevent it from developing a comprehensive and integrated approach to making our basic educational and financial decisions. Cornell must acquire the capacity to plan in a comprehensive manner.

1.2 The need for planning in a university poses a serious dilemma: The inherent tension between the need for an academic focus and the realistic need for centralized authority and momentum. Because Cornell is an institution in which academic purposes and academic achievement are highly prized, we envision any planning effort as requiring the involvement of Cornell's academic officers, students and faculty. Participation by the faculty must be assured at all stages if their responsibility for educational policy is to be maintained. We hope for an academic planning effort that will move far beyond the physical planning capability which has been developed in recent years. While it does not choose to recommend a particular administrative structure for this effort, the Committee is convinced that it should be carried out on at least the vice-presidential level. A small professional staff is needed to man the support function and provide focus and maintain momentum. The Deans and Department Chairmen would have prime responsibility for the formation and implementation of comprehensive plans.

1.3 This recommendation implicitly calls for a greater degree of centralized control and administrative intervention in affairs of the faculty than the University has experienced in the past. We believe this to be necessary. If a bureaucratic planning agency aloof from the academic programs were to evolve, the intentions and objectives of this recommendation would not be fulfilled. The natural inclination to think in terms of "my college," "my division," "my office" must be suppressed. The planning the Committee envisions requires involvement of the whole University and communication — the exchange of information and ideas — across all lines and up and down.

1.4 By itself, planning will accomplish nothing if, after the projections are made, they are not implemented. Having once established policies, the essential thing is to make the decisions that will activate them.

1.5 Also implicit in this recommendation is a recognition of the cost of a comprehensive planning effort. It may seem chancy to divert funds to such a purpose in an era of financial stringency, but we believe the need justifies the hazard, especially if one considers the accumulated costs Cornell might bear by continuing in its present mode. The Committee urges that the necessary resources be provided to support the creation of a planning capability.

1.6 The Cornell administration must recognize the pressing need for planning and organize a continuing effort which will lead to a 3-5 year Program Plan for the University.

2. *Institute unit planning at the smallest academic-budgetary program level. Unit plans would include:*

- 1) Definition of program purpose and scope
- 2) Staffing plans
- 3) Financial considerations
- 4) Performance measures
- 5) Evaluation procedures

2.1 This recommendation is intended to emphasize the pivotal planning role of the basic academic units of the University. (These units are usually departments, but centers, special programs, small schools and colleges, or groups of departments could be appropriate subdivisions.) It is primarily through unit plans that many of the parameters and topics discussed in these Recommendations will be defined. Again, the intention is to have those most directly involved in the process of education play an active role in planning.

2.2 The five topics listed in this recommendation are the main components of a unit plan and are necessarily interconnected. The ad hoc procedures of the past will not be adequate for the future. Understanding Cornell must begin with the basic units understanding themselves with 3-5 year plans.

Program purpose and scope — While it may appear that mission definition is a minor task based on easy extrapolation of current modes, such is not necessarily the case. The periodic, thoughtful exercise of reexamining the justification and direction of activities can (and often should) be a wrenching experience. The reexamination should include a review of the main thrusts of specialized activities, together with a determination of fractions of unit effort devoted to undergraduate teaching, graduate teaching, research and scholarly activity, professional service and extension. It should include consideration of

adjacent programs at Cornell as well as comparative efforts at other institutions. A well defined program purpose and scope can strengthen the basis for a cohesive effort.

Staffing plans — Because education as presently conceived depends heavily on the individual performer — the faculty member — staff development is at the heart of any unit planning effort. Specialization relative to program purpose and scope, size of unit faculty, age distribution and percentage tenured are factors which should be examined and clearly understood by all ranks in the unit. Good staff planning based on hard data is the route by which selective excellence is achieved.

Financial considerations — Budget projections for 2-3 years into the future should be prepared as part of a unit plan. At present it is not easy for most faculty to appreciate the financial implications of academic and staffing decisions; and it will be increasingly important for faculty to know and understand the economic factors which accompany academic choices. One way to increase faculty awareness of these factors is to make more and better financial information available. Only then can program and personal aspirations be reconciled with financial considerations. The ultimate incentive for staff participation in planning is the realization that the prosperity and welfare of a unit are heavily dependent upon the unit's various resources and the uses to which they are put. The realities of resource allocation can have both a sobering and stimulating effect on decision-making. College administrators will have to lead in the difficult area of determining educational costs. Even indices, such as cost per student credit hour, can be misleading due to the complicating factor of joint costs: joint costs of undergraduate and graduate functions, joint costs of major and service roles, joint costs of teaching and research or extension, joint costs of academic and support roles, etc. Because of present complexities, greatly improved measures of program input and output costs will have to be developed. Progress in this direction might well require the following steps to be taken:

- a) Program structure and accounting procedures adjusted to permit recording cost by program;
- b) A procedure developed for analyzing faculty activity by program;
- c) A system whereby joint costs can be allocated.

Performance and Evaluation — Unit plans conceived along the lines discussed above would necessarily include consideration of performance information which would be fed back into the system, thus modifying and refining the existing program. Self-evaluation could be complemented by periodic outside reviews of Cornell programs. It is difficult for faculty to be totally objective in assessing the quality of their own performance and an outside, nonadministrative review would be a valuable source of information for producing a balanced assessment. An important consequence of the process of unit planning should be an increased awareness by both junior and senior faculty of their individual responsibilities and contributions as unit members.

3. *Proceed now to develop a modern measurement and information system which will provide:*

a) *An improved system of reporting academic efforts and results.*

b) *The data resource base for program planning and evaluation including cost indices of diagnostic significance in such areas as:*

- 1) undergraduate instruction
- 2) graduate instruction
- 3) research and scholarly work
- 4) support activities
- 5) centers and special programs
- 6) number of courses offered
- 7) course size
- 8) minimum or critical program size
- 9) teaching loads

3.1 Traditionally, measures of academic effectiveness have not been well defined and when such measures have been applied, financial dimensions have been conspicuous by their absence. Although the faculty and administration make daily choices which affect academic programs and the personal welfare of the staff, measures of academic results are crude and lack definition, comparability and consistency over time. Because of the nature of the decision making process in a university wherein each discipline strives to improve its own program and eminence, it is not surprising that this state exists. While there is no substitute for this primary role of the discipline, it results in proliferation, self-sustaining justification and lack of concern for the combined effect of disciplinary decisions. The higher levels of administration are thereby confronted with the accumulated pressure of separate disciplinary aspirations

and are forced to make decisions with little quantitative or comparative data. Regardless of historical precedent or the seeming distasteful nature of things quantitative and pecuniary, Cornell must develop measures of program effectiveness and cost indices if it expects to plan rationally for the future. In short, Cornell must understand itself.

3.2 The difficulty of developing a reliable measurement and information system should not be minimized, especially at Cornell where diversity and independence are cherished and often beneficial values. However, we will have to realize that there are costs to diversity and that the aggregation of isolated decisions to maintain diversity can amount to sizeable financial obligations. Only such gross indices as student/faculty ratios, fraction of tuition to total income, degree production, or research support per faculty member have been determined and even such data are often scattered and not available in a comprehensive form. The information is not available which reveals the interactive nature of the many financial-academic decisions. For example, cost indices of various undergraduate and graduate programs do not exist, and the Committee found only a few scattered administrative attempts at estimating the cost of instruction. It was only during the course of the Committee's deliberations that a factual compilation took form and was published in June 1972 as a "Factual Profile of Cornell University" (1). In spite of the massive effort which this volume represents, it does not contain the data or information necessary for the purposes either of planning or decision making. In support of the planning effort called for in Recommendations 1 and 2, it is essential that Cornell generate a reliable data recourse base. *There is no substitute for good data widely distributed and understood.*

3.3 The diversity and independence of departments at Cornell have tended to encourage the proliferation of courses with little regard to the economic consequences. Course proliferation is accompanied by reduced student registration per course and so about 45 per cent of the courses offered have 10 or fewer students enrolled. While some argue that such small classes necessarily result in vastly superior instruction compared to appreciably larger classes, there is little evidence to support the claim (5). One suspects that in some cases virtue is attached to extravagant practice. The increase in the number of courses is also directly related to the growth of graduate education. (2). Faculty members desire to give courses to suit their own specialized interests. The Committee has refrained from recommending that formal University-wide review procedures be established to justify each course offering. Ideally, College, School or Departmental units should take the initiative in exercising the required self-discipline and professional responsibility, and the Committee believes that the units should take leadership in this area. If that initiative is not forthcoming, the Administration should require the Colleges to sharpen their attention to this problem.

3.4 In spite of the obvious direct relation of faculty teaching load to productivity, no readily available data describes teaching load practice at Cornell, nor are there any widely recognized policies governing the subject. It is generally considered that a weekly teaching load of 12-15 contact hours is a full time activity and that this load, thought unconsciously heavy, does not permit simultaneous research and scholarly endeavor. But as Table 17 shows, 15 hours a week was the average teaching load in "research universities" forty years ago as compared with 5-6 hours today, when it is assumed that about half of each faculty member's time is devoted to research. Based on this assumption, the teaching load would be in the 5-6 hour range. The assumption is questionable as regards Cornell, where, although flexibility in determining individual teaching loads exists, the practice of assigning the same teaching loads in a given unit has developed. This ignores the matter of equity while it has the appearance of equality. How do the teaching loads of those faculty members not seriously engaged in research compare with those who are? What of faculty graduate student productivity? Responses to such questions and the open recognition of the actual state of affairs could have a salutary effect on both interpersonal relationships and departmental teaching effectiveness. Any system which pretends to treat teaching productivity and scholarly research seriously must come to grips with the questions surrounding teaching loads.

3.5 The lack of an adequate measurement and information system adds a further dimension to the familiar geographical isolation of Cornell. We cannot take advantage of studies and practices at other institutions if the knowledge of our own is deficient. This extends

beyond mere measures of productivity and includes the need for sharpening the bases for judgments of quality. In a period when difficult choices have to be made, comparative information is invaluable. In fact, one cannot help but wonder whether the situation into which we have stumbled could not have been largely avoided had there been in existence a modest measurement, information and planning effort which tracked Cornell's growth and enabled critical comparisons to be made. Not only would comparative information be useful in itself, but it would encourage the policy of opening Cornell to regular external review. If selective excellence is indeed to be the guiding principle, then comparative evidence is a concomitant necessity.

3.6 The Committee is mindful that a certain danger lurks in the development of a system of program planning and evaluation. An academic community is justifiably apprehensive that an administration might use in a heavy handed manner the controls, restraints, incentives and centralization which accompany planning and thereby poison the well-springs of academic excellence. The potential for abuse only emphasizes the great importance of self-generated faculty responsibility for the effective use of resources. In recommending the development of a rational system of program planning and evaluation, the Committee is not advocating the substitution of formulae for human judgment. The nature and complexity of the system are such that informed judgment will remain at the base of the decision process. Certainly, improved understanding of the interaction between academic and financial parameters can only assist in preserving academic values. The Carnegie Commission study (5,p.22) summarizes the nature of this concern as follows: "(1) Outputs are difficult to specify and quantify. (2) Many services are performed by many different people in many different combinations — the diversity of effort is almost infinite. (3) Morale is at the essence of the enterprise and it is founded on self-determination of effort and self-generated goals.."

"The essence of the solution lies in conditions that (a) draw forth the maximum of voluntary effort at a high level of competence and (b) achieve effective use of resources. The artisan approach generally satisfies (a). Faculty members do hard work (a few abuses aside) and some of their contributions in teaching and research have been superb. This kind of performance can neither be controlled in detail nor coerced. It has been a productive form of mild anarchy — internal free enterprise. The spirit of the enterprise can be killed by driving the public utility approach farther and farther into the details of the operation. We support continued faculty responsibility for the essentials of academic life."

Orders of Magnitude

4. Institute the following overall guidelines of size:

- 1) The total number of faculty should not be increased.
- 2) Embark on a program of careful growth in the size of the student body, with the number of students rising to about 17,500 at the end of a five year period.

4.1 First-order controls on a system like a university are necessarily broad in scope and deal with the overall size of major components. The growth described earlier and shown in the Figures and Tables of the Appendix clearly indicate that the increase in numbers of faculty and support staff in the last ten years has far exceeded the growth of undergraduate students. Table 18 shows the number of Masters and Ph.D. degrees awarded by Graduate Field over the period 1960-61 to 1971-72. Also shown are number of degrees per faculty member. In this period the number of Ph.D. degrees per faculty member rose from 0.27 to 0.40, a 48 per cent increase, and the number of Master degrees per faculty member rose from 0.46 to 0.58, a 26 per cent increase. While higher education has not usually been thought of in terms of norms for graduate degree productivity, and the thought is abhorrent to some, one cannot avoid the question of norms when one is trying to optimize the allocation of precious resources. Recognizing that measures may vary between disciplines, and graduate degree productivity depends upon quality and educational approach, the Committee did not attempt to define proper norms for Cornell. However, in our judgment, the number of Masters degrees per faculty member could be substantially increased and a modest increase in the number of Ph.D. degrees per faculty member could be accommodated. It is in this sense that we believe Cornell has unused academic capacity at the graduate level. Faced with this situation, Cornell must either reduce the size of its academic and support staff or increase the number of students.

4.2 The increase of about 75 per cent in the number of Endowed Divisions faculty during the period 1960-72 is

indeed appreciable. Its justification rests on the great expansion in both the number of academic disciplines and the degree of specialization within disciplines thought necessary for the proper education of students in a modern university. Cornell now has a diverse array of well staffed units. Comparison between the years 1960-61 and 1971-72 shows that in the Endowed Divisions the overall student to faculty ratio dropped 20 per cent while the national trend showed a definite increase in this ratio. (see Table 19). A downward drift of teaching loads occurred simultaneously with the proliferation of courses. It is now estimated that in the Endowed Colleges (Law and B&PA excepted) about 45 per cent of the courses have ten or less students per class. Tables 20 and 21, together with Figure 8, show the details of this situation. Figure 9 shows the distribution by credit hours, and together with Figure 8 reveals that a relatively small number of students benefit from the great number of small classes. The Committee is mindful that in applying gross indices one slurs over many factors such as the uneven distribution of students and resources, the relative and changing attractiveness of different fields, and measures of quality. But from the respective trends in numbers of students and faculty and the relatively large number of small classes, it seems clear that further faculty expansion is unjustified.

4.3 Student body size inextricably involves questions of support facilities and services usually associated with the term "campus life". In spite of sometimes scant and conflicting evidence, the Committee has attempted to take into account these factors which bear on the quality of life at Cornell. In connection with a study (7) on the possibility of increasing the number of students to 20,000, the Office of the Vice President for Planning indicated that a conservative estimate of current classroom underutilization is 20 per cent. However, that figure does not refer to laboratories, libraries, utilities, and other components of the physical plant in some of which signs of strain now appear. These facilities have to be investigated case by case to determine whether difficulties would be encountered with additional students, and if so, the degree of strain. University Senate Task Force groups (8) warn of impending saturation in health care services, housing, University unions, athletics and central campus parking facilities. The comments which follow are intended to identify some of the major constraints and trade-offs associated with an increase of about 2,000 students.

Dining — The dining system is operating below capacity and could handle at least another 2,000 students. However, regardless of any increase in the numbers of students, renovation in some food service facilities is badly needed.

Health Care — Specific data for planning are lacking in this area in which the bounds on rising expectations seem to perpetually increase. The inclusion of health services for student spouses will increase the load at the Gannett Clinic. The need may arise for satellite facilities closer to the centers of student housing. Future expanded national health care programs could have a major impact on the mode and extent of student health services. All trends indicate that expansion of health care will have to take place regardless of additional students, and their needs will have to be considered in that expansion.

Athletics — Due to uneven demand with respect to time, some athletic facilities are now utilized near capacity. Helen Newman Hall is underutilized compared with Teagle Hall, although a general shortage of gymnasium space exists. Opinions differ as to trends in facility usage by upperclass and graduate students relative to underclass students. Possible relaxation of formal Physical Education requirements could shift the burden to greater recreational use and further crowd recreation periods. Cornell has a very diverse athletic program and plan where "any person can find instruction in any sport." The interest of women in athletic activities is bound to increase and the notion of "parity" is inevitable. As with health care, rising levels of expectation lead some to conclude that we are already at the threshold of deteriorating quality and diminishing accessibility of athletic facilities.

University unions — An unevenness in the needs and intensity of use exists among the different Union facilities. Willard Straight Hall is crowded, and even without an increase in the number of students it needs to be expanded. Some other Union facilities are not as intensively used as Willard Straight Hall. The proliferation of special interest student groups has created an increased need for meeting and activity rooms. The Committee suggests that the concept of multipurpose use of some of the academic buildings be explored in order to provide additional facilities. Additional students

would require that early attention be given to renovation and possible expansion of hard pressed campus Union facilities.

Parking and Transportation — Student parking is now extremely tight during the popular academic class periods. Assuming that additional peripheral land could be devoted to open parking, each space would cost about \$700. It is estimated that in a parking structure each space would cost about \$3,000 and the self-amortizing charge would be prohibitive. Increased peripheral parking would in turn require additional bus service during the three periods of greatest use: morning arrival, noon and evening departure. Parking and transportation are constraints on any plans which would significantly increase the number of students requiring peripheral parking; additional facilities would be required in advance of such additions.

Housing — Cornell housing accommodates 43 per cent of the students and is used to capacity. If no additional University housing units were added, an increase of 2,000 students would mean that the proportion of students in Cornell housing would decline to 38 per cent. Of course, this would require that the additional students be housed in off-campus units; and there is evidence (7) that they could be so accommodated. Cornell has not had a formal policy on the fraction of its students to be housed on campus, and changing student preferences have caused considerable variations in practice in recent years. The Committee prefers that additional students be housed on campus, but it would oppose such a trend if it meant either subsidization of housing or anything like the burdensome debt service of the North Campus Dormitory complex. There may be several options open to the University in this area; provision for on-campus student housing through cooperative arrangements with private firms is one. However, we must not engage in loose thinking here, for the University obtains Dormitory Authority mortgage money at about two points below that available to a private developer, who would also have to recover property taxes. Before embarking on major expansion in the number of students, Cornell must face up to a policy on student housing and then allow sufficient time for solid planning before implementation of its policy. One proof of the need for planning is the checkered history of provision for adequate student housing at Cornell.

4.4 *Income considerations* always make it tempting to think in terms of increasing numbers of students, because Student Fees are one of the very few income sources over which an administration has control. Indeed, in the earlier discussion of Income it was shown that one approach to maintaining a balanced budget was raising the fraction of the total income contributed by Student Fees, thus assuring that the rate of increase of income equals the rate of increase of expenditures. However, as past practice indicates, increasing the number of students is not in itself a panacea, but, as previously recommended, must be accompanied by tight controls on the expense side. The optimum size of the student body is not easy to evaluate because of the complex interaction between such factors as academic program choice, level of campus life services, physical facilities and both academic and nonacademic support services. Economies of scale have been investigated on a comparative basis (5), but the conclusions are far from decisive. As expected, because of minimum effective size considerations, economies of scale are most noticeable in administration, plant maintenance and libraries. However, there are significant differences between types of institutions, e.g. research universities, comprehensive universities, Liberal Arts colleges, two year colleges and between the public and private sectors. Although some studies imply that a minimum cost per student occurs between 15,000 and 20,000 students this is dependent upon the type, "style", and aspirations of a given institution. Unfortunately, the parameters leading to higher costs all work against Cornell: high diversity, significant commitment to graduate study, private status, large fraction of graduate degrees in expensive science and engineering disciplines.

4.5 The Statutory Colleges have programmed an increase of about 800 students for the next five year period. As previously discussed, Cornell does have unused capacity and the earlier examination of Income led to an estimate of about 1,000 additional students in the Endowed Colleges. A 12 per cent increase in the Endowed Colleges would add about 1,200 students. Primarily on the bases of existing program diversity, faculty size and increased income the Committee recommends an increase of 2,000 students. Careful planning will have to be undertaken and selectivity used in identifying the areas where additional students should

and could be accommodated. For example, upperclass transfer students and attractive one year master's degree programs should be encouraged. Growth will certainly mean increases in the number of students in some area, but analysis may show that decreases might well occur in other areas. Attention must also be given to questions of maintaining the quality of applicants and matriculants. In order to determine the full consequences of adding students, increased attention must be given to the financial and academic interactive effects between the Statutory and Endowed Colleges. With the information available, the recommended increase should be thought of as an upper bound.

4.6 The recommendation to increase the number of students rests on the assumption that the increment of income will appreciably exceed the increment of cost. Clearly, this requires tight controls on the system and a detailed tight controls on the system and a detailed understanding of costs. In an era of economic stress, close attention has to be given to controlling the expense of instruction. Faculty size will have to be carefully controlled, not permitted to increase, and if possible decrease. The average number of credit hours taught will necessarily rise and in this sense the average teaching loads will rise and a decline in the academic standards of living of the University might result. However, flexibility and discrimination in the assignment of teaching loads should be encouraged i.e. following an assessment of the overall contribution of a faculty member, the Department Chairman might give some professors very light assignments while others might receive heavy teaching loads. These questions will have to be evaluated as faculties review their programs with an eye to reduction of proliferation and duplication. We have recommended that the addition of students be made over a five year time span in order that sufficient time be allowed to resolve uncertainties, and should uneven distributions of students create "hot spots," means must be found to alleviate difficult situations. In conclusion, the Committee's overall understanding of the situation leads it to recommend that, with no increase in faculty size, Cornell should move to a level of 17,500 students in five years.

5. Adopt student financial aid policies which

1) Hold aid from unrestricted funds to a given percentage of tuition income - perhaps using 1970 as the base year.

2) Use increased student employment (summer and academic year) and stricter application of "need" criteria in the determination of a financial aid "package." Consider putting some graduate financial aid on a need basis.

3) Press for maximum possible utilization of State and Federal sources of student aid.

4) Implement an effective student loan plan attractive to middle and lower income families.

5.1 The factors playing a role in the financial duress of universities are especially evident in the area of financial aid. The rapidly rising costs of higher education reflected in increased tuition when coupled with a heightened concern for equality of opportunity have converged to put severe pressures on private universities. Further, the tuition gap between the more selective private institutions and their public counterparts is well over \$2,000. Thus, the private universities are in competition with large tax-subsidized institutions which have the full weight of government and public sentiment behind them. Financial aid is one of the first areas to feel the squeeze.

5.2 Tables 22 and 23 and Figures 10 and 11 show the growth in the components of financial aid. Cornell is largely a regional university (see Table 25) and hence is in competition with both well developed state systems of higher education as well as a variety of private institutions of high quality. As Table 24 shows, Cornell's resources place it at a distinct disadvantage in its "admit-deny financial aid" position relative to several of its sister institutions. Table 24 shows that most of the other selected universities have enough financial aid to cover their "approved applicants with need." Students in this category are offered a financial aid "package" sufficient to cover their need; i.e. no students are offered financial aid below their established need. Cornell's "admit-deny" policy operates so applicants who qualify academically for admission are denied financial aid because sufficient funds do not exist. The real significance here is our position relative to the other schools listed. There is some evidence to the effect that a fair fraction of these "admit-deny" cases manage to attend Cornell anyway and do quite well academically. However, they continue to seek financial aid in their upperclass years. A survey of (8) freshmen applicants for the classes of 1973-74-75 who were accepted at Cornell but matriculated elsewhere,

shows that (a) although about 50 per cent said that financial aid was not a primary consideration in the choice of College, almost 40 per cent indicated that it was a factor in the final school selection process; (b) the majority of students lost to other schools came from the \$14,000 to \$15,000 income group; and (c) our principal competitors were private universities, Ivy League schools, and small colleges, with the Ivy League and other private universities accounting for almost 60 per cent of the student drain for these three freshmen classes. Clearly, Cornell is having difficulty in maintaining economic accessibility for all students admitted and this can only result in the eventual reduction in the numbers of middle and low income students. Excepting only its Minority Education Program, Cornell is in a period of scholarship retrenchment for the overwhelming majority of its student constituents. The Committee sees no way to alleviate this situation without further use of unrestricted funds which would put additional pressure in the direction of an increased deficit. Thus, its recommendation for holding the use of unrestricted funds to a given percentage of tuition income.

