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The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

TO EPOB Faculty

FROM D. W. Crumpacker

SUBJECT Faculty Meeting

DATE 4/7/76

UNIVERSITY OF COLORADO

*Interdepartmental
Memorandum*

The faculty meeting on Wednesday, April 14, Hale 302 will be devoted to a discussion of the report on curriculum revisions which was first sent out to you last May. The accompanying copy has been changed very little from that one and supercedes it. Please read it carefully before coming to the meeting - we need to use the time for discussion. Call Paul Winston for clarification of anything. Remember, this is a set of suggestions, not a fait accompli.

Dr. David Rogers
Hale 114

Spring 1976

TO: Faculty of EPOB

Report of Curriculum Synthesis Subcommittee of the Executive Committee
(Pelane, Rogers, Segal, Windell, Winston) as redone for discussions in Spring 1976

This is still a preliminary report with the proposed program with changes and substitutions, the new courses, and those we recommend to be dropped. We did not do any pruning ourselves and the only courses dropped were those which we were told to drop by those teaching them, or courses which would be incorporated into something else. According to our charge, we took all suggestions from the various disciplinary groups and incorporated them into the curriculum. We feel strongly that the various disciplinary groups should be evaluating their undergraduate offering continually and not leave it as a one-shot effort. Much could be done here.

One of the charges to this committee was to present a possible set of departmental goals and we are still working on this. It is obvious, however, that we have a better chance to devise such a statement of these objectives once there is some agreement on the curriculum. Such a statement definitely needs to be made as a guide to students and administrators, to say nothing of us.

In the list of proposed courses we have done some juggling - partly for P.R. purposes, especially in terms of what substitutes for what. First, please don't begin by berating us - it will do no good. Second, try to look at the overall picture and try to see how things fit or don't fit into a picture. All of this is open for discussion and change, and we hope the criticisms will be constructive.

The big thing still to come is working out some logical "streams" as guides for students and advisors. If you have any suggestions give them to Paul Winston.

The committee has tried to do some revising and some reorganization on the Dept. Curriculum without making really drastic changes. We have all felt under the gun for a long time to have more of a plan and we are going to have to make some decisions soon to get us out from under, at least partially. Also, we are not going to get enough space and faculty to do it all and we must decide where to cut and prune. In the main no sweeping changes are suggested but we are going to point out places where we feel that the Dept. must do some heavy thinking about what we can and can't afford to do.

First, the major changes will be explained and then we will present other aspects which must be discussed and decided on by the Dept. These are points that have come up from all over and then have been hashed over by the Committee, sometimes ad nauseum. In the suggested new courses we have not worked out all the details and ask that you not get sidetracked by small points. Let's look at the forest and hold the trees until later. We are going to need agreement (or not) on the broad philosophy of these changes first.

The first big change, which is all ready in the making, is the substitution of EPOB 202 for 102 for those majoring in the Dept. Up to this point, the plan requires a team-taught survey of animals, plants, and microbes at 5 hours. There are several goals for this: (1) to get the students familiar with the major groups of organisms, (2) to give them a feel for the morphological bases of our understanding Evolution, and (3) to give them an introduction to the bases for Systematics. Majors would take 101 and 110 and then go into 202. Those who "pass" out of 101 would still take 202. You are all familiar with the changes taking place in this curriculum and it need not be belabored here.

There is such a strong feeling in the Dept. that the students need to be exposed to a strong dose of these subjects that this seemed to be the only solution. It is a compromise in that everyone feels that his or her own area surely needs a full semester (or 2) for a full and adequate treatment. It is our feeling that some of this is better than none and that the Principles

involved are basically the same no matter what groups are being considered; 3
that it is better given to majors alone rather than to be mixed groups of
102; that more detailed, intensive treatment should be reserved for advanced
courses after the kids have had more background in Biology, which would
point up to them the needs for this knowledge; and that we cannot require
all majors to spend more time on specific areas than this. The advanced courses
should then be available for those who need and want them.

Several objections have arisen to cutting out the Physiology, etc. for those not
taking 102. However, it is felt that the students are better off with the morphology
and survey as a basis for these courses; they don't need a short introduction to
physiology as much as the morphology

THE CORE REQUIREMENTS

The required core for Majors would be much like the present one: General Biology--
101 and 202, Principles of Ecology--341, Essentials of Physiology--322, and Introductory
Genetics--383. With the change to 202, the students would be introduced to five major
fields of Biology, on which the advanced courses can build. See below for the changes
in 341 and 322.

We must also decide on the requirements for Math and Physical Sciences. Perhaps
some compromises are possible on these. One suggestion has been a year of Chemistry
plus a year of one other Physical Science. Thus, some Ecologists and Morphologists
would benefit more from Geology instead of Physics. The Mathematics requirements are
another problem, but one year of Math is probably a bare limit.

We would also suggest that a course in Biomathematics at the 200 or 300 level should
be required of all Majors. This would include statistics, modelling, data management,
and experimental design.

At least some of the Department feel that to properly round out a student's
knowledge of biological principles, a course in General Systematics should be
included. Such a course would focus on the various subjects of taxonomy--
comparative morphology, biosystematics, chemotaxonomy, and taximetrics (or
numerical taxonomy). We have not reached a consensus in the committee on
this and need to consider this and possible alternatives. Something does

Ecology and Populations Biology

The Ecologists and many other interested people got together in the early Spring (1975) to try to work out some application of the plan that Carl Bock and others presented for the undergraduate instruction in this field. As four non-ecologists (almost) your committee suggests that there could be more agreement as to what should be done, but we have accepted the compromise that came out of that meeting. It seems very good but is far from ideal and we would like to suggest that more time be spent profitably by those who are or will be teaching undergraduate courses in Ecology and Populations trying to work out the best pattern and techniques for teaching the undergraduates. For something so important, precious little time has been given to discussion by the group as a whole and we feel that this is necessary. It should not be "wasted time." We are far too large for each person to do just what he wants to do at the undergraduate level. The same suggestions are pointed to all of us, not just the Ecologists. We all need to work on the curriculum.

Physiology

The proposed changes are less radical than the Ecologists' but there are some.⁵ First, the core course would be "Essentials of Physiology." This will be part plant, part animal, and part microbial. This is a large order, of course, but we feel that it can be done effectively. Plant and animal areas will be separated and taught by different people. They are so different that they come together only at the cellular level and this is where the students will get one dose of cell physiology. The cellular aspects will be worked in when they are needed rather than devoting a special section to the subject. An additional lot of cell physiology will come in with the microbial portion, especially certain biochemical aspects. There is still much to be done on this one.

In this way students can be given a broad slug of Physiology which is not limited to "Plant" or "Animal" or "Cell" in their first course. It is the kind of broad approach needed by those for whom it will be the only Physiology course. We feel that it would be the best exposure to the subject for the ecologists who need a broader picture of the field than we are giving them now. The Principles and concepts of Physiology, and especially the attitudes of the physiologist can be presented in this way as well as in the more specialized framework we use now.

With this change we would have a separate course in Human Physiology (the name might have to be changed to keep down the numbers of premeds and such). This would be a service course primarily but one still open to selected majors to substitute for the core course, such as prospective High School teachers.

The Physiology group has attempted to set things up to increase the offerings at the 400-level but in smaller, more restricted classes than are possible now. Cell Physiology would be dropped as such with the idea that the necessary cellular concepts will be introduced into the organismic Physiology courses as the need for such treatment arises. It will have the added attraction of removing one glaring point that someone

reviewing the Program might grasp and belabor, to the detriment of other, more important things. We can give our students what they need without having a course labelled with one of the titles of our sister Dept. There is a feeling developing that something like the Ecologists' new system might be developed here.

We are suggesting two new courses to contribute to the training of majors for jobs. One would be Techniques in Physiology and Anatomy and would be designed to give the background for working in a research lab. It would include for example, an introduction to Microtechnique. Many students want to go out to work in research labs and such; a basic course like this could cut down considerably on their on-the-job training and thus enhance their chances of getting the job in the first place. A second new course would be called Environmental Physiology and would be designed to help those going into areas where the physiological and medical effects of pollutants, drugs, additives, and such have to be evaluated. The people who have been and will be hired by Industry, EPA, and other agencies are not all going to have Ph.D.'s, (the two men working for the EPA out of Denver on this sort of thing have only B.A.'s) and we can help by giving our undergraduates and M.A.'s some practical background.

Genetics

The elementary Genetics course would be essentially unchanged from the present one.

Microbiology Curriculum

The proposed microbiology curriculum is designed to broaden and integrate course offerings in this area of biological science in such a way as to reinforce the various other disciplines in the Department of EPO Biology. The following proposals are intended to accomplish this goal.

Procaryotic and Eucaryotic Microbiology

1. Expansion of the scope of microbiology by inclusion of all of the unicellular, microscopic organisms, i.e. both procaryotic and eucaryotic microorganisms.

Following an introductory survey in the 202 course, it is proposed that the study of these two main groups be divided into a 2-semester sequence. The justification

for this proposal is that a common methodology and ecology underlies both groups. Furthermore in recent years there is growing acceptance of the proposal to unite them in a third kingdom, the Protista. The first semester, involving the study of procaryotic microorganisms, would include the following orders: (a) the blue-green "algae," recently given the name Cyanobacteria; (b) the bacteria; (c) the rickettsia, the mycoplasma and the chlamydia, the smallest and simplest of living cells; (d) and the non-cellular viruses, the simplest of biological entities. The second semester would include the study of eucaryotic microorganisms: algae, protozoa and fungi. The present course offerings dealing separately with each of these special taxa would continue to be taught at an advanced level.