5.3 Another aspect of the need to control the funds for financial aid is in the linkage between tuition and fees and financial aid. If the University increases Student Aid at a greater rate than Student Fees, then the rate of increase of net income contributed by the students declines. A kind of saturation effect occurs in that the net Student Fee income levels off. This is exactly what has happened at Cornell as can be seen from the relevant growth rates given in Tables 7 and 12. The effect is depicted in Figure 11. The gross curve is a plot of the Student Fee income column of Table 12 and the net curve is obtained by subtracting the corresponding Student Aid data of Table 7. Notice that the gap between gross and net widens with a definite leveling off of the net curve from 1967 until 1970. In the year 1970-71 the desired trend was restored, but the 1972 data shows a discouraging turn. As more students are added to the University, this aspect of net income must be controlled.

5.4 In responding to an acute national need, Cornell, together with several other universities, made a major commitment to equality of opportunity. While they did not expect full reimbursement for assuming this responsibility, they certainly anticipated an influx of State and Federal funds in recognition of their contribution to this national problem. Some funds have been forthcoming, but they have been meager relative to the need and give little institutional support. Even with the new U.S. Aid to Education Bill (10), there is little relief in sight. Cornell must be continuously alert to the possibilities of utilizing State and national resources for financial aid and must join with others for pressing its case.

5.5 The need for student aid funds is not apt to diminish in future years; indeed we can expect continued pressure for their expansion. In the previous examination of Expenditures, Student Aid was included as one of the cost components and the projections discussed there showed the nature of the trade-offs between the costs of instruction, support activities, libraries, etc. As one projects a manageable rate of increase in expenditures, one cannot ignore the need to balance the allocation of funds between categories. The University community must not lose sight of the fact that the need for financial aid is a reflection of a societal state of affairs whereby public forces are at work in the direction of universal higher education, but as yet the necessary supporting financial resources have not been provided. In cooperation with others, the University Administration must work toward devising plans, such as the voucher system, which will transfer the larger problem to the public domain.

5.6 In the mix of financial aid components, continued efforts should be made to expand student employment opportunities. It is interesting that this fraction of aid has fallen since 1958 and it is not apparent whether it is due to the expanded opportunities for scholarships and loans or a reflection of greater affluence. (See Figure 12.) In a recent study of student aid (15) it is estimated that \$4,000,000 over and above what is identified as student aid in the printed budget, is administered by departments, largely in the form of wages, without any coordination with the Office of Financial Aid. At a time when funds available for financial aid are tight, it becomes increasingly important to administer all components of student aid, including salaries and wages, in a coordinated manner. If wages paid to one student can be counted as part of his financial aid, then the scholarship or loan funds offset by these earnings can be given to another student.

5.7 There is some evidence that the process of

determining "need" is not entirely reliable (14). The Parents Confidential Financial Statement method of determining need has loopholes which are coming to light and some schools are requiring that an IRS form be submitted. At least two major sister institutions, when

switching to this new approach, found that they had been overawarding very substantial sums of money — of the order of several hundred thousand dollars per year. Thus, we advise that Cornell press efforts for refining the financial aid selection process. We are not suggesting that Cornell become a tight fisted institution, but rather to recognize that the area of financial aid is one of distributing a kind of justice, and this responsibility requires that difficult decisions be made. There is also evidence that a financial need test at the graduate level would help "stretch" the precious resources still further (14). The Committee discussed this question, but did not pursue the matter in great depth. There are questions as to the underlying philosophy of financial support for graduate students and the role of government in helping to support persons whose education is in one sense a national resource. The Graduate School should lead an investigation in this area to determine a policy for Cornell.

5.8 If indeed the concept of stability has any validity at all here, it is very difficult to predict the stable financial aid configuration that will emerge. As the discussion and analysis of Expenditures showed, critical parameters depend heavily on national economic factors and policy decisions largely beyond the control of Cornell, or even a consortium of private institutions. Cornell's freedom to choose is severely limited and it must resort to the complete spectrum of possibilities in order to hang on. One of the components which is receiving attention is the increased use of loans. Some interesting variations of the "learn now-pay later" concept are emerging and they are destined to play an important role in the inventory of approaches to family-student financial aid (13). We should take note of the Ford Foundation's consideration of this matter and their conclusion that, all things considered, an approach similar to the Harvard loan plan seemed wisest. In a period when insufficient endowment funds are available for scholarships and a policy of subsidization of public higher education continues, the University will be forced to transfer an increasing share of the cost to the individual. There is no alternative. Cornell must initiate a deferred payment plan which is attractive to and within the reach of middle-income families.

6. Tuition and fee increases of approximately 6 per cent be scheduled for the next three years with attendant evaluation of the effect on student quality, competitive position and possible tendencies toward income group "polarization"

6.1 Tuition and fees now account for about 45 per cent of the unrestricted income of the Cornell Endowed units. Table 26 traces the increases which have led to an average annual increase of 6.5 per cent during the period 1960-72. For the six year period 1967-72 the average increase has been 7.4 per cent. Of the various sources of income to the University, tuition and fees is the single major source and essentially the only one over which the Administration has some control. Universities are not in a market economy, have not had any rise in productivity (27), and have no control over the outside force of inflation. These effects are illustrated by Figure 3, which shows the annual percentage change of Current Fund Expenditures for the period 1960-71 for U.S. institutions of higher education, together with the data for Cornell. The percentage change in the consumer price index is also shown. Further, for several decades expenditures per student for departmental instruction and research (not sponsored) has risen at the constant annual rate of 7.5 per cent. General economy-wide inflation, as measured by the CPI, has accounted for only one quarter of this annual increase with the other three quarters of the costs resulting from (1) growing responsibilities of universities (2) expanding research programs (3) broader community activities (4) increased expenditures for research equipment (5) a greater fraction of effort devoted to graduate instruction (6) increased wage costs that, while consistent with price stability in the economy at large, do not relate to education because of no increase in productivity, and (7) the more rapid rise in university wages because of sharp increased demand for Ph.Ds. With no increases in productivity the higher costs cannot be offset with increased output. It is expected (28) that the 7.5 per cent increase will prevail until at least the mid-1970s. Thus, universities are caught in a squeeze between steadily rising costs and limited means to increase income. Cornell has attempted to meet this squeeze by the recent average annual 7.4 per cent increase in tuition and fees.

6.2 During the period 1930-60, the historic rate of

increase in cost per student per year in higher education was whatever the general rate of inflation was plus 2.5 per cent. When, for example, the general rate of inflation was 2.5 per cent per year, the average rate of increase in cost per student per year (or cost per credit hour) was 5 per cent. In the economy as a whole, the 2.5 per cent increase in inflation has been offset by a 2.5 per cent rise in productivity, but in higher education there has been no corresponding rise in productivity. From all indications, inflationary pressures will continue and if one assumes the rate will be between three and four per cent, say 3.5 per cent, then plus 2.5 per cent leads to the recommended 6 per cent increase. This 6 per cent rate of increase would merely enable Cornell to keep up with the rate of increase in costs and represents a diminution from the recent 7.4 per cent increase. It can be done only if we institute substantial economies. The above discussion should be considered together with the earlier Income analysis of Student Fees. In the projections used there, by assuming a rise from 0.31 to 0.34 in the fraction that Student Fees makes to the total income, a projected rate of increase of 5.9 per cent resulted. In view of the approximations used in that earlier analysis, this result could be viewed as fortuitous, but it does show that, under the assumed conditions, 6 per cent is the proper order of magnitude. It is interesting that another perspective gives an indication as to how the public has been able to spend more of its income on higher education and indeed has willingly increased the demand. Real per capita disposable income in the country has risen about 2.5 per cent a year over the long haul (5), and it is this excess above the rate of general inflation in the economy that has enabled families to increase their rates of spending for higher education at about the same rate (i.e. at about the 2.5 per cent per year in excess of inflation). Thus, it is roughly true, that the 6 per cent rate of increase of tuition and fees that we project would keep up with the anticipated rate of increase in disposable family income, in money terms.

6.3 The Committee is of course reluctant to recommend a continued rise in tuition and fees, but alternatives such as significant program cuts, continued invasion of invested funds, greatly reduced salary increases, or cuts in financial aid are deemed even more undesirable. It would be unrealistic and self-destructive to expect the University to absorb continued cost increases while, on the average, family income continues to increase. We are cognizant that the individual student tends not to see the yearly tuition and fee increase in the perspective of national economic trends and their reflection in increased costs to the University. But the trends are real and Cornell is caught in the cost-income squeeze.

6.4 Increased tuition and fees is accompanied by the danger of income group "polarization" within the student body — the reduction of students from middle income families, leaving only those needing little, if any, financial aid and those needing heavy financial aid. There are indications that this effect is being seen at a few competing institutions, while at others more favorably endowed with financial-aid funds the effect has not yet appeared (14). Traditionally, Cornell has drawn a significant fraction of its students from the middle income group and we recommend a continuation of this practice. Another serious question is whether there exists an upper limit for tuition and fees and as to whether, therefore, continuing increases will result in a falling off of applications? This question is related to the "style and aspirations" of the University as well as to national policies in areas such as taxation, wages and prices, and public subsidies to higher education. Thus, no long range answer is available and the Committee had to be guided by its overall assessment of the situation. It should be kept in mind that during the later 1970s and 1980s a drop and then a leveling off in the population of college age youth will occur. Cornell has observed a complete New York State system of higher education emerge in the brief span of a decade. The neighboring states from which Cornell attracts many of its students (see Table 25) have also expanded their systems. Certainly, if the gap between private and public charges continues to increase, there will be an erosion of attractiveness of the private institutions. In fact, in some metropolitan regions the competition is already taking its toll of the private institutions (29, 22). The warning flags are up and Cornell must proceed, knowing that at some stage it might well have to continue without the benefit of increased income from tuition and fees. Indeed, it must try to maintain sufficient flexibility in its options so that if this occurs it will not come as an unforeseen eventuality. The earlier analysis of Income showed very clearly that if, in the face of continued national inflation, the University

could not continue to increase tuition and fees, then we would face an extremely serious situation. The rate of increase of expenditures would diverge from the rate of increase of income, and the University would be left with little means at its disposal to control the situation. Overall, the recommendations of this report are directed toward getting the University on a basis of self-understanding and self-control so that it can anticipate and, hopefully, meet such future challenges to its financial stability.

7. *Keep a strong competitive faculty salary position based on merit increases.*

7.1 Salaries for instruction are the largest budgetary expenditure of the University. For the year 1970-71 salaries accounted for about \$26,000,000 or close to 30 per cent of the total Current Fund Expenditures, or 56 per cent of the Educational and General Funds less Organized Research; see Table 6. Table 27 gives the nine month median faculty salaries by rank for the Endowed Colleges at Ithaca together with the percent increases over the previous year. National studies show the following trends (27). For the period 1930-50 the average annual rate of change of salaries in all industries exceeded that for faculty salaries by about 1 per cent. However, in the 1950s the average rates of increase were the same for both, while during the decade of the 1960s faculty salaries rose more rapidly than did wages in other sectors of the economy. The comparative annual rates of increase for 1960-67 were 5.8 per cent for faculty and 4.0 per cent in all industry. However, during the three year period 1967-70, the average yearly increase for professors was 4.3 per cent, for associate professors 5.1 per cent, and for assistant professors 5.0 per cent. During this same three year period the average annual rate of inflation as measured by the consumer price index was 4.2 per cent. Thus, for this period, Cornell's faculty salary increases on the average just kept up with or somewhat exceeded inflation. During this same 1967-1970 period the AAUP reports (31) the average national rate of faculty salary increase as 6.1 per cent. To determine the "cost push" on Cornell's budget due to faculty salaries, one multiplies the fraction of Current Fund Expenditures devoted to instruction (previously cited as about 30 per cent) by the rate of increase of faculty salaries, about 4.7 per cent for all ranks, giving 1.41 per cent. From Table 6, the annual increase in Current Fund Expenditures for 1967-70 was 6.6 per cent. Hence, faculty salary increases contributed about 1.41/6.6=0.21 points, or about one-fifth to the cost increases during this period at Cornell. That is to say, although costs of instruction contributed 30 per cent to the total expenditures, they accounted for but 21 per cent of the rate of increase of those total expenditures. The conclusion is that Cornell's faculty salary increases have been just barely adequate when compared to national trends and there is a growing concern that serious erosion in our position will occur. It is little consolation that the most recent AAUP report (33) shows that serious salary erosion has begun and "for the fourth year in a row the economic status of the profession is worse than it was a year ago."

7.2 In looking to the future, it is not expected that the recent national rate of faculty salary increases will be maintained. The period of university expansion is over and consolidation has set in. In addition, during the 1970s and 1980s the supply of academic staff will exceed the demand in most disciplines; thus, the competition for staff of the 1960s on the buyer's side of the market will be greatly attenuated. Further, it is hoped that the rate of inflation will recede to about 3.5 per cent per year or less. All these factors mean that the rate of increase of faculty salaries is not expected to exceed the average wage trends in the rest of the economy.

7.3 Within the Endowed Colleges, salary increases in the past few years have been based exclusively on merit, while in the Statutory Colleges there has been a general tendency for the salary practice to become one of across-the-board increases. If this New York State policy continues, it will, in time, erode the base of the Endowed Colleges salary policy and make it very difficult to maintain an adequate salary structure. Thus, the Committee urges the Administration to use its influence in trying to convince the State authorities to move toward a merit system. One possible approach would be to use say half of any new funds available for merit increases. An incentive spread must be maintained if Cornell is to remain competitive and reward those faculty members who are making the greatest contribution.

Academic Affairs

8. *Give continuing high priority to selective graduate education. Assert Graduate School leadership in the*

identification of new programs and the financial resources needed for excellence.

8.1 Cornell is one of the leading national universities and has a distinguished record of graduate education. It is a fact of academic life that universities are largely judged on their capacity for excellence in graduate education. Cornell must strive to improve the quality of its graduate program in order that it play an even greater regional and national role. Even though it might appear that all graduate education will be substantially reduced, we are entering a transition period in graduate education and the new state of equilibrium is by no means certain. Although the proliferation of schools attempting to maintain graduate programs far exceed any sensible norm, this is not sufficient reason for those institutions which have high quality programs to arbitrarily cut them back. Cornell possesses an attractive variety of graduate fields spanning both professional and nonprofessional endeavors. Some of these are unique, and the flexible student guidance committee structure encourages combinations of topics particularly appropriate for the needs of our complex modern society. Here Cornell has a comparative advantage that it should vigorously exploit and promote. Thus, we recommend that Cornell adopt a policy counter to the apparent trend and try to improve its position and attractiveness for graduate study.

8.2 There is no doubt that on the basis of any reasonable distribution of costs graduate education is more expensive than undergraduate. The small size of graduate classes, the much greater degree of specialization and faculty attention, the use of library, laboratory and computer facilities all contribute to higher costs. Studies by the U.S. Office of Education and the Carnegie Commission show that expenditures per student are highest in the research (graduate) universities. Table 28 shows that in research universities the Educational and General expense and the costs of Instruction are approximately twice those of comprehensive universities. Further, such expenditures are higher in private institutions than in their public counterparts. The relatively high costs of the liberal arts colleges may seem surprising, but it is due to their practice of maintaining small classes taught by professorial staff, as well as the absence of economies of scale because of their size. Observe the very much greater amount of Organized Research performed at the research universities; this is clearly the distinguishing feature which makes them unique and in one sense a national resource. Further, the credit hour costs per student by various levels and types (science and nonscience) of higher education given in Table 29 is additional evidence of the higher costs of graduate education. On the other hand, graduate education is accompanied by the following off-setting considerations:

a) Graduate students do a great deal of our teaching;

b) In some areas graduate students are supported by research contract monies to a multiple of the normal tuition rate;

c) In many areas we could not attract excellent faculty to Cornell if we did not afford them the opportunity to train graduate students;

d) In the sense discussed in section 4.1, Cornell has unused academic capacity at the graduate level.

Therefore, overall considerations point to a course of action which rejects any notion of an across-the-board cutback on our level of graduate education, but rather looks toward selective strengthening of existing excellence and identification of areas in which the incremental costs of adding graduate students is relatively low. Selectivity includes the identification of areas in which marginal programs should be eliminated when (a) they do not bring in outside financial support and/or (b) the quality of the program is not particularly high, and it would be better for Cornell to leave the field to other universities, and (c) the program can be abandoned without serious injury to our undergraduate program. Selectivity implies a knowledge of the capabilities of competing institutions; complementary and collaborative approaches should replace regional proliferation. Further, there is room for innovation in selectivity by broadening the scope of some of our Ph.D. programs to include a greater measure of the versatility needs of the real world as opposed to academic overspecialization.

8.3 Cornell's diversity and flexibility suggest possibilities which should prove attractive:

a) The integration of undergraduate programs, including those of transfer students, with well defined master's degree programs,

b) The creation of program combinations aimed at education for government, administration or service positions in which interdisciplinary roles are important.

c) The establishment of alternate degrees requiring a smaller time commitment. Faculty groups should exert themselves in the formulation, promotion and execution of such programs.

8.4 Because the ranking of universities is most frequently based on the capacity for high quality graduate work (9), Cornell should encourage outside opinions and comparisons in evaluating its programs. There is a tendency toward isolation, sometimes bordering on complacency, which should be overcome. This concern, which appears in other contexts in this report, is not without dissenting opinion on the Committee. A small minority feel strongly that in many fields, outside evaluation by so-called experts is more often than not meaningless and expresses itself in faddism or a kind of nonconstructive supercilious criticism. The majority feel that if one keeps alert to the possibilities for such distortions, they can be accounted for in the interpretation of results. Regardless of whether Cornell wishes to recognize the problem, we should not forget that the comparison continues daily in the minds of faculty and students at Cornell and other institutions.

8.5 While the cutback of graduate student support at the national level has been severe and an over-supply of Ph.D.'s in some fields is a reality, as more students enter higher education, we can expect an increasing number of them to be attracted by the intellectual challenge of graduate study. Cornell should assay its graduate academic and financial resources and maintain a vigorous graduate effort. In a research university such as Cornell, the faculty must strive to obtain grants and contracts in support of graduate education. The administration must be aggressive at state and national levels for increased aid. Further, with a need for increased unity in the promotion of graduate education, there will be a need for close cooperation between the Graduate School and other academic units of the University.

9. A new Center, Program, Institute, Department or similar organizations should be created only if:

1) A clearly formulated unit plan exists which foresees its continued financial viability for a period of at least 5 years.

2) The plan includes an analysis of the cost to the University if it must be "absorbed" at a future date.

3) A clear and convincing case is made that the organization is not duplicative of existing functions or efforts at Cornell.

9.1 Program innovation is one of the most important yet difficult activities to stimulate in a research university. Perhaps the resistance to change is a consequence of the disciplinary expertise required for authoritative work, or the compartmentalization which naturally grows out of specialization, or the constraints of a society having well established patterns of employment, or a belief that the economic structure of universities precludes their investment of "venture capital" in things educational, or perhaps all of these. Whatever the cause, rallying a diffuse educational enterprise to change is a formidable task. As Cornell's founder realized, it is easier to start anew! During the past decade of growth many changes took place within existing academic divisions, but one of the most significant changes occurred through the introduction of centers and programs, and similar institutional structures (see Table 30). Many of these changes have been valuable in enabling Cornell to step out in new directions and in providing greater flexibility for students and staff. Overall, the results have been salutary for both students and faculty.

9.2 Nevertheless, we feel obligated to sound a note of caution by calling attention to the fact that the establishment of these new units was an integral part of the era of growth, an era in which the outside resources for change were plentiful and induced new commitments from within. The availability of outside, special purpose funds stimulated expansion, while timing and the force of circumstances made the selection among options nearly impossible. Regional duplication was overlooked as many institutions struggled to compete for similar programs. The concomitant processes of internal duplication or proliferation were hard to stop. Further, plans for possible amalgamation with existing academic programs were sometimes overlooked. As a consequence of the lack of an integrated understanding of the longer range ramifications of some of these programs, Cornell assumed an appreciable additional responsibility. Staff commitments were made which, though originally of finite duration, became enmeshed with the academic programs in an unplanned and

sometimes lax manner. As the programs grew and proliferated, they required added resources to support students. Increased demands on the Graduate School and Library resulted. Added administrative burdens were often totally neglected. Space requirements developed which seemed to have been overlooked or minimized in the initial enthusiasm. Incremental and overhead costs were not taken fully into account. As a result, Cornell absorbed an increasing array of obligations which entail real and continuing costs. Our recommendation is not intended to stifle the initiation of all such programs, but rather to emphasize the need for including these special academic structures in both financial and academic planning activities. In spite of their added complexity, the same level of financial understanding will have to be brought to bear on these units as on other divisions of the University.

9.3 The policy of selectivity applied to academic programs must also extend to the University's involvement in peripheral programs or services which attempt to rectify large social problems. Because of its diverse array of disciplines and its diffuse structure, the University is susceptible to a process whereby tentative local acceptance of a measure of responsibility or interest becomes translated into a sizeable commitment, one which always requires additional financial resources. The University's special contribution to society is the education of individuals who will, by virtue of that education, be prepared to assume leadership in the processes of change. In spite of society's disposition to transfer an ever increasing variety of problems to the doorstep of education, we reemphasize the need to be selective in undertaking new responsibilities and zealous in the advocacy of our primary mission — quality education. These remarks are equally pertinent to other recommendations made in this report.

10. Undertake a comprehensive review of the academic calendar leading to a decision on possible full year academic operation of the University.

10.1 While the Cornell community is cognizant of the previous lengthy and difficult considerations of the academic calendar, we believe that a critical review is required. With continuing financial pressure a certainty, it is clear that any system which includes an "idle period" of one third of the calendar year should be seriously examined and the apparent lack of utilization justified. In addition to factors considered in previous studies, the cost implications of the various alternatives must be ascertained and presented. The current calendar may be "best", but we do not have complete confidence in that conclusion. The various possibilities must be evaluated and a policy established. The University Senate will have to assume a leading role in this review because factors within its domain are of great importance. Questions of an academic nature will certainly arise in this review (see 10.2 below), and a method of involving the Faculty Council of Representatives must therefore be devised.

10.2 We realize that some attempts at year-round operations at other universities have failed (11). However, new approaches are being made at Dartmouth, Colgate, and Beloit College (12), partly as a result of the addition of women to the student body and/or provision for work-study opportunities away from campus. The Carnegie Commission (5) has recently concluded that "the most promising single avenue toward more effective use of resources in higher education is provided by current and proposed changes in degree structure ... including a change to the three-year, rather than a four-year, bachelor of arts degree either through reducing requirements or through operating on a year-round basis." Such changes involve issues of fundamental academic importance which extend far beyond the mere fitting of a "normal" academic year between the months of September and June. Any study of this subject must at the very least weigh the financial advantages of fuller physical plant utilization against the accompanying additional operating costs.

10.3 While we do not underestimate the difficulty of such a study, especially in view of the dearth of program cost indices previously cited, we believe that the information necessary for an intelligent conclusion can be marshalled. The pertinent Senate committees will have to be involved and provided with staff support.

11. Strengthen academic effectiveness by making a significant and continuing commitment to improvement of instruction through such means as:

1) Support of centralized facilities for research and development in teaching, learning, and evaluation of teaching effectiveness — for example the Center for

Improvement of Undergraduate Education.

2) Encouragement of faculty (through discriminating use of released time and other means) to develop new or improved instructional formats, educational materials, or learning aids.

3) Continued search for measures of effective teaching and for practices which will regularly reward faculty members for outstanding teaching.

11.1 There is a widely held belief that Cornell has a special strength in its balanced emphasis on both the undergraduate and graduate components of education. The interest in undergraduate education naturally brings with it a concern for teaching effectiveness. Historically, university faculty members whose scholarly and research activities focus upon their academic disciplines have been skeptical of the benefits to be derived from educational research and development. This skepticism has been sustained by the apparent paucity of results which have made a lasting impact on higher education. Nevertheless, the expectations of students and society, as well as the professional urge for improvement, will drive faculty members to devote thoughtful attention to development of the most effective ways to communicate their disciplines. Educational research and development at Cornell is not likely to grow into a large-scale enterprise, nor do we suggest it should. However, as Cornell seeks to take up whatever slack may exist and improve the match of faculty to instructional needs, it will be particularly important to develop sound measures of teaching effectiveness and to know how to use limited resources wisely. A central agency such as the Center for Improvement of Undergraduate Education (CIUE) seems the only conceivable way for an institution like Cornell to sustain a coherent program. We think of such an agency as a nucleus for this kind of activity. At the same time we should encourage separate, diverse efforts in a number of places, for if these new approaches are to take root and thereby have a lasting effect, it is the faculty groups within disciplines who are the ultimate instruments of change. But a core agency is important in providing a resource center for faculty members who wish to explore the world of educational R and D; but who cannot hope to find time to explore the background material in order to extract what they need. Collaborative arrangements can be made whereby the central agency participates only to a limited extent, while the larger effort is performed within the academic units. Thus, we recommend that the academic officers, the Provost and Deans, give serious consideration to a long-term commitment of stable funding for a central core agency such as CIUE. Since educational R & D efforts can ordinarily be expected to have only a long-term payoff, they must be funded by long-term commitments and not simply on the basis of the success of a one-year project. These commitments might be carried through by a combination of outside grants, with a percentage of the instructional budgets assigned to educational R & D. Although we have not attempted to set a percentage figure, it need not be large; it should, however, have an element of stability built into it.

11.2 Some faculty members will, at various times, develop serious interests in improving the quality of instructional formats and educational materials in their disciplines, but these interests will probably be pragmatic and will have only a limited lifetime. It is particularly important, therefore, that there be mechanisms for effectively capturing that interest, facilitating its immediate application, and accumulating a reservoir of knowledge and experience. While an agency like CIUE may be necessary for some of these purposes, there must also be provision for released time to allow individual faculty members to pursue these interests.

11.3 At the present time, there is considerable interest in the use of modern audio-visual aids — tapes, slides, films, cassettes — as well as in the use of interactive computer systems. Use of these expensive tools must be developed with discrimination. Controlled empirical studies, either at Cornell or elsewhere, which compare new teaching methods with the traditional and seek to find the relative advantages of each, are required. Communication systems which permit sharing of knowledge and experience among local experts in learning theory, developers of new technological assistance, and interested faculty members on the firing line are essential.

11.4 Accurate measures of teaching effectiveness are notoriously difficult to discover, and general agreement that a particular one is accurate is probably even harder to achieve. But the matter is so close to the heart of an

educational institution that one must never give up the search for these measures. The very act of searching may well have salutary effects. Only with a continuous search are we ever to know the impact on instructional quality of such parameters as student/faculty ratios, senior faculty/junior faculty ratios, and faculty/assistant ratios. The long-range financial implications are obvious.

2. *Strengthen academic effectiveness through such improved motivation, evaluation, and management techniques as:*

1) Establishing a continuing post-tenure evaluation system having the four components outlined below:

(a) An annual review of each faculty member's achievements;

(b) A regular review immediately prior to each sabbatic leave;

(c) A more scrupulous review for promotion from Associate to Full Professor;

(d) Increased use of early retirement.

2) Increase the effective length of appointments of department chairmen and provide adequate rewards and support.

3) For certain administrative purposes, consolidate small departments into ones having between 15 and 40 faculty members.

12.1 Increased academic effectiveness at Cornell depends ultimately upon each individual member of the faculty. Each faculty member evaluates on a continuing basis the goals he seeks to attain and his progress in achieving those goals. In the final analysis, no man can set another man's goals, or achieve his goals for him. Nevertheless, the institution can be of help to the individual in encouraging excellence and in evaluating progress. The current academic reward system at Cornell can be changed to increase motivation for setting and attaining high goals.

12.2 In theory all employees are subjected to continuing evaluation, but practice falls short of theory. Most attention has been given to the evaluation connected with the tenure decision itself, but the rest of the system, particularly post tenure evaluation, has been badly neglected. While the institution of a more uniform, formalized system of continuing evaluation after the tenure decision would mark a major departure from existing Cornell policy or practice, we consider the lack of such a system at Cornell a serious deficiency.

Counseling — The system for counseling individual faculty members in setting their goals should be improved. Faculty members should and do enjoy considerable freedom in setting their research, teaching, administrative, and public service objectives. Yet goals of individual faculty members should, within a broad band of tolerance, be supportive of department, college, and university goals. Both in his own self-interest and in the interest of Cornell, the individual faculty member should be afforded counsel on the compatibility of his own goals with those broader university goals which promote the common good. Counseling can be considered an important component of planning. The Committee believes that counseling at Cornell is, at best an infrequent affair poorly executed. At the very least, every faculty member is entitled to the opportunity of an annual meeting to discuss his objectives with the person(s) who determines his salary.

Annual Evaluation Review — Just as the faculty member is entitled to counseling in setting his goals, he is also entitled to a clear evaluation of his progress toward meeting those goals. Any evaluation system must be based on a systematic review procedure. Hence the Committee recommends that a system of evaluating the individual's professional activities on an annual basis should be uniformly implemented throughout the University; some divisions already have an acceptable plan that does not impose hardships on either the faculty member or the administration. Counseling and evaluation should be performed by the Department Chairman, with the Dean and Provost available for additional counseling and review of performance.

12.3 The Committee views the sabbatic leave as a unique opportunity for the University and the faculty member to benefit from a process that serves the needs and evolving purposes of the University. The sabbatic leave provides an opportunity for a faculty member to evaluate changes in the educational situation within his discipline, changes in student interest and how these relate to his own future contributions. We propose that in the year preceding a sabbatic leave the initial step in initiating a sabbatic request consist of a "Sabbatic Report" — a report prepared by the faculty member in

which he reviews his accomplishments during the preceding 5 year period and explains how they relate to departmental plans. The occasion of this report would provide an important opportunity for discussion between a chairman and the faculty member about the latter's performance, his sabbatic plans, and his future at Cornell. An important provision of this Sabbatic Report is that it be uniformly applied and become an expected procedure.

12.4 Provost R.A. Plane's memorandum of March, 1971 (21), reminds the faculty that the evaluation process for promotion from Associate to Full Professor should be as rigorous as that used for the granting of tenure. We quote: "Promotion from associate professor to professor is recognition of distinguished service to the University. To be promoted to professor, the candidate must continue to meet the criteria applicable to his promotion to associate professor and the awarding of tenure. The candidate must have made or clearly demonstrate the ability to make a significant contribution to the stature of the University. He must have achieved a distinguished reputation either as an outstanding teacher or as a productive scholar in his field". The faculty must recognize that promotion to full professor is not simply a routine recognition of six (or seven, or eight) years service at the associate level. This promotion should be considered a major step. As a natural part of the post-tenure evaluation called for above, it would be expected that the vast majority of associate professors would be promoted. However, as will be pointed out in Recommendation 13, the continued failure to be granted this promotion could be a step toward termination of a tenure appointment.

12.5 The Committee proposes that more options be available for early retirement or for a gradual shift from full-time duties to retirement. This subject needs further study at Cornell in order to assay its impact on faculty demography, opportunities for promotion, and financial affairs. The Committee notes that it is being used at some institutions in financial peril as a means of forced reduction in staff size (22). While we do not justify its use on this ground, we do believe that many faculty would favor more flexibility and would welcome guidance in retirement planning. A recent bulletin from TIAA-CREF on "Provisions for Early Retirement" highlights the growing interest in this area (23). We endorse generally the provisions of the Plane memorandum (21) that apply to retirement at age 65. However, we propose that the University exercise great flexibility in carrying distinguished faculty on, preferably on a part-time basis, past the age of 65 and perhaps even past the age of 68, and that in exercising this flexibility it be guided exclusively by academic and financial considerations. Such a practice would not be contrary to the policy of normal retirement at age 65, but would permit at least partial retention of individuals who are in some sense "irreplaceable."

12.6 First-line management at Cornell is the Department Chairman. He plays the single most important role in affecting the department which he heads. The following are the chief factors which bear on his effectiveness.

Training — There is no formal orientation or training period, and supporting services are often inadequate. Serious consideration should be given to the expanded use of administrative assistants. Further, when a department chairman leaves that post provision should be made for his reentry to the academic mainstream.

Time — While we are cognizant of the dangers inherent in a prolonged tenure as chairman, we believe that in some cases Cornell departments suffer from a lack of continuity and coordination by a rotation period of 3 to 5 years. Three years is a bare minimum; in many cases seven years is a more appropriate period.

Size — Although there is no convincing evidence that there is a single optimum or critical minimum size for all disciplines, Cornell should review the number of separate academic units and consider the efficacy of joining small departmental units with larger ones. A commonly held opinion is that optimum size varies between 15 and 40 faculty members.

13. *The tenure system should be continued, but with much greater faculty and administrative attention given to:*

1) Procedures which encourage continued professional growth,

2) Possible termination under carefully controlled procedures.

13.1 The tenure system is fundamental to any consideration of the present or future state of the

University. With the assistance of the Subcommittee on Tenure and the Reward System (4), the Committee gave serious and critical thought to this system which silently pervades the academic scene. The full consequences of the tenure system are largely misunderstood by those outside our academic institutions and too often unappreciated by those inside. The range of possibilities considered by the Committee extended from unaltered continuation of the present scheme to complete abolition of the tenure system. Indeed, a minority of the Committee believes that the tenure system has outlived its usefulness and an alternative should be sought. It would be redundant to repeat the many excellent statements which have appeared in support of tenure and the freedom of inquiry and expression which it affords. While often considered as a political issue, academic tenure is most convincingly justified as a means of protecting and encouraging independent investigation and insight. A majority of the Committee concluded that it would be virtually impossible for an academic community to survive within a university without some form of tenure system, and it therefore recommends modification rather than elimination of the existing system.

13.2 Important as the tenure system is, it is actually only one facet of the reward system which the academic community has seldom examined in detail. The total reward system involves a very complex series of institutional arrangements in which both monetary and non-monetary elements interact. In examining what changes would be appropriate, it became clear that a major problem resides in the relation of tenure to the financial future of the University. In this context, a listing of the classic criticisms highlights the nature of the problem.

—*The tenure system promotes inefficiency within an institution by protecting incompetent and mediocre faculty members:* In short, the University does not have as high a level or quality of output relative to input as might exist if tenure were abolished. Tenure was designed to protect academic freedom, not incompetency and inefficiency.

—*The tenure system introduces a major restriction on academic and administrative flexibility for program planning:* The tenure appointment is in essence an indefinite appointment leaving the University few options for program change for periods of as long as thirty years.

—*The granting of tenure is a self-protection device for those within the system:* It discriminates against those with new ideas, enforcing conformity with established norms.

—*Six years is too short a period of time for an evaluation that often leads to a 30 year commitment:* The only critical decision point in the system occurs too soon and those granted tenure may not live up to expectations.

—*Professors should not be guaranteed job security free of objective evaluation of performance when others in our society are constantly subjected to review and insecurity:* This strikes at the notion of tenure as a guarantee of job security.

Several of these criticisms have not so much to do with tenure itself as with the overall administration of the tenure and reward system. For example, the loss of flexibility resulting from tenured faculty being unwilling to adapt to new needs is in part a reflection of the lack of adequate planning by the University. Tenure does not preclude termination when programs are discontinued. Similarly, the notion of job security regardless of performance is not condoned by the AAUP or any other organization. The difficulty of course is in the nature of the educational system. Assessments are not precise, time scales of evaluation are long, and measures of quality are difficult to describe in objective terms. The result is that the system tends to provide unqualified job security, and it is this de facto protection which can lead to weakness. Several of the previous recommendations, especially those expressing the need for unit planning and academic evaluation, were aimed at meeting some of these criticisms, but additional measures need to be introduced.

13.3 The faculty member who enjoys tenure has a corresponding obligation to continue the intellectual growth that justified his being granted tenure in the first place. This is particularly important in view of the constant developments that take place at the frontiers of knowledge. This flexibility of the faculty member should be encouraged because, in periods of financial limitations, it replaces the previous practice of simply adding new staff every time the University wanted to strike out in new directions. In these circumstances, it is

existing staff members who must assume the responsibility for redirecting the University's efforts by redirecting their own activities, rather than by merely continuing however excellently, to do what they have done in the past. The University must have some device for communicating these needs to the individual faculty member and rewarding those who adjust.

13.4 In its considerations of ways to encourage continued professional growth, the Committee examined alternatives to the existing promotion pattern which typically occurs as follows:

Rank	Age
Assistant Professor	26
Associate Professor with tenure	33
Full Professor	38
Retirement	65

Consideration was given to a scheme having five ranks in which associate professor without tenure and distinguished professor would be added. While there are advantages to introducing the rank associate professor without tenure, the majority of the Committee opposed creating such a rank mainly because of problems created by the deferred decision process and competition with other institutions. The long period between promotion to full professor and retirement provides no change in status to stimulate the setting of high goals on a continuing basis. This effect, when coupled with the continued pressure to reduce salary differentials within ranks, led the Committee to consider a four rank professorial system:

Assistant Professor
Associate Professor
Full Professor
Distinguished Professor

The proposed title "Distinguished Professor," or a suitable alternative, would be awarded for distinguished teaching and research. The University might wish to further examine such a possibility.

13.5 Termination of Tenured Appointments. Much of the criticism of the tenure system has centered around the failure of the universities to face up to the charges that tenure protects the incompetent. The current dismissal criteria of "malfeasance or misfeasance" are ambiguous and restrictive. Similarly, the AAUP guidelines which state that a person may lose tenure for "gross incompetence, gross neglect, moral turpitude or conviction for treason" are not very helpful in defining the ground rules for removal from a tenured position. The Committee prefers the phrase "inadequate performance of University responsibilities" for defining the grounds for dismissal. Given this definition the Committee believes a suitable procedure for termination of tenure could be developed. While a comprehensive formulation of policy and procedures would have to be made by the proper committee, the following considerations should be included:

1) Any dismissal procedure must provide for due process, including conventional provisions for jury of one's peers, and it must place the burden of proof upon the University.

2) The Academic Deans should concur in any actions contemplated and probably should provide the leadership.

3) The recommendation for termination should originate with the unit faculty. The Department Chairman, or his equivalent, would initiate the process, collect evidence, counsel with other faculty members, but should not be viewed as the prosecutor.

4) The procedure, once it is determined by the Deans that there appears to be sufficient grounds for dismissal, should provide not less than two nor more than three years as a waiting period, or a period during which the faculty member has an opportunity to correct the deficiencies as identified.

5) When a two or three year warning is issued, the performance criteria which will be used to judge adequacy at the end of the period will be concisely defined and reviewed with the faculty member.

6) A warning should be issued in writing but confidentiality must be maintained extremely carefully.

7) The manner in which the unit faculty should be involved needs further discussion. If the Dean requires a vote, for example, the process could become controversial and confidentiality could be breached. On the other hand, if faculty are not involved the Chairman and Dean could encounter claims of bias and personality conflicts. The nature of the case will probably dictate the extent to which faculty are involved.

8) It is likely that the procedure will grow out of either an unsatisfactory sabbatic review or a negative decision on a request for promotion to full professor.

9) Before actual dismissal at the end of the waiting

period or earlier, there should be a provision for one external review by an expert group if requested by the faculty member. A procedure for selection (for example, one by the faculty member, one by the Dean, and one by those two) should be defined.

10) Unit plans should specify standards of faculty responsibility in such detail that any faculty member will have a clear idea of what is considered a minimum level of performance.

11) Such a dismissal procedure should be developed and put in writing in a manner similar to that now utilized for the tenure decision system, including its safeguards and appeals. Although we would expect this procedure to be invoked only very rarely, it seems to us important that it exist.

13.6 It should be emphasized that the recommendations and proposals of this section are not of themselves ends, but rather means toward a better working relationship between the University as an employer and the faculty member as a productive member of the community. A more effective reward system cannot operate without each faculty member being thoroughly familiar with the whole system, including information on standards of pay, budgetary limitations and choices, procedures for evaluation, and responsibilities for operation of the system. Retention of the benefits of the system is possible only if the faculty themselves are prepared to take time to make the system work and protect its standards. The faculty needs to be closely involved in the design and implementation of the reward system even though it might mean additional work for the Faculty Council of Representatives and its committees. We must make the collective effort to state explicitly what we have long treated as implicitly justifiable, thereby assisting the administrative process leading to the difficult decisions ahead.

14. *Plan the distribution of faculty by rank to provide continued opportunity for the promotion and addition of assistant professors. Encourage the use of part-time appointments in all faculty ranks.*

14.1 This recommendation is clearly aimed at maintaining the flow of new staff. During the previous period of growth renewal was easy to achieve, but the implicit assumption of continued growth meant that little attention was paid to either the fraction of faculty holding tenure or the age distribution of the faculty. When the tenure system is combined with a limitation on faculty size, the University is suddenly faced with a faculty configuration over which it has but very limited control. Tables 31-34 and Figures 13-16 give the relevant background information. Table 32 shows that during the period 1966-71 the average time to promotion from assistant to associate professor was appreciably below six years with the time of promotion from associate to full professor also less than six years. The short times to promotion are indicators of the competition for faculty and the relatively lax policies in effect. Table 31 indicates that a significant number of faculty were added at both the full and associate professor ranks from outside the University and suggests that if this outside source is curtailed a reasonable rate of promotion from within may be maintained. Although this recommendation is focused on the essential need to bring in new assistant professors, it is equally essential that some flexibility be maintained so that senior persons can also be added. Table 33 gives the data for the period 1967-71 on the number of professors who left as a result of resignation, death or retirement. From this information together with the retirement schedule one can compute estimated turnover rates which may then be used to manage the composition of the faculty. The following three examples are intended to illustrate the results of different policy approaches to the problem of faculty composition. There are, of course, numerous promotion models one could devise, but these three examples serve to illustrate the influence of various parameters and explore the degree of constraint from our existing configuration.

14.2 *Example 1 — A Policy of Reduction of the Fraction of Tenured Faculty.* If one focuses on the percentage of tenured faculty and decides that it must be driven down without regard to other consequences, then one could in principle adopt a policy of adding no tenured staff either by direct appointment or by promotion. Clearly, this is an extreme case. The curves shown in Figure 14 for the Colleges of Arts and Sciences and Engineering are based on scheduled retirements plus estimated loss through deaths averaged to give annual reduction rates of 6.5 for Arts and Sciences and 4 for Engineering. Resignations are excluded. The total number of faculty in each division is held constant and all departures from tenured ranks are returned to non-tenured positions, with no new tenured appointments

possible. The curves show that if this drastic policy were pursued for 10 years, the percentage of combined tenured faculty would be reduced to about 50 per cent. One could of course put an additional requirement on the distribution between the ranks of associate and full professor. For the whole University the current distribution is 709:362:432 (Professors, Associate Professors, Assistant Professors) giving ratios 1.64:0.84:1. If one wished 50 per cent of the faculty to be tenured with a 1:1:2 distribution, then the numbers in the three ranks would be 376:376:751 and it is obvious that no promotions from associate to full professor could be made during the ten year period. The financial consequences of such changes in distribution can also be ascertained. For example, if today Cornell had a 1:1:2 distribution instead of 1.64:0.84:1, the difference in yearly salaries would amount to about a \$3,300,000 reduction, or over twice the annual current deficit. This example is mainly intended to illustrate the time scale required to appreciably alter the composition of the faculty. As a policy, it would be ruthless and would demoralize the academic community. However, it serves as a warning that we cannot continue in an unthinking manner or we could reach a point where only ruthless alternatives remain.

14.3 *Example 2 — A Policy of Uniform Faculty Age Distribution.* The policy suggested by this title assumes that the desired faculty composition is one whereby in the steady state the faculty are evenly distributed by age. The number of new assistant professors added each year equals the number of retirees. It implies that the number of tenured faculty is not a critical parameter. Consider the following hypothetical department of 40 faculty members having an even age distribution between ages 25 and 65. Assuming that non-tenured faculty are added at age 25 and that decisions on tenure are made 6 years later at age 31, it is clear that even if all non-tenured faculty who come up for promotion are promoted, one new assistant professor can always be added each year to replace the tenured retiring professor. Such a department would be 85 per cent tenured yet would not stagnate as a result of not bringing in young staff. Table 35 shows the consequences for two Colleges of such an approach (25) with a calculation of the percentage of current assistant professors that could be promoted at the "ideal rate." In both cases the "ideal rate" is within the projected rate of subtraction of faculty (resignations included) and still permits promotion from assistant professor. This example is encouraging because it shows that the projected rate of subtraction is sufficiently large to permit an upward flow of faculty while pressing for a uniform age distribution. However, the financial consequences of moving to a uniform age distribution faculty are as follows: the accompanying ratios of 4.8:1:1 when compared to the present 1.64:0.84:1 distribution would mean a yearly salary difference amounting to about a \$2,750,000 increase. Clearly, some tradeoffs would be necessary because of financial considerations and the fact that each department is neither near the hypothetical ideal distribution nor does it have sufficient size. From the point of view of providing faculty renewal, however, if transformed into policy guidelines, the uniform age distribution approach has some attractive elements.

14.4 *Example 3 — A Policy of Mixed Constraints.* In an absolute sense, the previous two examples are not ones that Cornell should embark upon precipitously. Rather, starting from the initial conditions of 1972, one seeks a projection which is feasible within the time financial and tenure constraints are likely to prevail. In keeping with the purposes of this recommendation, we seek a plan which will permit a sufficient flow of new staff to avoid stagnation and at the same time maintain a balanced approach to the other parameters. Figure 15a shows some examples of projections for the College of Arts and Sciences (26). As can be seen from the bases, the faculty size is fixed, and it is assumed that retirement attrition is replaced by non-tenured appointments. Curves I and II assume remaining attrition (due to resignations and deaths) is replaced by tenured staff, while Curve III permits 50 per cent of such attrition to be diverted to nontenured positions. Curve I is the projection based on maintaining the recent practice of promoting 44 per cent to tenure with an average time of 4 years. Curve II shows that reducing the promotion fraction to 35 per cent and increasing the time to 6 years appreciably reduces the increase in the fraction tenured. By permitting additional non-tenure appointments according to Curve III, the rise in the fraction tenured can be further reduced. Figure 15b shows the number of new non-tenured professors permitted as a result of the various approaches described by Figure 15a. The results show a decline of new non-tenured positions without a drastic reduction. One can of

course add the financial implications of such projections and thus arrive at an overall strategy. One concludes that a sensible strategy can be derived which will achieve the desired objective. Figures 16a and 16b show analogous results for the College of Engineering, only with a modified set of bases due to the higher percentage of tenured faculty. Here all vacancies in tenured positions are replaced by non-tenured appointments with Curves I and II for 70 per cent and 50 per cent promotion fractions from non-tenured positions. The percent tenured is seen to change relatively little and the number of new non-tenured professors each year is essentially constant.

14.5 We conclude that if Cornell prudently manages itself, feasible policies can be adopted which permit the continued flow of new staff. We also recommend that the policy adopted have sufficient flexibility to permit the addition of tenured staff in senior positions so that such opportunities for significantly strengthening Cornell's faculty not be precluded. The total process must be controlled, with the faculty conscious of the processes at work and the great importance of staffing decisions.

14.6 Partly as a result of its geographic location and partly as a result of its "full-time" concept of education, Cornell has not used part-time faculty to any great extent. The premises upon which this past practice were based appear to be outdated and may in some areas actually work to the disadvantage of the University. Several of the reasons for concluding that the University should encourage part-time options are listed below:

- 1) To facilitate the appointment and professional development and productivity of promising young scholars, both women and men;
- 2) To utilize the neglected reservoir of faculty wives of outstanding professional promise, who have traditionally not had access to part-time academic positions, thus, also serving to liberalize the hiring practices with regard to women;
- 3) To provide possibilities for young men who would, for various reasons, prefer the option of a part-time career pattern to that of a continuous one;
- 4) To achieve and sustain academic strength by obtaining the services of distinguished professionals and scholars who might not otherwise be induced to come to Cornell;
- 5) To avoid the need to establish and subsidize full blown academic efforts in esoteric disciplines at the expense of academic scope;
- 6) To maintain flexibility in overall staffing as we enter an era when the number of college-age students will level off;
- 7) To retain distinguished senior faculty already resident in Ithaca who would prefer time to money, or part-time work to retirement.

The Committee believes that the recruitment and retention of a distinguished faculty will increasingly depend on the possibility of attracting highly qualified couples seeking independent professional opportunities in Ithaca. Suggested guidelines for implementing a system of part-time appointments are given in reference (4).

15. *Regard educational innovation as an essential aspect of long-range planning and set aside sufficient funds on a continuing basis for this purpose.*

15.1 The expanding University budget was deceptive to the extent that it permitted the academic community to pay inadequate attention to questions of cost and allocation. The allocation of resources was merely a process whereby fresh new funds were distributed, leaving the old ones undisturbed. Thus the constraints inherent in the operation were ignored, so that today we have inherited an accumulation of effects previously described. Even the annual budget process as traditionally carried out leaves room for little flexibility, for there are few truly elective choices possible. The central Administration estimates income and expense for the following year. By extrapolation from existing bases the various College targets are established, the Deans determine the Departmental targets, and the Department Chairmen work out their budgets for the following year. Thus perhaps 95 per cent of the new budget is preordained by the existing one. The process is incremental in nature and usually avoids policy considerations of major consequence. Or to look at it another way, real long-range commitments and matters of policy are indeed made, but made in relatively small pieces, so that it is the accumulated effect which confronts us at a later date and appears as a ponderous entity difficult to deflect to new purposes. For the foreseeable future, however, opportunities for change and innovation will have to rely heavily on the reallocation of existing resources.

15.2 We view the need for continued educational change and innovation as an essential and central aspect of long-range financial planning. Other recommendations have of course touched on various facets of this need. The provision for the flow of new staff, the encouragement of teaching reform, and the need for comprehensive planning itself are examples of recommendations to insure that we do not stagnate. But we must think beyond even these facets. As noted earlier, the rise of quality public higher education and the reduction in the increase of numbers of college-seeking youth mean that Cornell will find itself increasingly in direct competition with other institutions to attract students. This does not suggest that we must think of ourselves as a commercial enterprise, quick to alter its offerings in response to changing fashions. But it does suggest that the other extreme view is not supportable either — one in which we continue to do essentially what we have done in the past, secure in the knowledge that students will beat down our doors in their anxiety to gain access to the privilege of Cornell. Academic change will take place and Cornell should provide leadership. Educational innovation includes such things as alternate routes to traditional degrees, greater willingness to accept and adjust programs for transfer students, study in *absentia*, opening up possibilities for qualified students to graduate in shorter periods of time, support of regional cooperative and student exchange schemes between sister institutions having particular specialties, make possible the combination of field experience, always subject to maintaining proper academic standings, with ordinary classroom experience. The purpose is not to succumb to faddism or to respond to a loose demand for "relevance," but rather to be alert to ways in which we can demonstrate to students the relevance of the kinds of knowledge that we are most expert in imparting. These considerations point up the unhealthiness of having budgets entirely distributed by the traditional disciplinary-oriented departments.

15.3 Different approaches are available to provide the margin for self-renewal funds. The University is in the middle of an across-the-board approach and in some respects this might appear to be equitable, but with each succeeding year economies become more difficult to achieve and the process might be viewed as one of erosive attrition which avoids consideration of basic choices. Further, the diversity at Cornell would suggest that some selective cutbacks are feasible and may indeed be necessary in the near future. Another approach is to consolidate existing groups where overlapping programs are in existence. In a situation of no growth in the size of the faculty the question of faculty line item reallocation will of course arise. We support the policy of the Plane Memorandum (21) which makes it clear that line items revert to Colleges and are not tied to particular departments. Whether cross-College allocation of resources is appropriate will depend on the results of program cost analyses and priority determinations called for in previous recommendations. The various techniques outlined above are of course not mutually exclusive and the University will have to use a variety of approaches. New programming funds in Cornell's 1971-72 budget amounted to about \$170,000. We view this as a bare minimum; \$250,000 is a more realistic figure. This amount is approximately 1 per cent of the current Endowed College Expenditures for Instruction and Departmental Research (32). The Carnegie Commission recommends that 1-3 per cent be taken from existing allocations for self-renewal (5). While this has an attractive ring to it, the Committee does not believe that instructional funds should be the sole source of innovative capital. In conclusion, Cornell must provide a pool of funds for educational innovation leading to new programs of significance.

Support Functions

16. *In the areas of non-academic and para-academic staff and support services Cornell must:*

- 1) Encourage better manpower utilization, control the size of the support staff, and press for reductions wherever possible;
- 2) Strengthen the role of supervisory and middle management personnel by providing management advisory service where necessary and by supporting implementation of sound manpower practices;
- 3) Try to eliminate the dual systems resulting from the presence of State and Endowed divisions;
- 4) Anticipate unionization and try to improve staff utilization and efficiency.

16.1 Table 36 shows that during the 1960s total support staff grew in direct proportion to the number of faculty. The ratio of support employees to faculty was about 3.6 in the early 1960s, but since 1965 it has

remained at approximately 4. The ratio of the number of students to support employees fell from about 3 to 2-plus during this period. In trying to sort out some of the effects of these changes the Committee ran into difficulty because of the great lack of readily available information, as well as conflicting evidence and changes in organization which make comparisons over time of questionable value. For example, in attempting to obtain a count of individuals by support categories, we discovered that some categories were defined differently from one year to the next. The Committee then attempted to obtain the salary cost information in certain support categories in order to make a "cost push" calculation similar to that done for costs of instruction. This also proved to be not feasible because the information is not aggregated in ways which permit such an analysis. While we believe the information can be extracted if sufficient effort is extended, it would require a very detailed investigation by someone who was familiar with the nuances of the University, and the Committee did not have at its disposal the necessary human resources. Consequently, little information of a diagnostic character was unearthed; such data must be assembled. The 1961-70 rise in total staffing in the Deans' offices in the Colleges of Arts and Sciences and Engineering rose about 80 per cent, an increase about equal to the 75 per cent growth of the Endowed faculty but appreciably larger than the 42 per cent increase in Endowed students. These data show the effects of 1) expanded program and promotional commitments 2) introducing greater flexibility in academic options and meeting student needs and 3) more elaborate attention to admissions activities. We believe that analysis of several other support areas would yield similar conclusions. The message is simple — flexibility and added services cost money. It may be that we believe the addition is worth the money, but let us be aware that costs are involved and that the gains must therefore be weighed against the sacrifices.

16.2 In the current three year budget reduction program, most of the support areas have taken a 15 per cent cut (as opposed to 10 per cent in academic units). There is evidence that some divisions are quite efficient and seriously try to effect cost reductions (19). But the Committee heard persistent stories of overstaffing, abuses in fulfilling the standard work week or time off, waste in use of facilities and equipment, sloppiness and toleration of poor personnel practices. For example, there are at least 110 Xerox machines with an annual cost of \$500,000. It is difficult to believe we are making the most efficient possible use of this equipment. The constant ratio of about 4 indicates that there was no greater planning or attempt at controlling growth in the support areas than in the academic programs. Support staff accretion arose from the locally justified needs of faculties, departments, and administrations, with little overall control of or apparent concern for the consequences. Some universities have responded to the era of financial stringency by substantially cutting back support staff and service; at least one school has consciously adopted a policy of continuing cutbacks until the faculty rise in protest. While one might resort to across-the-board reductions in some areas, in other areas this approach is simply not appropriate. For example, as has been previously noted, the level of maintenance in many sectors is already close to a tolerable minimum and further reductions would be false economy. However, in other areas savings might be possible. Seasonal or other special demands would make it possible to put some jobs on a nine or ten-month basis or on shortened daily schedules. Early retirement options should be explored and unproductive employees should be encouraged to avail themselves of such alternatives. There simply are no easy answers, but a strenuous effort must be made to effect savings even if it means a reduced level of support service. The ratio of 4 is not sacred. There is no question but that the whole staff, faculty included, must give more thought to better utilization of support staff. We believe the present state of affairs is largely the result of an absence of management. No one was looking critically at these areas or attempting to effect efficiencies. Everyone has a stake in this area and administration must press for improved efficiency.

16.3 As with the academic programs, the diversity of Cornell's support activities requires a great variety of special talents. The difficulties are compounded by the inherent dispersion within the system which reduces the effectiveness of supervising personnel. On a local scale lax standards are sometimes tolerated and come to be an accepted norm. Without destroying the informal atmosphere which serves as a motivating force in an academic environment, the University must encourage

the development of professional attitudes. Supervisory and middle management personnel play a key role in establishing and maintaining work standards, and Cornell must find means to support these personnel. In so far as a management advisory service could help, this should be encouraged, but incentive techniques also should be used. Thus, supervisors who try to maintain high standards of performance should be encouraged and supported.

16.4. At several places in our study we observed how the differences in practice between the Statutory and Endowed Divisions sometimes proved detrimental to the Endowed Colleges. This is particularly true where the support staff is concerned, for here the influence of State policies and practices is felt most directly. For example, the legislation of mandatory fringe benefits has caused appreciable cost increases in the Endowed units. The University should try as much as possible to minimize the ratcheting effect of the dual system.

17. *Maintain selectivity in the capital expansion and improvement program; specifically:*

1. Require that full project costs of academic facilities be funded for both construction and maintenance with minimum use of endowed funds.

2) Require that life cycle project costs of revenue producing facilities be amortized from income and gifts.

3) Give high priority to maintenance programs and critically review plans for renovation and rehabilitation.

17.1 The institutional capacity for physical facilities planning and associated research dates from the establishment of the University Planning Office in 1965. The Office of Planning has invested considerable effort in creating and implementing a plan which integrates the programmatic needs of the institution (18). Table 37 is one version of a program which contains the accumulated wisdom of those associated with the process. It gives the impression that a great many worthy and often urgent projects exist. The obvious concern in a period of financial stringency is that vital resources which could be used in support of academic programs not be drained off for "bricks and mortar." Although it is not always possible to make optimal academic use of our physical plant, Cornell already has classroom capacity for at least 17,500 students.

17.2 Buildings for academic purposes are usually considered as non-revenue producing and hence not self-amortizing. Funds for such buildings have traditionally come from gifts. Buildings which can be considered revenue producing are set up as self-amortizing, and the current practice is to borrow the capital for these enterprises from bonds sold by the New York State Dormitory Authority. The capital borrowed plus interest is paid back over a period of years. Cornell's total debt, including money we owe ourselves is about \$54,000,000, spread over about 29 projects (4), with the outstanding debt currently about \$47,000,000. Fifteen projects have been financed by outside borrowing, and Cornell has never borrowed outside directly from other than the Dormitory Authority. The annual debt service payment to that Authority rose from zero in 1962 to \$3,755,000 in 1972-73. The 1972-73 debt service component for the Division of Campus Life is \$2,147,000. Clearly, debt service is a large and has been a growing budgetary item, reflecting a major capital expansion program which was especially urgent in the Campus Life area.

17.3 The only externally financed project which was not set up on a self-amortizing basis was the Social Sciences Building, recently named Uris Hall. Only for this building is it now contemplated that the loan will be repaid from unrestricted funds. This recently completed facility is an example of the latent problems in the construction of academic buildings. Gifts to cover the \$8,665,000 cost of this project have amounted to \$3,340,000, including the \$2,000,000 gift of Harold and Percy Uris. The balance of \$5,325,000 has been borrowed from the State Dormitory Authority. Beginning with the academic year 1972-73 total debt service will be about \$382,000 per year; in addition, the total operating expenses are estimated to be \$228,000 yearly for maintenance, custodial care and utilities. Without unraveling here the history leading up to the decision to construct this building, we wish to cite it as an example of the trade-offs involved in any such decision. There are very strong benefits derived from providing such a fine facility for the groups housed therein and these benefits are being traded-off for the unrestricted funds referred to above. The point here is that before large sums of money are committed to nonself-amortizing purposes, Cornell must toughen up the decision process and be certain that the project can be fully justified.

17.4 The North Campus Dormitory complex is an example of an income producing facility whose financing

is set up on a self-amortizing basis. Originally it was hoped that gifts would offset a substantial fraction of the cost of construction, and the Development Office instituted a promotional effort to that end. Donors have not been found and \$17,489,000 has been borrowed from the State Dormitory Authority to cover the project cost. For the year 1971-72 debt amortization and service interest is \$1,416,000. These carrying expenses exceed the room charges to the students living in the complex. Without reciting the train of events which apparently involved some wishful thinking and changes of ground rules, we mention this case as another example of the trade-offs which are now apparent. Construction of expensive living facilities is expensive, and in planning for the housing of additional students, Cornell must carefully weigh the various alternatives.

17.5 In planning expensive facilities, attention should be given to possible multiple use for both academic and nonacademic purposes. For example, class and seminar rooms might be made more adaptable for extra-curricular meeting and conference rooms, and lecture halls be made adaptable as auditoria, with but minor and relatively inexpensive modifications in design. If at all possible, advantage should be taken of the latent flexibility involved.

17.6 Maintenance of both buildings and surroundings is one of the continuing problems associated with any institutional complex. Cornell's diverse physical plant requires constant maintenance and rehabilitation. In recent years, unmistakable signs of deterioration have appeared which, if allowed to continue, will grow to serious proportions. Although it might appear tempting to reduce drastically the University's maintenance and rehabilitation program, experience shows that such a course is shortsighted. Contrary to common belief, in comparison with other similar institutions (19), Cornell's operating expenses for maintenance, custodial service, and utilities are not excessive. Further, considerable progress has been made in keeping these costs down. Cornell should not neglect the continuing needs for plant maintenance.

17.7 In capital expansion or improvement projects the combination of forces at play is complex and mitigates against categorical pronouncements as to future courses of action. However, Cornell should undertake such projects only after very careful consideration with justification based on clear policy decisions of urgent academic need. One of the central reasons why Cornell must create an academic plan is the need to integrate its requirements with those of physical facilities planning. In fact, a physical facilities plan should be made in conjunction with academic planning so that the interaction between academic program priorities and costs relative to capital outlays and debt service can be evaluated. Only in this way can the fundamental problems of selection and resource allocation assessment be rationalized.

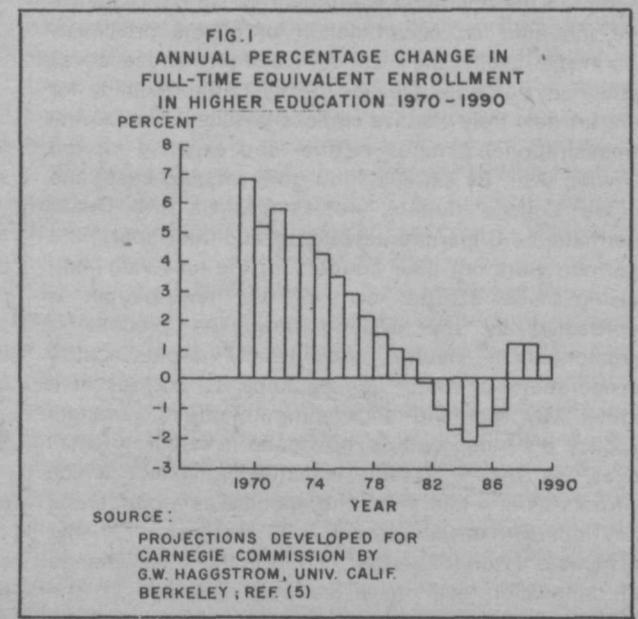
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APPENDIX I — FIGURES



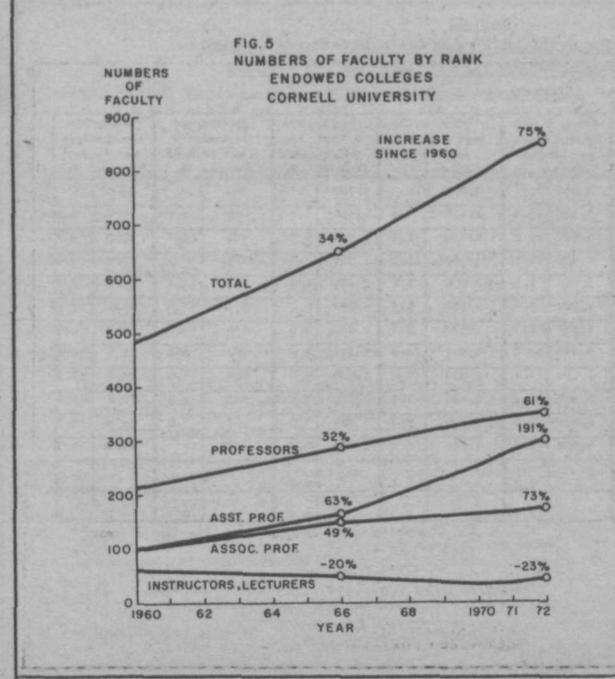
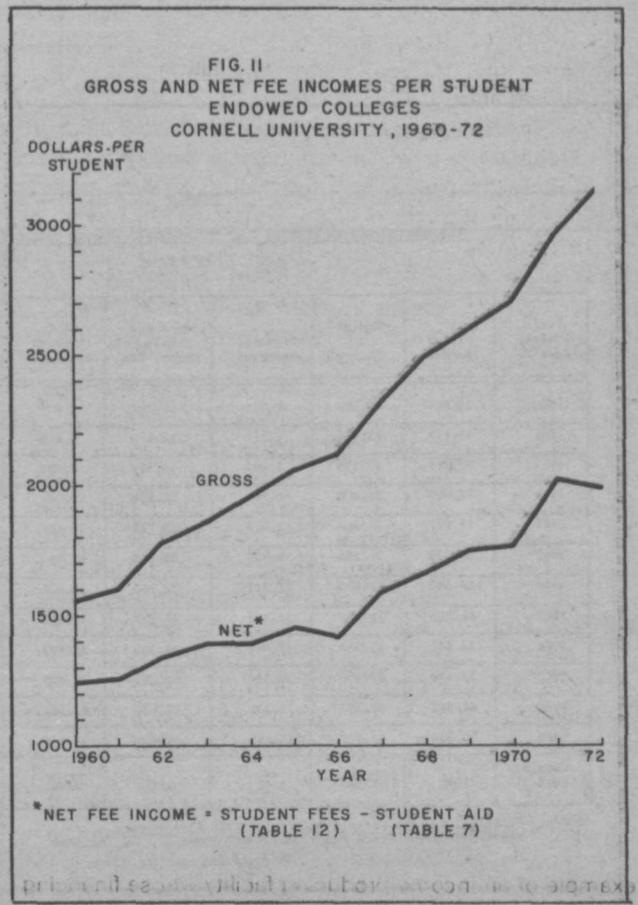
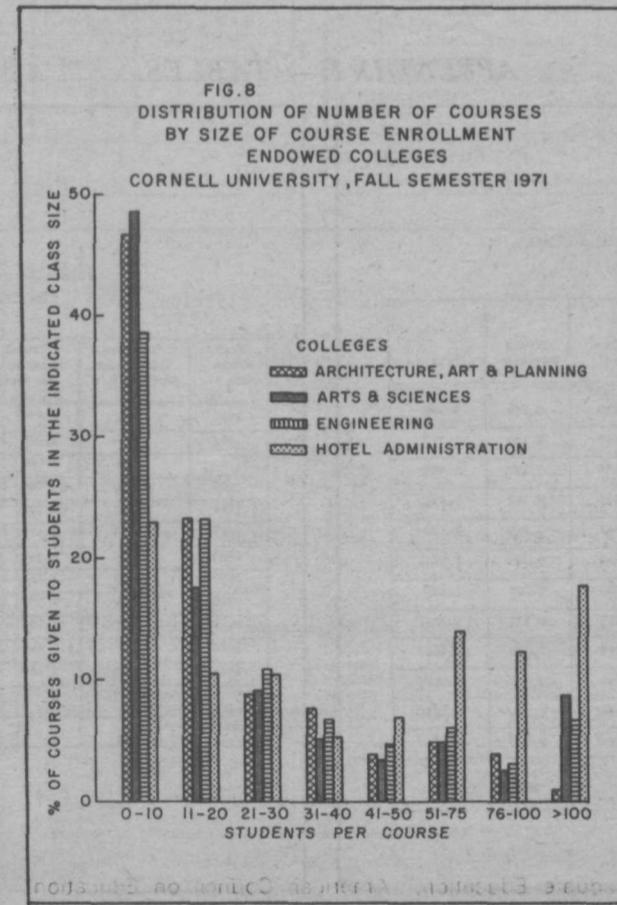
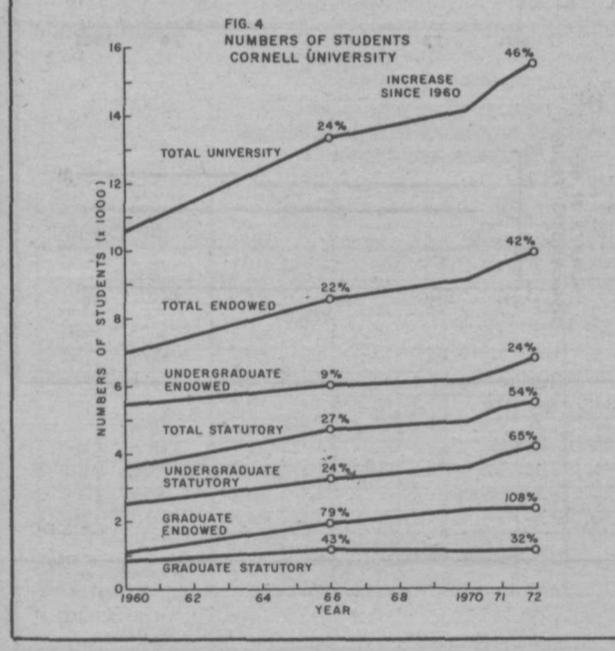
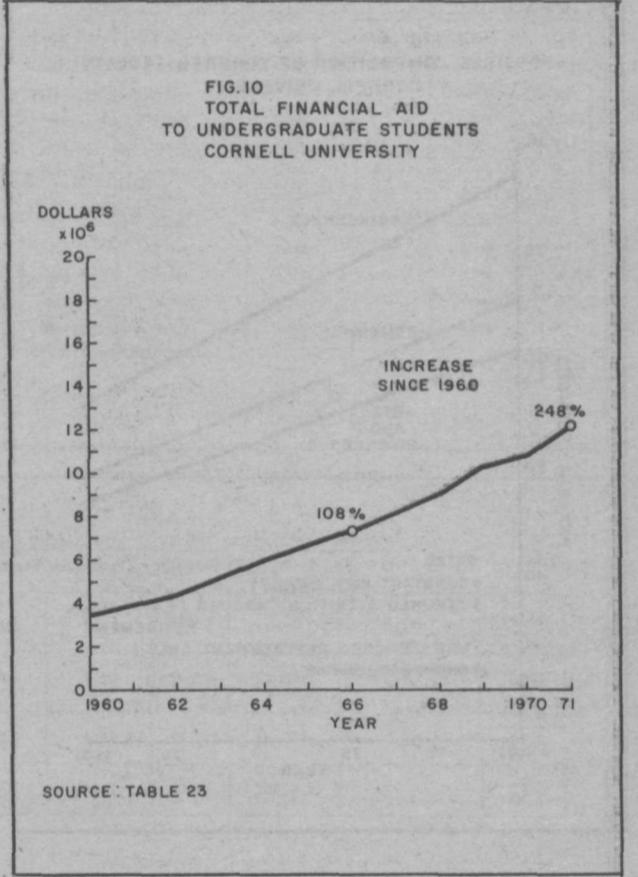
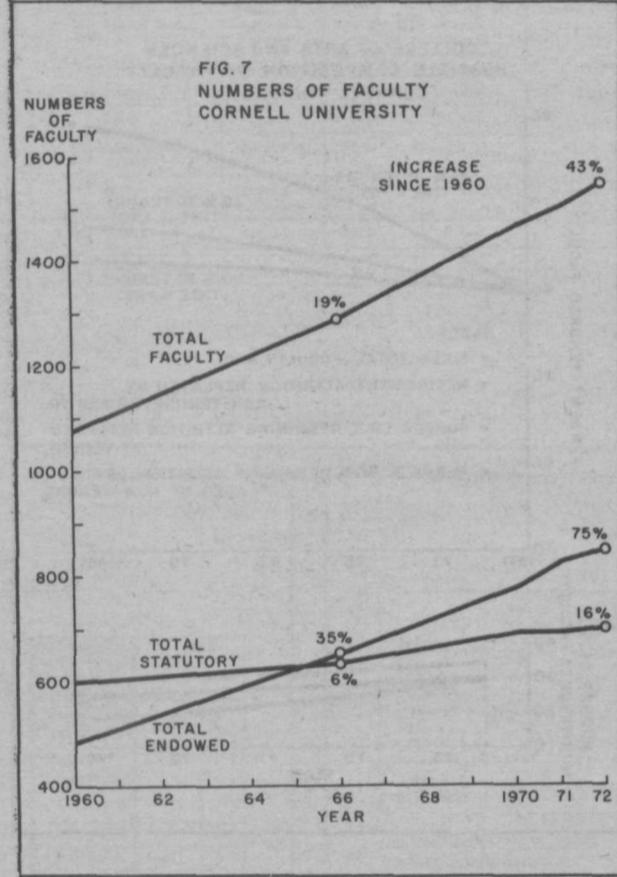
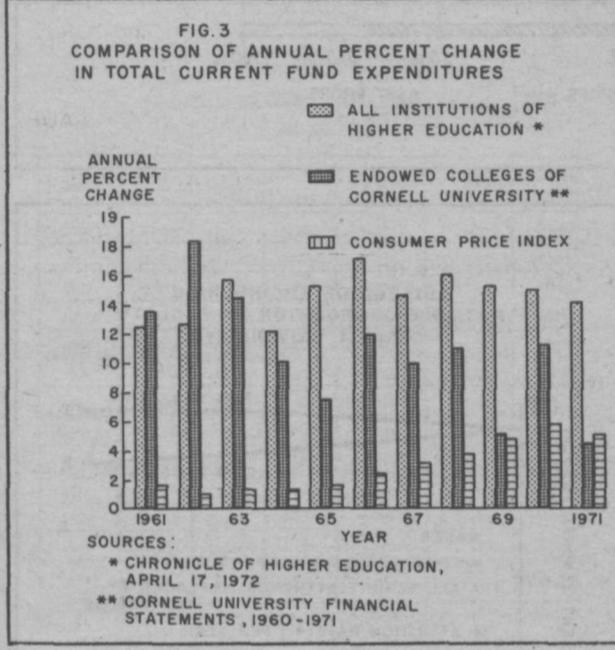
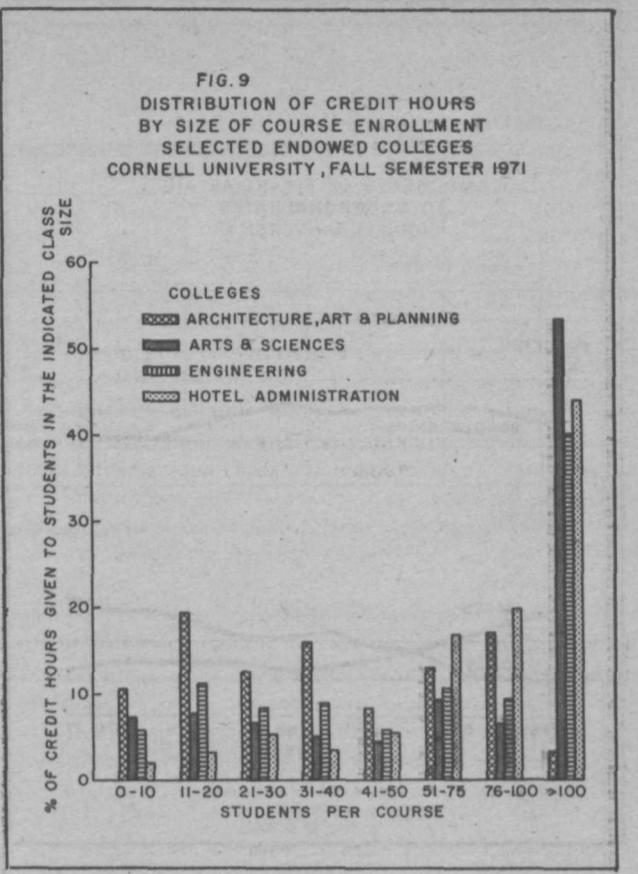
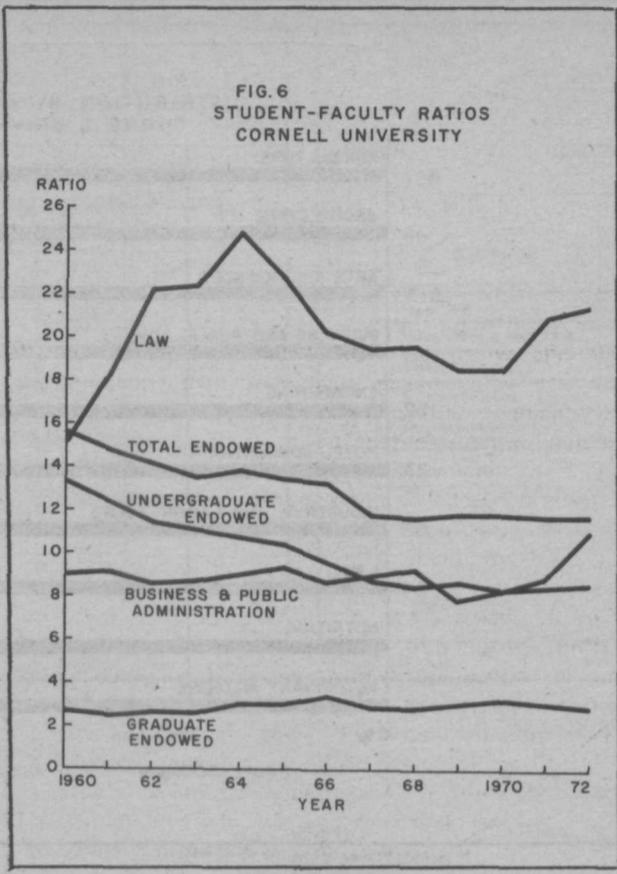
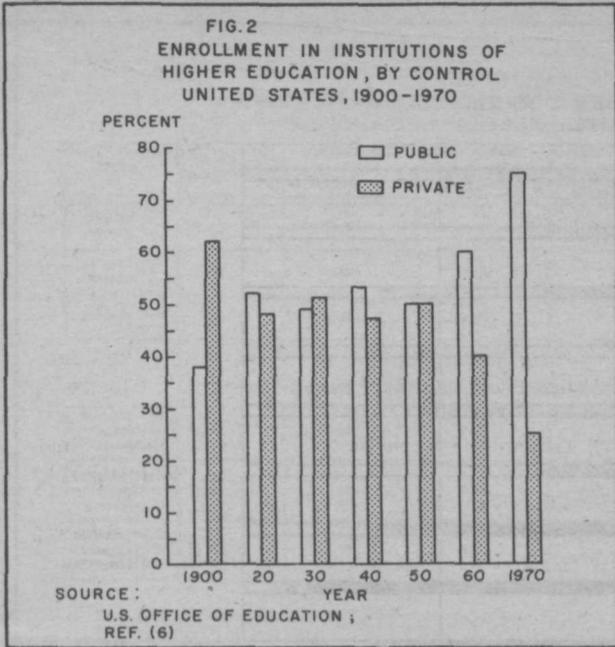


FIG. 12
COMPONENTS OF FINANCIAL AID
TO UNDERGRADUATES
CORNELL UNIVERSITY

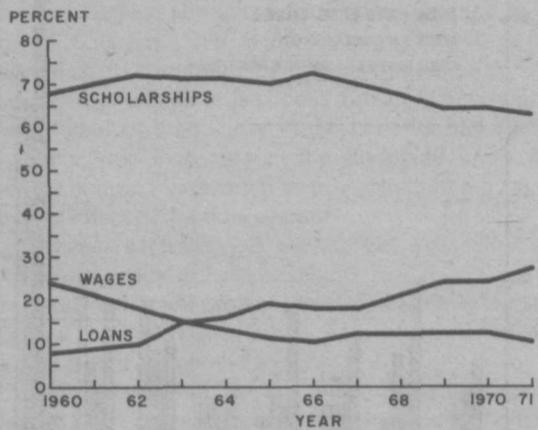


FIG. 13
DISTRIBUTION BY ACADEMIC RANK
CORNELL UNIVERSITY

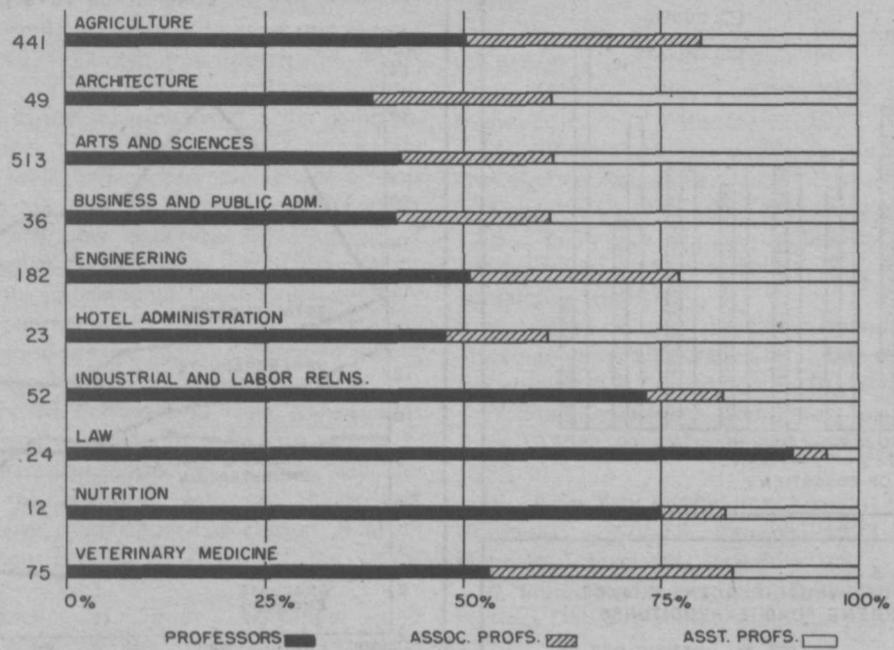


FIG. 14
POSSIBLE COMPOSITION OF TENURED FACULTY
CORNELL UNIVERSITY

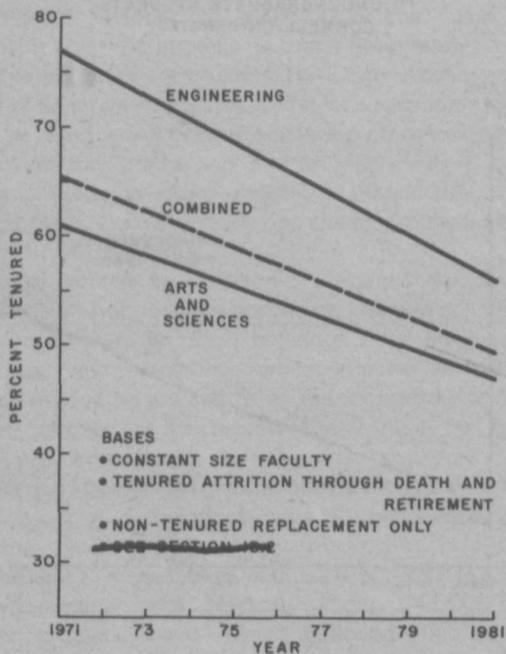


FIG. 15
COLLEGE OF ARTS AND SCIENCES
POSSIBLE COMPOSITION OF FACULTY
CORNELL UNIVERSITY

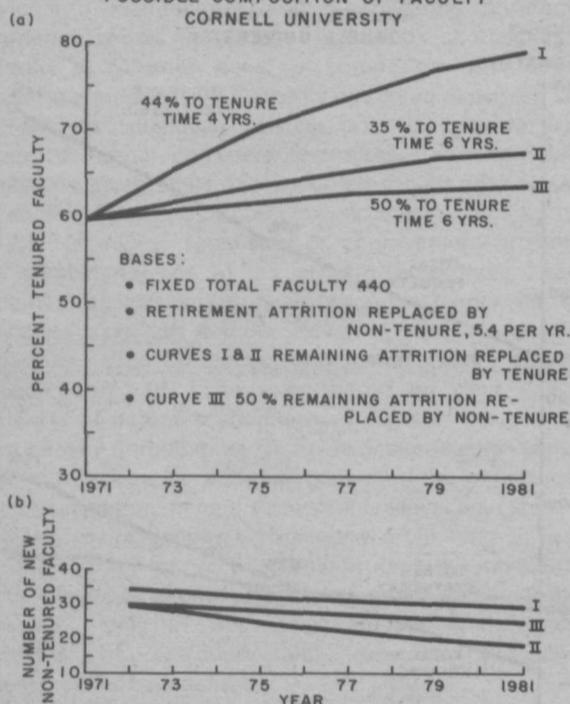
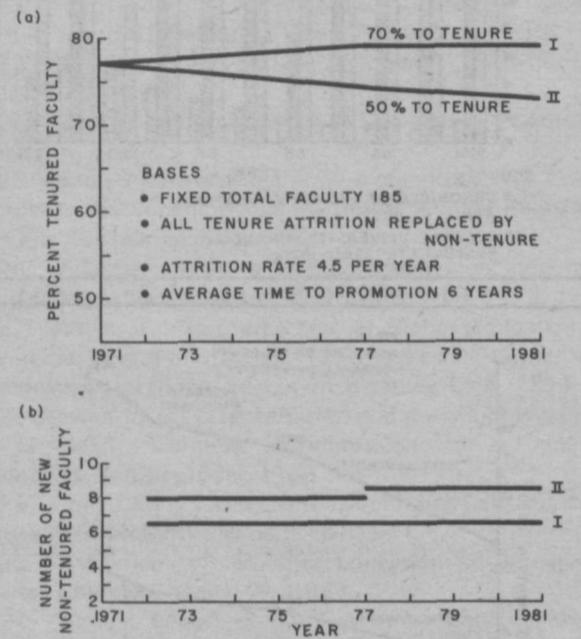


FIG. 16
COLLEGE OF ENGINEERING
POSSIBLE COMPOSITION OF FACULTY
CORNELL UNIVERSITY



APPENDIX II — TABLES

TABLE 6
SELECTED CATEGORIES CURRENT FUND EXPENDITURES ENDOWED COLLEGES ITHACA 1960-1971
DOLLARS X 10⁶

Year Ended June 30	Total Expend.	Educ. & General	Organiz. Research	Ed. & Gen. less Organ. Res.	Instruct. & Depart. Research	Student Aid	Safety Division	Libraries
1960	29.268	20.167	4.026	16.141	7.755	2.210	0.194	0.998
1961	33.220	23.484	6.311	17.173	8.215	2.465	0.209	1.213
1962	39.345	28.193	8.600	19.593	8.981	3.156	0.232	1.433
1963	45.000	32.670	10.182	22.488	10.044	3.539	0.242	1.916
1964	49.551	35.749	10.016	25.733	11.658	4.447	0.276	2.130
1965	53.269	38.360	9.807	28.453	12.860	4.940	0.295	2.374
1966	59.669	42.875	11.712	31.163	14.602	6.002	0.319	2.533
1967	66.265	48.245	13.513	34.732	19.137	6.423	0.371	3.053
1968	73.641	53.419	15.064	38.354	20.903	7.268	0.474	3.266
1969	77.478	57.105	14.584	42.521	23.137	7.746	0.635	3.667
1970	86.082	62.597	15.561	47.036	25.567	8.594	0.776	3.983
1971	90.026	65.107	17.998	47.109	26.556	8.989	0.900	4.352
Change 1960-71	208%	223%	347%	192%	244%	307%	363%	336%

SOURCE: Financial Reports Cornell University 1960-1971.
1960-71 Consumer Price Index Compounded Annually, 40% Increase

TABLE 7
SELECTED CATEGORIES CURRENT FUND EXPENDITURES PER STUDENT
AND ANNUAL PERCENTAGE RATE OF INCREASE PER STUDENT
ENDOWED COLLEGES 1960 - 1971

Year Ended June 30	Endowed Enrollment Students X 10 ³	Total Expenditures per Student Dollars %	Educ. & Gen. Expenditures per Student Dollars %	Educ. & Gen. less Org. Res. per Student Dollars %	Instruction & Dept. Res. per Student Dollars %	Student Aid Expenditure per Student Dollars %	Safety Div. Expenditure per Student Dollars %
1960	7.021	4,170	2,860	2,300	1,100	315	27.6
1961	7.096	4,680	3,300	2,410	1,160	348	29.4
1962	7.230	5,440	3,900	2,710	1,240	436	32.0
1963	7.396	6,100	4,420	3,040	1,360	480	32.6
1964	7.859	6,300	4,550	3,270	1,480	565	35.1
1965	8.167	6,510	4,700	3,480	1,570	591	36.2
1966	8.630	6,920	4,970	3,610	1,690	695	36.9
1967	8.655	7,660	5,570	4,000	2,220	742	42.9
1968	8.670	8,500	6,150	4,420	2,420	830	54.6
1969	9.077	8,540	6,300	4,680	2,550	853	70.0
1970	9.180	9,400	6,820	5,120	2,780	935	84.6
1971	9.586	9,400	6,800	4,930	2,770	935	94.0
Average Annual Rate Increase 1960-70		8.6	9.2	8.4	9.9	11.7	12.0
Average Annual Rate Increase 1967 to 1970		7.5	7.4	9.3	8.4	8.7	32.0

TABLE 8
AVERAGE ANNUAL RATE OF EXPENDITURE INCREASE PER STUDENT
Cornell University - Endowed Colleges Ithaca

Period	Total Expenditures	Educational & General	Educ. & Gen. less Organiz. Research	Instruction & Dept. Research	Student Aid	Safety Division
1959-60	8.6%	9.2%	8.4%	9.9%	11.7%	12%
1969-70	7.5%	7.4%	9.3%	8.4%	8.7%	32%
1970-71	0%	-0.3%	-3.7%	-0.4%	0%	11%

Carnegie Commission on Higher Education Study 1959-60 to 1969-70

Schools not in financial trouble	Schools headed for financial trouble	Schools in financial difficulty
7.5%	7.3%	10.6%
8.0%	7.0%	9.5%
7.7%	6.8%	9.0%
7.3%	7.7%	8.0%
12.0%	18.1%	21.5%

TABLE 10

ESTIMATES OF ANNUAL PERCENTAGE INCREASE IN TOTAL EXPENDITURES PER STUDENT

Cost Factor	Extent of Campus Control	I Cornell 1967-70 Analysis	II Possible Cornell Projection	III Carn. Comm. "Schools in financial difficulty"	IV Carnegie Comm. "Best" Judgment
Inflation	None	2.5	2.1	2.4	2.4
Instruction & Dept. Res.	Substantial	2.4	1.4	2.0	1.3
Student Aid	Partial	0.8	0.8	1.7	0.9
Safety Division	Partial	0.2	0.1	1.0	0.3
New Responsibilities	Substantial	1.6	1.6	3.5	1.5
Total		7.5	6.0	10.6	6.4

Note: Columns III and IV data from Ref. (29) for 1967-70 period.

TABLE 11

CURRENT INCOME ENDOWED COLLEGES ITHACA 1960-71
DOLLARS X 10⁶

Year Ended June 30	Total Income	Student Fees	Gifts	Investment Income	Federal & State Gov't	Other
1960	29.750	10.945	3.502	2.325	6.513	6.475
1961	33.968	11.371	3.529	2.739	9.024	6.905
1962	40.149	12.861	3.795	3.541	13.433	7.519
1963	45.656	13.806	4.191	4.291	15.828	8.240
1964	49.906	15.400	5.837	4.969	14.850	8.850
1965	53.804	16.838	9.907	5.432	12.130	9.497
1966	59.422	18.249	4.525	5.720	20.618	10.307
1967	65.706	20.189	4.972	6.133	23.249	11.163
1968	73.229	21.688	7.365	6.949	24.545	12.682
1969	74.794	23.607	5.998	7.334	25.515	12.340
1970	84.012	24.851	9.884	8.888	26.939	13.450
1971	89.920	28.464	10.272	9.435	24.735	17.014
Change 1960-71	202%	160%	193%	305%	281%	163%

1960-71 Consumer Price Index Compounded Annually, 40% Increase

TABLE 12
ESTIMATES OF ANNUAL PERCENTAGE INCREASE OF TOTAL INCOME PER STUDENT

Income Factor	Extent of Campus Control	I Cornell 1967-70 Analysis	II Possible Cornell Projection
Student Fees	Partial	1.7	(2.0)
Gifts	Partial	2.2	1.0
Investment Income	Partial	1.1	1.0
Fed. & State Gov't.	Partial	1.0	1.2
Other	Partial	0.8	0.8
Total Income		6.8	6.0

TABLE 16
SPONSORED RESEARCH
ENDOWED COLLEGES 1960-71

Year Ending June 30	Sponsored Res. Total Dollars x 10 ⁶	Total Salary Recovery Dollars x 10 ⁶	% Total	Indirect Cost Recovery Dollars x 10 ⁶	% Total
1960	4.765	0.156	3.7	0.749	15.7
1961	10.425	0.246	2.4	1.013	9.7
1962	10.054	0.305	3.0	1.311	13.0
1963	11.199	0.308	2.9	1.601	14.3
1964	12.425	0.352	2.8	1.971	15.8
1965	11.812	0.400	3.4	1.947	16.5
1966	13.348	0.511	3.8	2.004	15.0
1967	16.143	0.580	3.6	2.660	16.5
1968	17.853	0.612	3.4	3.099	17.4
1969	17.577	0.568	3.2	3.217	18.3
1970	18.704	0.555	3.0	3.586	19.2
1971	19.426	0.585	3.0	3.898	20.1

TABLE 12

CURRENT INCOME PER STUDENT BY CATEGORY AND ANNUAL PERCENTAGE RATE OF INCREASE PER STUDENT
ENDOWED COLLEGES 1960 - 71

Year Ended June 30	Endowed Enrollment Students X 10 ³	Total Income per Student Dollars	%	Student Fee Income per Student Dollars	%	Gifts Income per Student Dollars	%	Investment Income per Student Dollars	%	Federal and State per Student Dollars	%	Other Income per Student Dollars	%
1960	7.021	4,240		1,560		500		331		927		922	
1961	7.096	4,730	11.6	1,601	2.6	498	-0.4	396	19.6	1,270	37.0	975	5.7
1962	7.230	5,550	17.3	1,780	11.2	525	5.2	490	23.8	1,860	46.5	1,040	6.7
1963	7.396	6,180	11.3	1,870	5.0	567	7.0	580	18.4	2,050	10.2	1,115	7.2
1964	7.859	6,350	1.9	1,960	4.8	742	30.8	632	9.0	1,890	-7.8	1,140	2.2
1965	8.167	6,580	3.6	2,060	5.1	1,150	95.0	630	-0.3	1,485	-21.4	1,161	1.8
1966	8.630	6,890	4.7	2,120	2.9	525	-54.4	663	5.2	2,390	61.0	1,195	2.9
1967	8.655	7,600	10.3	2,330	9.9	574	9.3	709	6.9	2,690	12.5	1,290	7.9
1968	8.670	8,440	11.0	2,500	7.3	850	48.1	802	13.1	2,830	5.2	1,460	13.2
1969	9.077	8,240	-2.4	2,600	4.0	660	-22.4	807	0.6	2,810	-0.7	1,360	-6.8
1970	9.180	9,150	11.0	2,710	4.2	1,075	63.0	966	19.7	2,930	4.3	1,465	7.7
1971	9.586	9,400	2.7	2,970	9.6	1,070	-0.5	984	1.9	2,580	-12.0	1,780	21.5
Average Annual Rate Increase 1960 - 70		8.4		5.7		14.1		11.6		14.7		4.9	
Average Annual Rate Increase 1967 to 1970		6.8		5.4		29.1		12.0		3.0		4.5	

TABLE 14

AVERAGE ANNUAL RATE OF INCOME INCREASE PER STUDENT
Cornell University - Endowed Colleges Ithaca

Period	Total Income	Total* Expendit.	Student Fees	Gifts	Invest. Income	Fed. & State Gov't.	Other
1959-60	8.4%	8.6%	5.7%	14.1%	11.6%	14.7%	4.9%
1966-67	6.8%	7.5%	5.4%	29.1%	12.0%	3.0%	4.5%
1969-70	6%	6%	(5.9%)	10%	10%	4%	5%

Carnegie Commission Study
1959-60 to 1969-70

* From Table 8

Schools not in financial trouble	7.1%	7.5%
Headed for financial trouble	6.6%	7.3%
In financial difficulty	9.2%	10.3%

TABLE 17

MEDIAN FACULTY TEACHING HOURS PER WEEK¹

	1931-32*		1969*	
	Public	Private	Public	Private
Research universities ²	15.1	15.1+	6.0	5.2
Other doctoral-granting universities			7.3	8.2
Comprehensive universities and colleges ³	16.7		11.0	10.0
Liberal arts colleges	+	+	11.2	11.0
Two-year colleges	18.0	17.5	15.1	13.6

- Adapted from U.S. Office of Education, National Survey of the Education of Teachers, Bulletin No. 10, Washington, D.C., 1933, p. 182; and Carnegie Commission Survey of Students and Faculty, 1969.
- Research universities classified in category 1.1 of the Carnegie Commission Classification of Institutions of Higher Education in Appendix of New Students and New Places (1971), Ref. 6.
- The 1931-32 data is for teacher's colleges and normal schools which were the predecessors of many of the comprehensive universities and colleges of today.

* 1931-32 data is median clock hours per week while 1969 data is median classroom hours per week.

+ There was no category, "public liberal arts colleges" in the 1931-32 survey, and the private category were grouped with private universities.

TABLE 18

GRADUATE DEGREES
Endowed Colleges - Ithaca*

Field	MASTERS DEGREES			
	1960-61	1964-65	1967-68	1971-72
Humanities	61 (32)	94 (35)	62 (14)	89 (20)
Social Sciences	21 (11)	29 (11)	60 (13)	76 (17)
Biological Sciences	11 (5)	10 (4)	11 (2)	14 (3)
Physical Sciences	100 (52)	133 (50)	326 (71)	267 (60)
Totals	193	266	459	446
M. Degrees/Faculty	0.46	0.50	0.67	0.58

Field	DOCTORS DEGREES			
	1960-61	1964-65	1967-68	1971-72
Humanities	19 (16)	37 (20)	47 (18)	58 (19)
Social Sciences	27 (23)	25 (13)	30 (11)	57 (18)
Biological Sciences	10 (9)	20 (11)	26 (10)	30 (10)
Physical Sciences	60 (52)	104 (56)	164 (61)	166 (53)
Totals	116	186	267	311
D. Degrees/Faculty	0.27	0.35	0.39	0.40

*Excludes Law and B & PA Professional Degrees. Numbers in parentheses show percentages by Graduate Field.

TABLE 19

RATIOS OF FULL-TIME EQUIVALENT STUDENTS TO FULL-TIME EQUIVALENT FACULTY MEMBERS

Year	Universities ¹		Cornell Endowed ³	
	Unweighted	Weighted ²	Unweighted	Weighted ²
1955	13.0	15.4		
1957	12.0	14.4		
1959	12.9	15.9	14.7	19.5
1961	13.6	16.9	14.3	19.3
1963	14.4	17.8	13.9	19.0
1966	15.9	20.1	13.3	19.5
1967	15.7	20.1	12.9	18.5
1968			12.6	17.6
1970			11.7	17.8

Notes:

- Adapted from Ref. (5) p. 65
- Graduate enrollment weighted 3 to 1 compared to undergraduate based on estimates of relative costs at various universities. See Table 29.
- Excludes B & PA and Law.

TABLE 20

TOTAL NUMBER OF COURSES OFFERED
BY ACADEMIC YEAR*
SELECTED ENDOWED DIVISIONS
CORNELL UNIVERSITY

	1962-63	1966-67	1971-72
Architecture, Art Planning	182	262(44)	315(73)
Arts & Sciences	1202	1548(29)	1820(52)
Engineering	411	496(21)	535(30)
Hotel Administration	97	98 (1)	119(23)

* Numbers in parentheses are percent increase over 1962-63.

SOURCE: Taken from Master Course List, Office of Student Records and Finance.

TABLE 22

OPERATING EXPENSE & STUDENT AID
SUPPORTED BY UNRESTRICTED FUNDS
ENDOWED COLLEGES-ITHACA

Academic Year	Operating Expenses X10 ⁶	Student Aid X10 ⁶	Percent S.A. to O.E.
1960-61	\$16.1	\$1.15	7.1
1961-62	18.0	1.36 (18)**	7.5
1962-63	20.4	1.69 (25)	8.4
1963-64	23.0	1.89 (12)	8.2
1964-65	25.0	2.33 (24)	9.3
1965-66	28.1	2.51 (7.8)	9.0
1966-67	31.3	2.78 (11)	8.9
1967-68	34.1	3.15 (13)	9.3
1968-69	38.0	3.24 (2.9)	8.8
1969-70	43.5	3.80 (17)	8.7
1970-71*	48.2	5.25 (38)	10.9

SOURCE: Reference 15

* 1970-71 figures budgeted; others are actual.

** Numbers in parentheses are percent increase over previous year.

TABLE 24
NEED OF 1971 APPLICATIONS
APPROVED FOR ADMISSION
SELECTED UNIVERSITIES

School	I		II		Admit-Denies
	Applicants Approved for Admission No Need	Applicants Approved for Admission With Need	Applicants Approved for Admission No Need	Applicants Approved for Admission With Need	
Yale*	102	481			0
Pennsylvania	365	1378			6
M.I.T.	296	908			0
Dartmouth	136	546			0
Columbia	151	655			2
Cornell	525	2350			300
Princeton	230	827			0
Brown	172	582			13
Harvard	Not Available				

*Based on 90% of matriculants

SOURCE: Ref. 8

Interpret this Table as follows. Consider all applicants to a given institution who are approved for admission. Remove those with no financial need - list in column I. With those having need, give sufficient financial aid to meet need - list in column II. Balance represents students admitted but denied financial aid because of insufficient funds.

TABLE 21

DISTRIBUTION OF COURSES BY SIZE OF ENROLLMENT GIVEN BY SELECTED
ENDOWED COLLEGES - FALL SEMESTER 1971
Cornell University

Number of Courses by College *	Number of Students per Course									
	0-10	11-20	21-30	31-40	41-50	51-75	76-100	101-200	201-500	500
Architecture Art, Planning	48 (46)	24 (23)	9 (9)	8 (8)	4 (4)	5 (5)	4 (4)	1 (1)	-	-
Engineering	89 (39)	54 (23)	25 (11)	16 (7)	11 (5)	14 (6)	7 (3)	10 (4)	5 (2)	-
Arts and Sciences	362 (49)	131 (18)	69 (9)	38 (5)	26 (4)	37 (5)	19 (2)	40 (5)	20 (3)	4 (1)
Hotel Administration	13 (23)	6 (11)	6 (11)	3 (5)	4 (7)	8 (14)	7 (12)	8 (14)	2 (4)	-
TOTAL	512 (45)	215 (19)	109 (10)	65 (6)	45 (4)	64 (6)	37 (3)	59 (5)	27 (2)	4 (0.2)

* Numbers in parentheses are percentage of courses in a given category.

SOURCE: Taken from Master Grade Distribution List, Office of Student Records and Finance

TABLE 23

COMPONENTS OF FINANCIAL AID* TO UNDERGRADUATES

Academic Year	Loans In thou- sands of Dollars	Percent- age+of Total Aid	Wages from Employment+ In thou- sands of Dollars	Percent- age+of Total Aid	Scholarships		Total In thou- sands of Dollars
					In thou- sands of Dollars	Percent- age+of Total Aid	
1959-60	297	8	818	24	2,348	68	3,483
1961-62	427	10	790	18	3,199	72	4,416
1963-64	962	16	760	13	4,269	71	5,991
1965-66	1,310	18	768	10	5,250	72	7,328
1966-67	1,452	18	999	12	5,787	70	8,238
1967-68	1,883	21	1,100	12	6,015	67	8,998
1968-69	2,485	24	1,187	12	6,618	64	10,290
1969-70	2,608	24	1,200	12	7,000	64	10,808
1970-71	3,210	27	1,198	10	7,856	63	12,264

* These data include aid which has been received from sources both within and without the University. This includes New York State Regents and Scholar Incentive awards, National Defense Loans, etc.

+ These data represent wages for jobs obtained through the Office of Scholarships and Financial Aid. Money earned from jobs obtained independently by students are not reflected in these figures.

++ Percentages were rounded off to whole numbers. As a result, the total percentages some-
times equal slightly less than 100.

TABLE 25

GEOGRAPHICAL ORIGINS OF CORNELL
STUDENT POPULATION

	Percent U.S. Population 1960	1962-63 Total	1970-71 Total
New York	9.4%	52.3%	54.2%
PA., N.J. & New England	15.5	20.7	20.1
Other U.S. East of Mississippi	41.2	13.1	11.8
U.S. West of Mississippi	33.9	5.7	6.5
Canada		1.2	1.4
Other Foreign		6.9	6.2

SOURCE: Reference 8

TABLE 26

ANNUAL TUITION AND FEES
CORNELL UNIVERSITY 1946 - 1972

YEAR	ANNUAL TUITION	ANNUAL FEES	TOTAL
1946	\$ 500	\$ 70	\$ 570
1948	600	80	680
1952	700	120	820
1954	750	135	885
1956	850	150	1000
1958	1025	225	1250
1960	1200	225	1425
1962	1340	260	1600
1964	1400	300	1700
1966	1550	400	1950
1967	1575	475	2050 (5.1)*
1968	1725	475	2200 (7.3)
1969	1850	500	2350 (6.8)
1970	2050	550	2600 (10.6)
1971	2175	625	2800 (7.7)
1972	2365	635	3000 (7.1)

* Numbers in parentheses are percentage increase over previous year.

TABLE 27

MEDIAN SALARIES BY RANK¹
ENDOWED COLLEGES ITHACA
1965 - 1971
Cornell University

Year	Professors	Associate Professors	Assistant Professors
1964-65	\$ 16,000	\$ 11,500	\$ 9,000
1965-66	16,500 (3.1) ²	12,000 (4.4)	9,250 (2.8)
1966-67	17,625 (6.8)	12,500 (4.3)	9,500 (2.7)
1967-68	18,000 (2.1)	12,750 (2.0)	9,800 (3.2)
1968-69	18,800 (4.5)	13,500 (5.9)	10,250 (4.6)
1969-70	20,000 (6.4)	14,500 (7.4)	11,000 (7.3)
1970-71	20,600 (3.0)	15,000 (3.3)	11,750 (6.8)

NOTES

1. Nine month salaries.

2. Numbers in parentheses refer to percent increase over previous years.

TABLE 28

RATIOS OF WEIGHTED ANNUAL EXPENDITURES PER FTE STUDENT FOR DIFFERENT TYPES OF
PRIVATE AND PUBLIC* INSTITUTIONS COMPARED TO COMPREHENSIVE COLLEGES
AND UNIVERSITIES 1967-68⁺

Type of Institution	Educational & General expense (less organized research) ¹	Instruction and departmental research	Organized Research
Research Universities I	2.23 (1.69)	1.90 (1.56)	74.5 (22.8)
Comprehensive colleges and universities	1.00 (0.94)	1.00 (1.06)	1.00 (0.72)
Liberal Arts Colleges	1.90 (1.94)	1.78 (1.12)	1.78 (0.12)
Two-year institutions	1.18 (0.63)	0.95 (0.98)	0.06 (0)

* Data in parentheses for public institutions

1. Includes instruction and departmental research; extension and public service; libraries; general administration; general institutional expense; student services; organized activities relating to educational departments; other sponsored programs and all other educational and general expense. In computing all averages, graduate FTE enrollment is given a weight of three, as compared to a weight of one for undergraduate FTE enrollment.

+ SOURCE: Adapted from U.S. Office of Education data and Carnegie Commission. See Ref. 5 p. 38.

TABLE 32

PROMOTION PROFILE* BY TIME IN RANK 1966-71

	Time as Assistant Prof. at Promotion, Years							Av.	Time as Associate Professor at Promotion to Full Professor, Years										Av.
	1	2	3	4	5	6	7+		1	2	3	4	5	6	7	8	9	10+	
Arts and Sciences	7	16	20	15	15	6	1	3.5	1	6	10	17	17	9	2	1	1	4.5	
Engineering		3	2	15	8	3		4.2	1	2	1	4	6	1	2	1	1	5.6	
Arch. Art Planning	1	2	2	1	4			3.5		2	2	3	2	1				5.4	
Business & Public Ad.			2	2	3			4.1		1		1		1				4.0	
Law		1	1					2.5		3		2						2.8	
Hotel					1	1		5.0											
Biological Sciences	2	2		2	2			3.0			1	1						4.5	
Statutory Colleges	1	3	18	26	26	34	6	4.7	1	1	7	18	17	19	16	8	8	4	5.9

* Numbers in parentheses signify female

+ All cases exceeding 7 years for assistant professors and 10 years for associate professors omitted.

SOURCE: Minutes of the Meetings of Board of Trustees

TABLE 29

RATIO OF CREDIT HOUR COSTS PER STUDENT AT VARIOUS LEVELS OF PUBLIC HIGHER EDUCATION IN OKLAHOMA TO AVERAGE COSTS FOR ALL DIVISIONS, 1961-62 AND 1966-67*

Level of Instruction	Ratios		Percent Increase Credit Hour Costs
	1961-62	1966-67	
All divisions	1.00	1.00	21
Lower division science	0.76	0.79	26
Lower division nonscience	0.75	0.71	14
Upper division science	1.24	1.51	47
Upper division nonscience	1.13	1.11	19
Graduate science	3.79	4.50	44
Graduate nonscience	2.34	2.72	40

* SOURCE: Computed from data in J. Froomkin, Enrollments and Resources: The Challenge to Higher Education in the Seventies. U.S. Office of Education, Washington, D.C. 1970 p.41. See Ref.5, p.37.

TABLE 30
NEW CENTERS AND PROGRAMS ESTABLISHED DURING THE PERIOD 1960-61 TO 1970-71

Name of Unit	Expenditures 1970-71*	
	Unrestricted Funds	Restricted Funds
1. Africana Studies & Research Center	\$ 226,000	\$ 40,000
2. Center for Applied Mathematics	29,000	18,000
3. Center for Environmental Quality Management	4,400	90,000
4. Center for Improvement of Undergraduate Education	48,000	193,000
5. Center for International Studies & Affiliated Programs	120,000	1,883,000
6. Center for Radiophysics & Space Research	45,000	1,700,000
7. Materials Science Center	6,300	2,281,000
8. Water Resources & Marine Sciences Center	23,000	196,000
9. Center for Urban Development		281,000
10. Ford 6 Year Ph.D. Program		250,000
11. Human Affairs Program		30,000
12. Society for the Humanities		161,000
13. Science, Technology & Society Program	21,000	236,000

*SOURCE: Ref. (32) and/or Unit annual reports.

TABLE 31

PROMOTION PROFILE* BY RANK 1966-71

	To Full Professor		To Associate Professor	
	New to Cornell	From Assoc. Professor	New to Cornell	From Ass't. Professor
1966	8	8	5	11 (1)
1967	5	15	3	14
1968	9	11	5	13
1969	5	8	6	10
1970	5	10	4	14 (1)
1971	2	11	4	17 (1)
6 year av.	5.7	10.5	4.5	13.2

Engineering

	To Full Professor	To Associate Professor	To Full Professor	To Associate Professor
	New to Cornell	From Assoc. Professor	New to Cornell	From Ass't. Professor
1966	2	3		8
1967	4	7		5
1968	2	7		5
1969	1	4	1	5
1970	1	3		8
1971	2	2	1	1
6 year av.	2	4.3	0.3	5.3

Statutory Colleges

	To Full Professor	To Associate Professor	To Full Professor	To Associate Professor
	New to Cornell	From Assoc. Professor	New to Cornell	From Ass't. Professor
1966	11	19 (2)	4	28 (7)
1967	8	9 (1)	5	12 (1)
1968	5	12	2	22 (2)
1969	2	27	4 (1)	19 (2)
1970	2	31 (2)	1	17 (2)
1971	6 (1)	16	1 (1)	26 (5)
6 year av.	5.7	19	2.8	22

SOURCE: Minutes of the Board of Trustees. * Numbers in parentheses signify female.

TABLE 33

SUBTRACTIONS FROM TENURE RANK 1967-71

Arts and Sciences

Year	Resigned	Deceased	Retired	Total
1967	8	1	2	11
1968	13	1	3	17
1969	16		2	18
1970	8	1	3	12
1971	11	1	8	20
	56	4	18	78

Engineering

Year	Resigned	Deceased	Retired	Total
1967	1	1	6	8
1968	3		2	5
1969	2	1	2	5
1970	5			5
1971	1		4	5
	12	2	14	28

SOURCE: College records

TABLE 34

FACULTY DISTRIBUTION BY RANK*

Institution	Number of Faculty	% Profs.	% Assoc. Profs.	% Assist. Profs.	% Instructs.
Brown	472	44.5	24.8	25.9	4.8
Columbia	912	47.8	17.7	26.2	8.2
Cornell (Endowed) (Statutory)	804	42.3	20.9	35.1	1.7
	682	49.0	27.4	19.8	3.8
Dartmouth	309	41.4	18.4	28.8	11.3
Harvard	999	57.7	12.0	27.8	2.4
Pennsylvania	800	42.0	25.0	33.0	—
Princeton	597	43.8	16.4	32.5	7.2
Yale	801	43.3	18.9	33.8	3.9
Chicago	850	46.3	16.9	29.9	6.9
Duke	481	45.3	27.0	24.1	3.5
Johns Hopkins	363	44.0	21.5	29.2	5.3
M.I.T.	869	47.1	25.9	20.6	6.4
Northwestern	726	43.5	23.7	24.0	8.8
Rochester	488	37.7	23.6	32.4	6.3
Stanford	714	55.7	18.9	22.8	2.6
Illinois (Urbana)	3206	34.4	24.1	28.6	12.9
Michigan (Ann Arbor)	1625	46.3	23.8	24.0	5.9
Minnesota	2054	37.5	23.8	23.9	14.9
SUNY Buffalo	982	31.9	30.5	34.0	3.6
Wisconsin (all)	2638	30.9	21.2	36.7	11.2
Colgate	142	32.4	24.6	29.6	13.4
Amherst	141	45.3	14.9	36.2	3.6
Oberlin	223	28.2	29.2	30.9	11.7

* AAUP Bulletin - Summer, 1971

TABLE 36

SUPPORT EMPLOYEES

Cornell University

Year	Number of Support Employees	Support Employees per Faculty Member	Students per Support Employee
1959-60	3392	3.6	3.1
1961-62	3795	3.5	3.0
1963-64	4413	3.8	2.8
1965-66	4837	3.9	2.8
1967-68	5264	3.9	2.6
1969-70	5692	3.9	2.5
1971-72	6120	4.0	2.2

TABLE 35

CONSEQUENCES OF UNIFORM AGE DISTRIBUTION

Arts and Sciences

Retirement Interval	Raw Rate Retirement Tenure Profs. 1.	Average Turnover Rate 2.	Retirement Rate Corrected for Turnover 3.	Projected Rate Subtraction from Tenure 4.
1971-75	5.2	11	3.4	14.4
1975-80	6.0	11	2.4	13.4
Total size (1971) of Tenured Faculty = 279		% Tenured 60	Ideal 34 Year Promotion Rate = 8.2	

Engineering

Retirement Interval	Raw Rate Retirement Tenure Profs. 1.	Average Turnover Rate 2.	Retirement Rate Corrected for Turnover 3.	Projected Rate Subtraction from Tenure 4.
1971-75	2.8	2	2.5	4.5
1975-80	2.8	2	2.1	4.1
Total size (1971) of Tenured Faculty = 95		% Tenured 76	Ideal 34 Year Promotion Rate = 2.8	

- Assumes no subtractions from tenured ranks due to turnover.
- Turnover is the estimated subtractions resulting from death and resignations; see Table
- Correction applied to account for possible turnover cases included is raw retirement. Assumes turnover occurs in all ranks at an equal rate; thus in each of six age brackets between 1971-2000 the rate is assumed to be 1/6 the turnover rate. Also assumes no faculty hired directly into tenure in these six age groups.
- Sum of Average Turnover Rate and Rate of Retirement Corrected for Turnover.

TABLE 37

A 6-YEAR CAPITAL IMPROVEMENT PROGRAM AS OF JUNE 1, 1972

1972-73 through 1977-78

CAPITAL PROJECTS IN PLANNING, CONSTRUCTION OR UNDER CONSIDERATION

A. By Type of Project	No. Project	Est. Project Cost
1. Endowed Campus, Ithaca		
Academic	21	\$26,670,000.
Arts and Sciences	(6)	(11,025,000.)
Arch, Art & Planning	(4)	(1,230,000.)
Engineering	(6)	(2,925,000.)
Law	(1)	(3,000,000.)
Div. Biol. Sciences	(4)	(8,490,000.)
Library	1	\$1,500,000.
Student Services	3	\$3,300,000.
Athletics	10	\$1,905,000.
Traffic & Parking	30	\$1,568,000.
Services	3	\$175,000.
Utilities	3	\$1,050,000.
Landscape Capital Projects	29	\$1,042,000.
ENDOWED TOTAL	100	\$37,210,000.

SOURCE: Reference 18 and Thomas Mackesey, Vice President for Planning.

APPENDIX III

NOTE 1: Commentary on Inflation and New Responsibilities

As already suggested, one fallacy in this line of reasoning is that it seems to assume that inflation had its impact only on the "Remainder" category of expenditures. This was not so! If, as we suggest in the text, the CPI provides a reasonable approximation of the impact of inflation on all categories (although strictly speaking different price indexes should be applied to each, depending on the varying composition of their respective inputs), the figures in Column I of Table 10 would change as follows:

	(1) Table 10	(2) Corrected
Inflation	2.5	4.2
Instruction	2.4	1.2 = (8.4-4.2) (29.0)
Student Aid	0.8	0.4 = (8.7-4.2) (9.7)
Safety Div.	0.2	0.3 = (32-4.2) (1.0)
New Responsibilities	1.6	1.4 (residual)
	7.5	7.5

The second fallacy is to measure as "enrichment and new responsibilities" that portion of expenditures in *only* the Remainder category not accounted for by inflation. That is clearly a gross oversimplification. The increase in expenditures for instruction not accounted for by inflation (if the latter were properly measured) would likewise represent "enrichment"; the same would in some perverse sense be true of the real (i.e. apart from inflation) expansion in the Safety Division and Student Aid where clearly the real growth in the Safety Division and Student Aid outlay represented the assumption of "new responsibilities." In a sense, therefore the "new responsibilities" caption could embrace not just the 1.4 percentage points of our corrected figures above, but all the residuals (after taking out inflation) of the other three categories of expenditure, the 1.2, the 0.4, and the 0.3, or a total of 3.3 of the original 7.5. By this reasoning the entire 7.5 per cent would be explained solely by inflation (4.2 points) and the undertaking of new responsibilities (3.3 points).

But this kind of computation undoubtedly grossly exaggerates the contribution of real new responsibilities and enrichment. In the economy at large, wages typically increase more rapidly than the general price level and the difference is explained primarily by improvements in productivity. It is doubtful that productivity at Cornell, or in other universities (however measured), improved as much as in the economy generally in this particular period. A more reasonable guess might be that it did not improve at all. The difference between our 8.4 per cent average increase in instructional expense and the 4.2 per cent of the CPI is therefore almost surely explained in part by the fact that our improvement in productivity was smaller than in the economy at large. The same is true of Student Aid, a major portion of which is accounted for by tuition. Tuition went up about 8 per cent a year in this period and a large part of the excess over the CPI is explained precisely by our slower rate of productivity advance than in the economy generally: so *more* than 4.2 of the 8.7 per cent increase in this category reflected mere price increase. On the other hand, undoubtedly some part of the increase did reflect "enrichment," including such services as the introduction of new course offerings and necessarily the more pervasive presence of the Safety Division.

To some extent these difficulties in Cheit's reasoning are offsetting: his failure to take into account the "enrichment" in all categories of expenditure, and the exaggeration of the enrichment component where he does measure it, tend to be offsetting — but to what extent and in which way the balance of error lies, we did not have the data base or resources to assess.

NOTE 2: Commentary on Degree of Stringency

We have assayed an alternative computation of a reasonable goal, using the definitions set forth in NOTE 1 above. First, we reproduce the table given there in column (1) of the following table, with the only difference being the assumption of a 3.5 rather than a 4.2 per cent rate of general inflation, and a corresponding 0.7 point decline in the rate of increase in all categories of expenditures.

	(1)	(2)
Inflation	3.5	3.5
Instruction	1.2 = (7.7-3.5) (29.0)	0.7
Student Aid	0.4 = (8.0-3.5) (10.0)	0.3
Safety Div.	0.3 = (31.3-3.5) (1)	0.1
New Responsibilities	1.4 (residual)	1.4
	6.8	6.0

It should not be surprising that in column (1) above only the first line and the total change: the influence of inflation is by this method concentrated in the first line and removed from all the other categories of expenditure.

Their "real" annual rate of increase is therefore unchanged by our altered assumption concerning the rate of inflation.

We assume next that the residual increase in instructional expenditures, after general inflation is removed, of (7.7-3.5) - 4.2 per cent, which includes or reflects (1) real increases in programs (enrichment), (2) any excess in the rate of increase in input prices — mainly wages — in this sector than in the economy generally, and (3) the lower rate of productivity advance here than elsewhere, cannot reasonably be cut below 2.5 per cent. This cuts its annual increase to 6 per cent and its contribution to the increase in total expenses from 1.2, shown in the first column, to 0.7 = (2.5)(29.0).

We will be proposing that the growth in Student Aid be held henceforth more closely in line with the increases in total expenses. Since that total must be held to a smaller differential above economywide inflation in the future than in the past (7.5 minus 4.2), and since this effect will also moderate the annual increases in tuition — which in turn is an important determinant of the size of Student Aid, we think it realistic to assume a drop in the excess of Student Aid increase over inflation from 4.5 - (8.7-4.2) to 3.3 - (6.8-3.5). This reduces its contribution to the overall increase from 0.4 to 0.3 - (3.3)(10 per cent) — which would still leave it rising slowly relative to total expenses and income.

Finally, we retain the same hope expressed in the text, of halving the growth rate in the Safety Division expenses, and of holding "new responsibilities" unchanged. The result is an estimated expansion rate of 6 per cent in total expenses. Clearly, achieving the 6 per cent goal will require a strenuous effort.

NOTE 3: Calculation of Increase in the Number of Students

With Student Fees fraction 0.31
 $F_1 =$ Income (dollars) from Student Fees per year
 $T_1 =$ Total Income (dollars) per year
 $S_1 =$ number of students
 $F_1/T_1 = 0.31$ (1)

With Student Fees fraction 0.34
 $F_2 =$ Income (dollars) from Student Fees per year
 $T_2 =$ Total Income (dollars) per year
 $S_2 =$ number of students
 $F_2/T_2 = 0.34$ (2)

Statement on Income Increase per student per year assuming the increase in Student Fees fraction from 0.31 to 0.34 occurs in one year (assuming 5.9% value from Cornell Projection Student Fees entry of Table 14):

$$\frac{F_2}{S_2} = \frac{F_1}{S_1} + 0.059 \frac{F_1}{S_1} = 1.059 \frac{F_1}{S_1}$$
 (3)

Statement on Increase of Total Income per year (assuming 6% value from Cornell Projection Total Income entry of Table 14):

$$T_2 = T_1 + 0.06 T_1 = 1.06 T_1$$
 (4)

Substituting T_2 from Eq. (4) into Eq. (2) gives

$$F_2 = (0.34) (1.06) T_1$$

and if this is substituted in Eq. (3) one obtains

$$\frac{S_2}{S_1} = 0.34 \frac{(1.06) T_1}{(1.059) \frac{T_1}{F_1}}$$

Using $F_1/T_1 = 0.31$ from Eq. (1) gives

$$S_2/S_1 = \frac{(0.34) (1.06)}{(0.31) (1.059)} \approx 1.1$$

With S_1 10,000 we obtain $S_2 \approx 11,000$. Hence

$$S_2 - S_1 \approx 1000 \text{ students.}$$

NOTE 4: Commentary on Income Analysis

The approach we have used involves estimating income from the various categories that are less subject to University control, and on the basis of those estimates determining policy targets with respect to the increase in income from Student Fees. Since the estimates in the categories other than Student Fees are, after all, only estimates, it is a reasonable question to ask how sensitive are the results we reached with respect to Student Fees to reasonable differences in those other controlling projections.

For example, if one took the position that all categories other than Student Fees income should be pushed to their limits of revenue yield, then one might obtain the following configuration:

	Fraction Total Income	Rate %	Increase %
Student Fees	(29)	(3.4)	(1.0)
Gifts	11	12	1.3
Investment Income	10	12	1.2
Fed. & State Govt.	33	5	1.6
Other	17	5	0.9
			6.0

This table is derived by making much more optimistic

estimates of Gifts, Investment Income, Federal and State Governments and Other categories and then working out the required annual rate of increase per student in Student Fees. Implicit in the numbers assigned is (a) a policy of raising charges in the "Other" category (for example, for housing and dining) high enough to convert them into profit-makers, (b) modest policy changes for sponsored research, or improvement in public support of higher education, (c) driving appropriations under "Investment Income" to a point at which we would be consuming our Endowment and (d) anticipating Gift income beyond reasonable expectations. Even with these assumptions, a rise in the rate of increase in Student Fees of over 3 per cent is required (as compared with our earlier 5.9 per cent estimate).

Another example gives the orders of magnitude if all categories other than Student Fees fell to their reasonable lower values, thus throwing the burden on Student Fees.

	Fraction Total Income	Rate %	Increase %
Student Fees	(37)	(8)	(3.0)
Gifts	8	8	0.6
Investment Income	9	9	0.8
Fed. & State Govt.	30	3	0.9
Other	16	4	0.7
			6.0

In this case, the goals set for Gifts and Investment Income are modest and probably not even reasonable lower bounds. Even so, notice that they involve the assumption we can increase these kinds of income by 8 and 9 per cent annually, respectively! Federal and State Government and Other are lower bounds. Here, the 37 per cent fraction of total income would require an increase of about 1,400 students and an 8 per cent annual rate of increase of Student Fees. This result would have serious ramifications because the 8 per cent increase could not be sustained and the large increase in the number of students would require major expenditures in the area of "campus life." But notice that the values assumed in this example and those used for the projected "best" estimate (see Table 13 and 14) differ by only one percentage point in almost all cases. This illustrates the narrowness of the margins and the critical role played by Student Fees.

There is another possible criticism of the approach we have used. Is there not some element of arbitrariness in our having selected income from Student Fees as, in a sense, the residual variable that the University must manipulate to bring income and expenses into balance? Might we not, at least in principle, have taken any one of the categories of Table 13 as the eventual residual, made various assumptions about the other ones, and then proceeded to determine the required rates of increase in *that* residual rather than Student Fees? The simplest answer to this objection is that the other income items are far less subject to University policy than the level of tuition and size of the student body. But it would in any event be instructive to try such an alternate approach. Let us assume, at the extreme, that we are determined to have no increase whatever in the income from Student Fees per student; and let us take Investment Income, instead, as our residual variable.

	Fraction Total Income	Rate %	Increase %
Student Fees	30	0	0
Gifts	10	10	1.0
Investment Income	(14)	(21)	(3.0)
Fed. & State Govt.	30	4	1.2
Other	16	5	0.8
			6.0

In this case Investment Income would have to go up 21 per cent a year. This is clearly beyond any reasonable possibility: the rise from 10 to 14 per cent in the fraction of total income from this source would require an additional \$3.6 million of earnings (hence requiring about a 40 per cent increase in Invested Funds principal) and a rate of increase in Investment Income per student approximately twice the ten year 1960-70 average. It is obvious that a similar result would have been obtained had Gifts been considered the residual or control variable. This result is clearly unreasonable in its expectations of either Invested Funds or Gifts.

The above examples show the nature of the constraints and trade-offs, and give perspective on the values chosen for the projected "best" estimate.

Cranch Committee Issues Report

Continued from Page 4

Cornell press continued efforts at refinement of the financial aid selection process. We are not suggesting that Cornell become a tight fist institution, but rather to recognize that the area of financial aid is one of distributing a kind of justice, and the associated responsibility requires that difficult decisions be made."

A deferred payment plan which is practical for middle income families is a "must," according to the committee, because "In a time when insufficient endowment funds are available for scholarships and a policy of subsidization of public higher education continues, the University will be forced to transfer an increasing share of the cost to the individual. There is no alternative."

In its sixth recommendation, the committee said: "Tuition and fee increases of approximately 6 per cent be scheduled for the next three years with attendant evaluation of the effect on student quality, competitive position and possible tendencies toward 'income polarization'."

During the period 1960 to 1972, Cornell had an annual average tuition increase of 6.5 per cent. Between 1967 and 1972, the average increase was 7.4 per cent. The recommended 6 per cent rate of increase "would merely enable Cornell to keep up with the rate of increase in costs and represents a diminution from the recent 7.4 per cent increase. It can be done only if we institute substantial economies," the committee said. "The 6 per cent rate of increase ... would keep up with the anticipated rate of increase in disposable family income, in money terms."

The committee stated it did not like to recommend the increases, "but alternatives such as significant program cuts, continued invasion of endowment funds, greatly reduced salary increases, or cuts in financial aid are deemed to be even more undesirable."

Cornell has drawn a significant number of students from middle income families and the committee recommended a continuation of the practice. That will not be easy, the committee stated, because of the increasing gap between costs of public and private institutions.

"The warning flags are up and Cornell must proceed knowing that at some stage it might well have to continue without the benefit of increased income from tuition and fees ... if, in the face of continued national inflation, the University could not continue to increase tuition and fees, then we would face an extremely serious situation."

The seventh recommendation stated: "Keep a strong competitive faculty salary position based on merit increases."

According to statistics compiled by the committee, between 1967 and 1970 "Cornell's faculty salary increases have been just barely adequate when compared to national trends and there is a growing concern that serious erosion in our position will occur."

Salary increases in Cornell's endowed colleges have been based solely on merit in recent years. However, there have been "across-the-board" increases in Cornell's statutory colleges. "If this New York State policy continues, it will, in time, erode the base of the Endowed Colleges salary policy and make it very difficult to maintain an adequate salary structure. Thus, the Committee urges the Administration to use its influence in trying to convince the State authorities to move toward a merit system."

Under a section titled "Academic Affairs," the committee's eighth recommendation stated: "Give continuing high priority to selective graduate education. Assert Graduate School leadership in the identification of new programs and the financial resources needed for excellence."

Cornell has the kind of varied graduate programs that are valuable and attractive, according to the committee. "Cornell has a comparative advantage here that it should vigorously exploit and promote. Thus, we recommend that Cornell adopt a policy counter to the apparent trend and try to improve its position and attractiveness for graduate study."

The ninth recommendation said: "Centers, Programs, Institutes, Departments or similar organizations should be initiated only if: 1) A clearly established unit plan exists, which foresees their continued financial viability for a period of the order of 5 years. 2) The plan includes an analysis of the cost to the University if they must be 'absorbed' at a future date. 3) A clear and convincing case is made that the organization is not duplicative of

existing functions or efforts at Cornell."

In the decade of the 1960s, funds were available for the creation of new programs, the committee noted, and they often were instituted without adequate planning. "As a result, Cornell absorbed an increasing array of obligations with which are associated real and continuing costs. (This recommendation) is not intended to stifle the initiation of all such programs, but rather to point up the need for inclusion of these special academic structures in both financial and academic planning activities."

The committee's 10th recommendation said: "Undertake a comprehensive review of the academic calendar leading to a decision on possible full year academic operation of the University."

The committee observed that financial pressures will continue and "any system which includes an 'idle period' of one third of the calendar year should be seriously examined and the apparent lack of utilization justified." The committee called on the University Senate to review the matter and noted that the Senate and the Faculty Council of Representatives will have to develop ways to work together on the calendar.

Recommendation 11 stated: "Strengthen academic effectiveness by making a significant commitment to improvement of instruction through such means as: 1) Support of centralized facilities for research and development in teaching, learning, and evaluation of teaching effectiveness - for example the Center for Improvement of Undergraduate Education (CIUE). 2) Encouragement of faculty through discriminating use of released time and other elements of the reward structure, to develop new or improved instructional formats, educational materials, or learning aids. 3) Continued search for measures of effective teaching and for practices which will regularly reinforce the faculty reward structure in recognition of outstanding teaching."

The committee stated that an agency like CIUE "seems like the only conceivable way ... to sustain a coherent program" of educational research. Because of this, the committee recommended "serious consideration (of) a long-term commitment of stable funding of a central core agency such as CIUE."

The 12th recommendation said: "Strengthen academic effectiveness through such improved motivation, evaluation and management techniques as: 1) Establishing a continuing post-tenure evaluation system having the four components outlined below: (a) An annual review of each faculty member's achievement; (b) A regular review immediately prior to each sabbatic leave; (c) A more scrupulous review for promotion from Associate to Full Professor; (d) Increased use of early retirement. 2) Increase the effective length of appointments of department chairmen and provide adequate rewards and support. 3) For certain administrative purposes, consolidate small departments into ones having between 15 and 40 faculty members."

The report details how these steps toward increased academic effectiveness can be achieved.

The committee's 13th recommendation stated: "The tenure system should be continued, but with much greater faculty and administrative attention given to: 1) Procedures which encourage continued professional growth. 2) Possible termination under carefully controlled procedures."

While writing in support of the tenure system, the committee observed that the system "tends to provide unqualified job security and it is this de facto protection that can lead to weakness." Noting that tenured faculty have an obligation to continue the intellectual growth that justified the tenure appointment, the committee also offered a suggestion for professional growth.

According to the committee, the long period between promotion to full professor and retirement "provides no change in status to stimulate the setting of high goals on a continuing basis." In order to overcome this, the committee suggested a fourth professorial rank — distinguished professor — which would be awarded for distinguished teaching and research.

The committee said it did not like the traditional criteria for dismissal of tenured faculty and preferred the phrase "inadequate performance of University responsibilities." Using this guideline, the committee "believes a suitable procedure for termination of tenure could be developed." The committee offered a complex procedure which although they expected would be "invoked very rarely — it seems to us important that it exist."

The committee's 14th recommendation said: "Plan the distribution of faculty by rank to provide continued

opportunity for the promotion and addition of assistant professors. Encourage the use of part-time appointments in all faculty ranks."

The recommendation is "aimed at maintaining the flow of new staff" so that the faculty is renewed. The committee provided information to compute estimated turnover rates in order to manage the composition of the faculty. Also, the committee offered three examples to illustrate the results of different policy approaches to the problem.

The 15th recommendation stated: "Regard educational innovation as an essential aspect of long-range planning and set aside sufficient funds on a continuing basis for this purpose."

In commenting on this recommendation the committee reported that "New programming funds in Cornell's 1971-72 budget amounted to about \$170,000. We view this as a bare minimum with \$250,000 being closer to the necessary level ... Cornell must provide a pool of funds for educational innovation leading to new programs of significance."

Under the heading "Support Functions," recommendation 16 said: "In the areas of non-academic and para-academic staff and support services Cornell must: 1) Control the size of the support staff, press for reductions wherever possible and encourage better manpower utilization, 2) Strengthen the role of supervisory and middle management personnel by providing management advisory service where necessary and by supporting implementation of sound manpower practices, 3) Try to eliminate the dual system resulting from the presence of State and Endowed divisions, 4) Anticipate unionization and try to improve staff utilization and efficiency."

In noting that the ratio of support employees to faculty is about 4 to 1, the committee stressed the difficulty it had gaining information in this area because of different reporting techniques. The committee pointed out that the support costs are high and may not be worth "the sacrifices."

"... a strenuous effort must be made to effect savings even if it means a reduced level of support service. The ratio of 4 is not sacred. There is no question but that the whole staff, faculty included, must give more thought to better utilization of support staff. We believe the present state of affairs is largely the result of an absence of management. No one was looking critically at these areas or attempting to effect efficiencies. Everyone has a stake in this area and administration must press for improved efficiency."

The final recommendation, 17, stated: "Maintain selectivity in the capital expansion and improvement program; specifically: 1) Require that full project costs of academic facilities be funded for both construction and maintenance with minimum use of endowed funds, 2) Require that life cycle project costs of revenue producing facilities be amortized from income and gifts, 3) Give high priority to maintenance programs and critically review plans for renovation and rehabilitation."

The committee cited two examples of recent building projects that have proven more costly than originally envisaged; Uris Hall, the new social sciences building, and the North Campus Dormitory complex.

Uris Hall "is an example of the latent problems in the construction of academic buildings," the committee said. The total cost was \$8.6 million, with \$3.3 million coming in gifts, including \$2 million from Harold and Percy Uris. The balance has been borrowed from the State Dormitory Authority.

Beginning this academic year, the committee said total debt service will be some \$382,000 per year, with operating expenses estimated at \$228,000 per year. "The point here is that before large sums of money are committed to nonself-amortizing purposes, Cornell must toughen up the decision process and be certain the project can be fully justified."

When the North Campus complex was planned, it was hoped that gifts would cover a large portion of the construction cost, according to the committee. When the gifts were not forthcoming, it was necessary to borrow \$17.4 million from the State Dormitory Authority. The 1971-72 debt amortization and service interest was \$1.4 million and these carrying expenses exceed the room charges to students living in the complex. "Construction of expensive living facilities is expensive," the committee observed, "and in planning for the housing of additional students, Cornell must carefully weigh the various alternatives."

At Cornell Plantations

'Fall-In' Set for Sunday

Apples, cider and balloons will be plentiful at the Cornell University Plantations second annual "Fall-In" scheduled for Sunday, Oct. 8, from 2 p.m. to 5 p.m., with Oct. 15 as the rain date. The "Fall-In" is free and open to all.

The afternoon's events include folk dancing, landscape sketching, folk singing and talks on fall bulb planting, birds and wildlife photography. Other visitors may wish to visit the Sculpture Gardens, learn about the Forest Home Community, or "pinch and smell" fragrant herbs and woody plants.

Horsedrawn wagons will transport persons throughout the square mile of land devoted to "Fall-In" events between Caldwell Rd. and the Test Gardens.

Visitors of all ages are invited to take part in the 18 "Fall-In" activities, according to Plantations director Richard M. Lewis, who said "the purpose of the 'Fall-In' is to develop community awareness of the Plantations and of the resources it provides for the Cornell and Ithaca communities."

Over 1,500 persons attended the first "Fall-In" last October.

Lewis described the Plantations as "outdoor laboratories — a place for education, research and enjoyment."

The Plantations includes over 1,500 acres of University land used for arboretum collections and natural areas including gorges, ponds and lakes, bogs and woodlands.

Steve Shauger, a graduate student coordinating this year's "Fall-In," said visitors will be given "Fall-In" buttons and maps directing them to the various events — such as William J. Hamilton's talk on bulbs. A professor of zoology, emeritus, Hamilton is also versed in the history of the area and Indian stories, Shauger said.

Another emeritus professor, L.H. MacDaniels of floriculture and ornamental

horticulture, will discuss edible nuts as well as displaying his nutcracker collection. Richard B. Fischer, professor of science education, will demonstrate how to create effective nature photography while Robert J. Lambert, professor of freehand drawing in the Department of Floriculture and Ornamental Horticulture, will demonstrate sketching techniques. Audrey O'Connor of Cornell Plantations will have a demonstration of living plants known for flavor and fragrance.

Liese Bronfenbrenner of the Forest Home Community Association will present the history of old houses and old mills in the Village of Forest Home and Jack L. Squier, professor of art, will give a history of the Sculpture Gardens and discuss the production, design and purpose of architectural sculpture. Howard A. Bursen, a graduate student, will lead "a casual group of folksingers," Shauger said.

Several clubs will be on hand. The Cornell Bird Club will discuss attracting and identifying birds. The Cayuga Trails Club will talk about the trail system and the geology of the Fall Creek area. The Sierra Club, Ecology House and the Cornell University Press also will have displays. Performances by the Cornell Folk Dancing Club "whose only request was for flat ground" are planned and the Cornell Pomology Club will handle distribution of cider and free apples, said Shauger.

The "B" parking lot on Rt. 366 will be open for visitor parking with campus bus transportation to and from the corner of Plantations and Caldwell Rds. Another registration center will be in the Test Gardens, Shauger said.

Campus bus pick-ups for students will pass the North Campus Union, Risley Hall and Willard Straight Hall at 30-minute intervals.

Job Opportunities At Cornell University

The following are regular continuing full-time positions unless otherwise specified. For information about these positions, contact the Personnel Department, B-12 Ives Hall, N.W. An equal opportunity employer.

Administrative Secretary, A-15
Senior Administrative Secretary, A-17
Administrative Clerk, A-16
Administrative Secretary, A-15
Stenographer II, NP-6
Stenographer I, NP-5
Administrative Assistant
Data Clerk, A-13
Assistant Counsel
Assistant to the Associate Dean
for Research in Graduate Education
Associate Registrar
Financial Management Director
Senior Accountant
Business Manager
Assistant Director
Extension Aide IV, U-8
Dining Services Manager, A-21
Accounting I, A-20

Extension Specialist III
Teaching Specialist
Research Technician III, NP-12
Research Technician II, NP-10
Research Technician II, NP-10
Research Technician, A-21
Pharmacist (1/2 time)
Mechanical Engineer, A-28
Chief Design Engineer
Utilities Rate Engineer, A-28
Central Heating Plant Supervisor, A-25
Machinist Trainee, A-14
Programmer III, A-23
Technical Writer, A-21
Computer Operator, A-16
Short Order Cook II, A-15
Maintenance Mechanic, A-16
Housekeeping Supervisor, A-14

Sports Scoreboard and Schedules

VARSITY FOOTBALL: Colgate 37-7; Nov. 17, Dartmouth; Nov. 25, at Oct. 7, Rutgers; Oct. 14, Pennsylvania; Princeton.
Oct. 21, at Harvard; Oct. 28, Yale; Nov. 4 at Columbia; Nov. 11 at Brown; Nov. 18 Dartmouth; Nov. 25, at Princeton.

VARSITY CROSS COUNTRY: Colgate 18-43; Oct. 7, Syracuse; Oct. 14, Lafayette; Oct. 21, at Harvard; Oct. 28, Yale; Nov. 3, Heptagonals; Nov. 7, at Army; Nov. 13, IC4A.

VARSITY SOCCER: Hartwick 2-4; RPI 2-0; Bucknell 5-0; Oct. 6, Syracuse; Oct. 11, Colgate; Oct. 14, Pennsylvania; Oct. 18, at Cortland; Oct. 21, at Harvard; Oct. 28, Yale; Nov. 4, at Columbia; Nov. 11, at Brown;

LIGHTWEIGHT FOOTBALL: Oct. 6, at Princeton; Oct. 13, Navy; Oct. 27, at Rutgers; Nov. 3, Pennsylvania; Nov. 11, at Army; Nov. 18, Columbia.

Louis Leakey, 69

British anthropologist Louis S.B. Leakey, an Andrew D. White Professor-at-Large, died Sunday of a heart attack in London. He was 69.

Leakey made two extended visits to the Cornell campus in his capacity as a professor-at-large. His first visit was in the fall of 1968 and his second was last winter. His lectures and seminars during both stays were attended by capacity audiences.

Sage Notes

Several of the regular fellowship programs have formally announced the continuation of their programs and the deadlines for applications.

NATO Postdoctoral Fellowships in Science for 1973: NSF expects to award 55 fellowships in February, 1973. Details available from: NATO Postdoctoral Fellowship Program, Division of Graduate Education in Science, National Science Foundation, Washington, D.C. 20550.

Applications have just been received for the Fulbright-Hays Doctoral Dissertation Research Abroad Fellowship and are available through the offices of the several Foreign Area and Language Study Centers or the Fellowship Office of the Graduate School. Completed applications should be returned to the Foreign Area Centers by Oct. 6, 1972.

The Career Center has the most complete list of fellowships that are available for graduate students. Students should read the Career Center News or go to the Career Center for the latest information.



University Unions Begins Program Of Practical Non-Credit Courses

Cornell University Unions is undertaking an "experimental college" of non-credit courses "geared to help students deal with everyday problems," according to Ernest Jackson Jr., program director.

"Some courses we have discussed offering include consumer education, wine-making, leadership training, health foods, gourmet cooking, automobile repair and a course in racial and cultural interaction," he said. "We haven't decided on any of these courses yet. We are looking for input on courses we might offer."

The program's first course, a 10-week session in professional 35 mm photography techniques, begins tonight in the North Campus Union.

Jackson anticipated many of the courses would be free. Exceptions would include courses with a laboratory fee or professional instruction.

Persons in the Cornell community interested in teaching a course or in suggesting topics are asked to contact Jackson in the University Unions program office, 38 Willard Straight Hall, by Oct. 13. Jackson hopes to begin additional classes by Nov. 1.

Course in Electronics to Begin

A two-year course open to members of the Cornell University community who seek upgrading in the field of electronics will start Monday, Oct. 9.

Persons interested in taking the course should contact Gerald S. Thomas, management development and training manager in the Office of Personnel Services, B-12 Ives Hall, 256-4869. Cost of the course will be carried by the enrollee's department and the Office of Personnel Services.

The class will meet Monday and Friday from 8 a.m. to 9 a.m. The Monday sessions will take place in the auditorium on the first floor of Stimson Hall. The Friday session will be conducted initially in the auditorium but later will be conducted in locations to be announced.

The course will utilize a television lecture series on electronics produced by the Hewlett Packard

Company and a number of guest lecturers. In addition, there will be laboratory sessions. The course is appropriate for any person in electronics, regardless of background. It will be of particular use to introducing technicians to design procedures.

George Peter, research engineer at Cornell's Radiophysics and Space Research Laboratory in Danby, is coordinating the course. He and Franklin Chesire, research engineer, Electronic Design and Development, Division of Biological Sciences, are among several engineers on campus who have been instrumental during the past four years in conducting various courses for upgrading in the electronics field. These courses have been attended by Cornell employees, students and faculty.

The Senate Page

The Senate Page is the official bulletin of the Cornell University Senate. Publication is supervised by Robert E. Gardner, secretary of Senate, 133 Day Hall, 256-3715.

Senate Calendar

Thursday, Oct. 5 — Internal Operations Committee, Senate Office, noon.

Friday, Oct. 6 — Minority and Disadvantaged Interests Committee - Blacks and Other U.S. Racial Minorities Subcommittee, 4 p.m., International Lounge, WSH.

Monday, Oct. 9 — Executive Committee, Senate Office, 5:15 p.m.; Parking and Traffic Subcommittee, ILR Library,

12:20 p.m.; Physical Education and Athletics Subcommittee, Schoellkopf House, 3 p.m.

Tuesday, Oct. 10 — University as an Employer Committee, 214 Ives, 4:30 p.m.; Cornell University Senate Meeting, Kaufmann Auditorium, 7:30 p.m.

Proposed Agenda

1. Question time
2. Address by President Corson on planning procedures
3. Announcements
4. Minutes

Notice

The Minority and Disadvantaged Interests Committee Complaint Procedure is on file in the Cornell University Senate Office, 133 Day Hall.

5. Agenda
6. Election dates
7. C-93-a - A Revised Procedure for Filling Vacant Seats in the Cornell University Senate (John Harding)
8. C-88-a - Establishment of University Apartments (Mike Foster)
9. C-27-a - Costing of Actions Amendment to the Senate Bylaws (Ken Ageloff)
10. Other business

Bulletin Board

3 Parking and Traffic Notices

The University Traffic Bureau has suspended the sale of campus parking permits, except the student and AB employe permit categories.

Maynard Richardson, acting information officer for the bureau, said the sale of "S", conference, short-term, temporary medical and special request permits will continue at the discretion of the Traffic Bureau.

"It is not known how long the moratorium on permit sales will remain in effect," he said.

Further information on the new policy may be obtained by calling Lance Haus, administrator of the Office of Transportation Services.

All Cornell University campus parking areas marked with yellow paint are considered 24-hour "no parking zones" and will be ticketed as such as of Monday, according to Maynard A. Richardson, acting information officer, Traffic Bureau.

A parking fee of \$1 will be charged persons wishing to park their cars on Upper Alumni Field Saturdays when Cornell plays varsity football here. No parking will be permitted on the field in the event of bad weather or bad field conditions.

Marshall Scholarships

The Marshall Scholarship program is designed to enable citizens of the United States, both men and women, who are graduates of United States colleges and universities to study for a degree of a university in the United Kingdom for a period of at least two academic years. Marshall Scholarships are available for tenure at any university of the United Kingdom but the award of each scholarship will be made for a specific course of study at a university named in the award.

For information, contact the campus representative, N. W. Ashcroft, associate professor of physics, 507 Clark Hall, 256-5179 or 256-4192. The closing date for applications is Oct. 23.

Small Grant Program Reduced

The Cornell Research Grants Committee has announced that it will continue its small grant program for research during 1972-73, but at a reduced level. Consideration of applications will be made in late November and again in April 1973. Summer support will be considered at the April meeting only.

Announcements will be mailed to each faculty member within the next two weeks indicating an application deadline of Nov. 1.

Because of the funding reductions and the resultant tightening of the program guidelines, faculty and graduate students should investigate possibilities of external funding more thoroughly and well in advance of expected needs.

NSF Announced Two Programs

The National Science Foundation has announced its 1973 program of Undergraduate Research Participation. Under this program, departments within an institution can submit proposals for primarily summer programs to stimulate undergraduate students interested in research. Only 60 per cent of the student participants can come from the host institution, with forty per cent recruited from neighboring institutions. The closing date for submittal of proposals to NSF is Oct. 16, 1972. Departments interested in this program can obtain a copy of the Undergraduate Research Participation brochure from the Office of Academic Funding, 123 Day Hall.

The NSF also announced the 1972-73 program of NATO Postdoctoral Fellowships in Science. The fields covered are the mathematical, physical, medical, biological, engineering and social sciences and the history and/or philosophy of science. Also included are interdisciplinary fields which are comprised of overlapping areas among two or more sciences. Recipients of these awards are expected to study in countries that are members of NATO, other than the United States.

The program is limited to nationals of the United States and is designed primarily for applicants who have received their doctorates within the past five years. The 12-month stipend is \$7,500.

The NSF deadline for submitting applications is Oct. 23, 1972. An application must be submitted on the standard official forms, obtained from the Division of Graduate Education and Science, National Science Foundation, 1800 G St., N. W., Washington, D. C. 20550. Further information regarding this program is available in the office of Academic Funding, 123 Day Hall.

'Black and Beautiful' to Be Reshown

Cast Productions, a division of Collaborations in Art, Science and Technology (CAST), will present a repeat showing of the United Black Artists' (UBA) "To All Things Black and Beautiful" Thursday at 9 p.m. on WCIC-TV, channel 2.

This television adaptation of the stage production, conceived and directed by Chestyn Everett, Langston Hughes Professor of Theater Arts at Cornell University's Africana Studies and Research Center, was first telecast last fall. The production features a large cast of players drawn from the Ithaca black community. The show is produced by Todd Caso and Patsy Scala for CAST.

Current Legislative Log

(The full text of any bill introduced in the University Senate is available in the Senate Office, 133 Day Hall.)

BILL NUMBER	DATE SUBMITTED	TITLE	SPONSOR	COMMITTEE REFERRED TO
C-93-a	9/22/72	A REVISED PROCEDURE FOR FILLING VACANT SEATS IN THE CORNELL UNIVERSITY SENATE [This bill repeals Title XI, Section Five of the Senate Bylaws (The section providing for By-Elections) and substitutes a more flexible procedure intended to fit the varied circumstances under which seats become vacant.]	John Harding for Internal Operations Committee	1. Internal Operations 2. Executive Committee
C-94	9/19/72	COMMUNITY INPUT INTO LONG RANGE PLANNING ACT [Requests from the President any long range plans before they are sent to the Board of Trustees for approval, thus ensuring Senate Consideration of such plans.]	Harry Solomon	Planning Review Committee
C-95	9/19/72	PHOTOGRAPHY POLICY PROCEDURAL RULE FOR UNIVERSITY JUDICIARY BOARDS [This act seeks to mandate the 'photography policy' which the Senate previously recommended.]	Levy, MacKay, Greenwald, Mass, Minella, Chang, Mannis	Judiciary
C-96	9/19/72	SCHOLARSHIP AND FINANCIAL AID GUARANTEE ACT [This bill recommends to the Administration that it guarantee scholarships and other forms of financial aid to those male students drafted out of study after the elimination of II-S deferments on April 23, 1970.]	C.K. MacKay, Grad Senator	Admissions and Financial Aid
C-97-a	9/21/72	PALATE PROTECTION ACT [This act sets up a University Dining Board with sufficient powers to insure that users of the dining facilities have a substantial voice in its operation.]	Clifford Mass	Dining Subcommittee
C-98	9/25/72	RECOMMENDATION TO DEFER ACTION ON BIOSCIENCE COMPLEX [Recommends that the Board of Trustees defer action on the Bioscience Complex until the Senate reviews the concept.]	Harry Solomon	Planning Review
C-99	9/27/72	SENATE REPORTS ACT [This bill authorizes the Executive Committee to require periodic reports to the Senate from various Senate boards, commissions, and related offices.]	Harold Levy, ILR Undergraduate	Executive Committee
C-100	9/28/72	THE CORNELLCARD RIP-OFF REPARATION ACT [This bill provides for the return of a portion of the \$5 base fee charged to users of the Cornellcard.]	Charles K. MacKay, Grad Senator	Campus Life Committee
C-101	10/2/72	SENATE CONTRIBUTION TO POLICE-COMMUNITY RELATIONS COMMITTEE FUNDING [This bill provides for the disbursement of the amount of \$100 to the Police/Community Relations Committee from Campus Life Funds, or Senate operating funds, and the provision of such secretarial support as the Administrator shall find it possible to render.]	Charles K. MacKay, Grad Senator	Campus Life Committee

Hardin to Give Messenger Lectures

Garrett Hardin, professor of biology at the University of California at Santa Barbara, will present the 1972 Messenger Lectures at Cornell University between Oct. 10 and 19 on the topic "The Value and Dignity of Life."

The six lectures in the series, which are open to the public, will be presented in the Uris Hall

auditorium at 8 p.m. on Oct. 10, 11, 12, 17, 18 and 19. Uris Hall is the new social sciences building.

The Messenger series, which has taken place annually since 1924, is generally considered the University's most prestigious lecture program. The series is intended to attract the world's leading scholars to discuss

topics related to the evolution of civilization.

Hardin will discuss "A Century and a Half of Contraception" on Oct. 10, "Shall We Withhold the Boon on Abortion?" on Oct. 11; "Infanticide, Cryptic and Overt" on Oct. 17; and "A Rational Theory of Human Value" on Oct. 18 and 19.

Calendar

October 5-11

Thursday, October 5

11:15 a.m. George Fisher Baker Lecture. Baker 200.
 4:30 p.m. Food Science Seminar: "Promoting International Food and Nutrition Developments." Dr. Samuel Weisberg, the League for International Food Education. Refreshments at 4:15 p.m. 204 Stocking Hall.
 7 p.m. Free Film Series: *Lost Horizon* (1937), directed by Frank Capra. 9:15 p.m. — *What's Up Tiger Lily* (1966) with Woody Allen. Multi-purpose Room, North Campus Union.
 7 p.m. Modern Jewish Thought, led by Norman Roth. Grad. Blue Room, Anabel Taylor Hall.
 7:30 p.m. Israeli Folk Dancing with instruction, led by Neil Sonenklar. One World Room, Anabel Taylor Hall.
 7:15 p.m. Volleyball Club meets in Teagle Gym. All interested in learning or playing are welcome.
 8 p.m. Christian Science Organization testimony meeting. Visitors are welcome. Founders Room, Anabel Taylor Hall.
 8 p.m. Cornell Duplicate Bridge Game. Sage Hall Cafeteria.
 8 p.m. Colloquium: "The Green Revolution — Implications for the Future." J. George Harrar, Andrew D. White Professor-at-Large and former president of the Rockefeller Foundation. Sponsored by the Dept. of Plant Pathology. 233 Plant Science.
 8 p.m. International Wives Friendship Club "Get Acquainted" meeting. For all wives of international members of Cornell and the Ithaca community. 135 Emerson Hall, Tower Road.
 8:15 p.m. Dept. of Romance Studies and Society for the Humanities lecture. Michel Foucault, professor of philosophy at the College de France. "Une Societe qui enferme." Kaufmann Auditorium.
 8:15 p.m. *University Theatre Production: *The Empire Builders*. Willard Straight Theatre.
 8:30 p.m. Nat'l. Students for McGovern present Helen Gahagan Douglas. Ives 110.

Friday, October 6

10 a.m. - 8 p.m. Activities Fair. Sponsored by University Unions Program Dept. Memorial Room, Willard Straight Hall.
 4 p.m. Dept. of Natural Resources Seminar: "Effects of Water Hyacinth and Fertilization on Fish Food Organism and Fish Production." Dr. Harold Wahlquist, senior aquatic biologist, Alabama Power Co., Birmingham, Ala. Coffee at 3:45 p.m. Conference Room, Third Floor, Fernow Hall.
 7 & 9:15 p.m. *Film: *Goodbye Columbus*, with Ali McGraw and Richard Benjamin. Statler Auditorium.
 7 & 9:15 p.m. *Film: Joseph Losey's *The Go-Between* with Julie Christie and Alan Bates. Social Sciences Auditorium.
 7:30 p.m. Lecture: "What Is and What Could Be" by Vietnam Vets. Sponsored by Vietnam Vets Against the War. Anabel Taylor Aud.
 7:30 p.m. *Varsity Soccer - Syracuse. Schoellkopf Field.
 7:30 p.m. Shabbat Services: Community service, Founders Room, Anabel Taylor Hall; Creative service, Chapel, Anabel Taylor Hall. 9 p.m. Readings from "Souls On Fire" by Elie Weisel, led by Rabbi Goldfarb. 205 Bryant Ave.
 8 p.m. Open Mike at the Commons. Anabel Taylor Hall.
 8 p.m. Lecture: "Jesus and Eros: Erotic Emptiness and the Love of God." Dr. Merold Westphal, professor of philosophy at Yale University. Sponsored by Graduate Christian Forum. Ives 110.
 8:15 p.m. *Cornell University Theatre Production: *The Empire Builders*. Willard Straight Theatre. (See Oct. 5.)
 Fall trip to Lake George, Friday, Oct. 6 to Sunday, Oct. 8. Leader: Allen MacNeill. Phone 256-0624. Meet at Japes. For

time, call leader. Return Sunday afternoon or night. Equipment - sleeping bag and tent. Cost, about \$10.00. Sponsored by Cornell Outing Club.

8:15 p.m. Cornell University Trio - Works of Brahms. Barnes Hall.

Saturday, October 7

9:30 a.m. Shabbat Service. Edwards Room, Anabel Taylor Hall.
 Noon. Varsity Cross Country - Syracuse.
 2 p.m. *Varsity Football - Rutgers. Schoellkopf Field.
 2 p.m. Talmud Study, 106 West Ave.
 6 p.m. *Chinese Student Association Dinner. One World Room, Anabel Taylor Hall.
 7 & 9:15 p.m. *Film: Joseph Losey's *The Go-Between*, with Julie Christie and Alan Bates. Social Sciences Auditorium. (See Oct. 6.)
 7 & 9:15 p.m. *Film: *Goodbye Columbus*, with Ali McGraw and Richard Benjamin. Statler Auditorium. (See Oct. 6.)
 8:15 p.m. *Cornell Concert Commissions presents "Jason." Bailey Hall.
 8:15 p.m. *Cornell Polo Club plays Alumni. Cornell Riding Hall.
 8:15 p.m. *University Theatre Production: *The Empire Builders*. Willard Straight Theatre. (See Oct. 5.)
 9 p.m. Chinese Student Assoc. Movie. Anabel Taylor Auditorium.

Sunday, October 8

9:30 a.m. Episcopal Church at Cornell. Worship, Anabel Taylor Chapel. Church School and Nursery Care provided. All are welcome.
 9:30 a.m. Yoga. Loft II, Willard Straight Hall.
 11 a.m. Sage Chapel Convocation. The Rev. Donald S. Harrington, Minister, Community Church of New York (Unitarian), New York, N.Y. Sage Chapel.
 2 p.m. Table Tennis Round Robin Matches. Noyes Center Third Floor Lounge.
 2 p.m. Free Film: Sherlock Holmes (Basil Rathbone) in *The Voice of Terror*.
 8:15 p.m. *University Theatre Production. *The Empire Builders*. (See Oct. 5.) Willard Straight Theatre.
 7 & 9:15 p.m. *Film: *Claire's Knee*, directed by Eric Rohmer. Statler Auditorium.

Monday, October 9

4 p.m. Music Dept. Concert: Anne Parks, Organ. Lecture-Recital (organ and chorus); Nun Komm, der heiden Heiland. Barnes Hall Auditorium.
 4:15 p.m. Society for the Humanities Lecture: "Erasmus and Biography." Margaret Mann Phillips, University of London. Ives 110.
 4:30 p.m. Dept. of Geological Sciences Seminar: "Plate Tectonics Problems of the Precambrian." John Dewey, Dept. of Geological Sciences, State University of New York at Albany. Coffee at 4 p.m. 212 Kimball Hall.
 7 & 9:15 p.m. *Film: Federico Fellini's *Nights of Cabiria*. Memorial Room, Willard Straight Hall. Film Club members only.
 7:30 p.m. Halachic and Talmudic Judaism, led by Jean-Claude Klein. G-34, Anabel Taylor Hall.
 8 p.m. Biology and Society Lecture Series: "Early Nutrition and Behavioral Development." David Levitsky, nutrition. Statler Auditorium.
 8:30 p.m. Poetry Readings at The Commons, Anabel Taylor Hall.

Tuesday, October 10

11:15 a.m. Film: *Chronicle of Anna Magdalena Bach*, starring Gustav Leonhardt as Bach. Sponsored by the Music Dept. Statler Auditorium.
 11:15 a.m. George Fisher Baker Lecture Series. Baker 200.
 7 & 9 p.m. *Guitar Lessons. Sponsored by University Unions Program Dept., International Lounge, Willard Straight Hall.
 7:15 p.m. "A Jewish View of Jesus" led by Rabbi Goldfarb. Blue Room, Anabel Taylor.

7:30 p.m. *Concert: Indian Music - Sitar. Krishna Mohan Bhatt & Co. Sponsored by South Asia Studies Assoc. Anabel Taylor Auditorium.

7:30 p.m. University Senate Meeting. Kaufmann Auditorium.
 8 p.m. *Film: *A Taste of Honey*, with Rita Tushingham. Statler Auditorium.

8 p.m. Messenger Lecture: "A Century and a Half of Contraception." Garrett Hardin, University of California at Santa Barbara, professor of biology. Uris Hall Auditorium.

8 p.m. Landscape Architecture Program: Lecture by Ethel Hugi Koudela, registered architect and landscape architect. Dept. of Parks and Recreation, City of Pittsburgh. "Landscape Architecture in the City." Room 404, Plant Science Building.

Wednesday, October 11

11 a.m. - 8 p.m. *Art Sale - Marson Ltd. Multi-purpose Room, North Campus Union. Sponsored by University Unions Program Office.
 1 p.m. Lecture: "Vietnam, the Hawk, the Dove and the Owl." Dolf Droge, staff member, National Security Council. Sponsored by Cornell Republican Club. Memorial Room, Willard Straight Hall.
 4:30 p.m. Special Seminar: "Role of the International Research and Training Institutes." J. George Harrar, Andrew D. White Professor-at-Large and former president of the Rockefeller Foundation. Sponsored by the Program in International Agriculture. 135 Emerson Hall.
 4:30 p.m. *Varsity Soccer - Pennsylvania. Schoellkopf Field.
 4:30 p.m. Freshman Soccer - Colgate.
 4:30 p.m. Faculty Council of Representative Meeting. Ives 120.
 6:30 p.m. Beginners' Conversational Hebrew, led by A. Cohen. 314 Anabel Taylor Hall.
 7:15 p.m. Intermediate Conversational Hebrew, led by A. Cohen. 314 Anabel Taylor Hall.
 8 p.m. "Woman Is My Name." Open stage for Cornell women. Sponsored by Women in the Arts. International Lounge, Willard Straight Hall.
 8 p.m. *Film: *Citizen Kane* - Orson Welles. Statler Auditorium.
 *8 p.m. Messenger Lecture: "Shall We Withhold the Boon of Abortion?" Uris Hall Auditorium. Second of six. Uris Hall Auditorium.
 8:15 p.m. Advanced Conversational Hebrew, led by A. Cohen. 314 Anabel Taylor Hall.

Free tutorial service available for those with problems in writing. Sponsored by the English Dept. Contact R.T. Farrell, 355 Goldwin Smith, Tuesday and Thursday 2-5 p.m.

Exhibits

Franklin Hall Gallery. Graduate Students in Art. Open to October 19.
 Andrew Dickson White Museum of Art: Contemporary Ceramic Art of Japan. Open to Oct. 15. Hours: Tues. - Sat. 11 a.m. - 5 p.m.; Sunday 1 p.m. - 5 p.m.; Closed Monday.
 Olin Library: American Presidents: Elections and Autographs.
 Sibley Dome Gallery: Dept. of Art Faculty Show - Drawings, Graphics, Painting and Sculpture.
 Willard Straight Art Lounge: "I Share Your Uneasiness" - the words of George Wald. Drawings by Mary Cady Johnson. Open to Oct. 25.

*Admission charged.
 Attendance at all events is limited to the approved seating capacity of the hall in which they are presented.
 All items for the Cornell Chronicle Calendar must be submitted to the Office of Central Reservations, Willard Straight Hall (either through the mails or by leaving them at the Straight desk) at least 10 days prior to publication of the Chronicle. The Calendar is prepared for the Chronicle by the Office of Central Reservations.

Biology Complex

Continued from Page 2

said.
 "The need for space is now," O'Brien said. "We needed it seven years ago — for research, graduate and undergraduate studies."

Asked at what point planning is now, Mackesey said it is hoped to commission an architect at the Nov. 15 meeting of the University's Board of Trustees.

The architect, he said, would develop a master plan for Lower Alumni Field and develop schematic drawings for the "first component."

"We're still working on a definition of this," he said.

In reply to a question on funding, Mackesey said the Board of Trustees has money

from a bequest from the Ellis I. Behrman Fund for the first phase planning which he estimated to cost between \$75,000 and \$100,000. The Behrman Fund specified that the monies be used in connection with the construction of buildings for biology.

Pressed for a cost estimate on the entire complex, Mackesey said that if built now the entire biological complex would cost \$40 million. Eventual cost might be higher than this because of factors such as inflation, he said.

One senator asked whether any project had ever been dropped after sums of money had been spent on the planning process. Mackesey replied that this had not happened in recent

years.

Asked what percentage of the money the University might have to pay, exclusive of gifts, Mackesey replied "Zero." He said capital funds must come from outside the University and that no endowment funds will be used.

The vice president pointed out in reply to a query that any new facility adds to the University's operating cost since heat, light, power, and air conditioning expenses are increased. He added, however, that much of this can be recovered from overhead costs in sponsored research projects.

O'Brien said present plans call for construction of buildings with

a total of 350,000 gross square feet in the first phase of construction and 150,000 gross square feet in the second. He said that something like 30 per cent of this would be for undergraduate teaching, 55 per cent for graduate and post graduate work and for research and 15 per cent for general support space.

Mackesey was asked whether a tightening of the "space belt" might not be advisable. He replied that renovation projects are or have been undertaken in McGraw Hall, the Engineering Quadrangle for the Division of Geological Sciences, Morrill Hall, Sibley Hall, Rand Hall and in Rockefeller Hall whenever funds can be found.

"But," he said, "there's no substitute for new, efficient buildings for biological sciences."

O'Brien stressed that there now are 1,400 biology majors or pre-majors and that this number will increase to 1,800 in three years. He said the division is teaching 34,573 student credit hours.

The feeling among many at the meeting was that planning has been going on for nine years and that it was quite agreed that the construction program is both desirable and necessary.

It was made clear, however, that the senate wishes to be kept informed of progress on the plans so they might make any contributions they deemed advisable.