Aquatic and Soil Microbiology

2. Integration of microbiology with our expanded ecological program by including in the latter the sub-disciplines of aquatic and soil microbiology. Microbiology has an as yet unfulfilled contribution to make in the development of ecological science.

Infectious Diseases of man, other animals, and plants

3. Integration of the study of infectious diseases so as to include microbial diseases of plants, animals and man. The central theme of this proposed course would be a study of the host-parasite relationship as a unifying concept, with equal emphasis being placed on the diverse manifestations of this phenomenon. As in the case of the other proposals in microbiology, this course would have to be team-taught. The present courses in Pathogenic Microbiology and Parasitology could be continued at an advanced level. However consideration should be given to the possibility of offering them as separate course sections of a broad course in infectious diseases.
4. Continuation of courses in Microbial Physiology and Immunobiology both to satisfy the needs of majors in microbiology and of majors in related biological disciplines.
5. Expansion of the offerings of advanced seminars in specialized aspects of the

field of microbiology.

Quantitative Biology

It has long been obvious that the Dept. needs more mathematical and statistical material for the students (and faculty?). Several new courses have been proposed and we would like to suggest that a required course be set up at the 200 or 300 level comparable to Quantitative Methods in Biology. This could include Statistics, Research Design, Data Storage, and Data Manipulation.

Proposed Courses

A list of the proposed courses follows with the changes, substitutions and some explanations. If we have left your favorites out, please let us know. Cross-listed courses and those taught elsewhere (e.g. Embryology) are not included, for the most part.

Number	Name	Remarks
101-3	General Biology	for all
102-3	General Biology	for non-majors
110-1	Gen. Biol. Lab Investigation	for majors only
202-5	Advanced Gen. Biol. (Note 1)	for all majors
219-3	Human Anatomy	a service course
251-2	Introduction to Evolution	for non-majors
283-3	Heredity and Society	for non-majors
300-1	Applications of Medical Technology	
-4	Procaryotic Microbiology	subst. for 301-4, Aquatic Botany 523-2, Algology 554-3, Morphology of Non-Vascular Plants 311-4
	Eucaryotic Microbiology	
303-4	Introduction to Entomology	
312-4	Morphology of Vascular Plants	
315-3	Plants and Man	
-4	Essentials of Physiology (Note 3)- All majors	subst. for 322-4 (in part), 423-4, 321-4 (in part)
-3	Human Physiology (Note 4)	subst. for 322-4 (in part); mostly for non-majors
341-4	Principles of Environmental Biology (Note 5)	some subst. for 443 (in part); all majors to take this
383-3	Introductory Genetics	all majors to take this
400/500-3	Teaching Modern Biology	
402/502-3	Ethno-ecology	
404/504-4	Comparative Invertebrate Physiology	was 543-3 and 544-3 should be 40/yr.
405-2	Teaching Laboratory Biology I and II	
406-2		

Number	Name	Remarks
-3	Parasitology	w/302-3
408-3	Principles of Comparative Vertebrate Anatomy - Lecture (3) and Lab (2)	
411/526-5	Invertebrate Zoology	
414-3	Mycology	
416/516-3	Neurobiological Bases of Behavior	
417/517-3	Advances in Sociobiology	
418/518-3	Limnology (Lecture only)	
421-521-3	Dynamics of Mountain Ecosystems	
422/525-4	Vertebrate Physiology	
424-3	Introduction to Animal Behavior	
428/528-2	Laboratory in Animal Behavior	
-4	Plant Physiology	was 321-4 - same enrollment
-4	Microbial Physiology (lecture and lab)	was 561-3 and 568-2
-3	Animal Ecophysiology	new course - 40-60/yr.
-3	Plant Ecophysiology	was 621-3; 20-40/yr.
-4	Research Methods in Physio- logy and Anatomy (Note 6)	new course; should be 40; was 565-3
-3	Applied Environmental Physiology (Note 7)	new course; 40/yr.
-4	Immunobiology	was 549-3 and 550-2
430-4	Classification of Flowering Plants	
431-4	Insect Taxonomy	
432-3	Biology of Amphibians and Rep- tiles	
433-2	Lab-Herpetology	

Number	Name	Remarks
434-3	Ornithology	
435-2	Ecology for Man	for non-science majors only not open to freshman
436-4	Infectious Diseases of Man, other Animals, and Plants (Note 5)	was Pathogenic Microbiology
437/533-4	Mammalogy	
438/538-3	Biometry	
-3	Survey of Quantitative Methods in Biology	was 505-3 (sect. 1)
-3	Problems in Biomathematics (Note 9)	new course
441/541-4	Plant Ecology	
444/545-3	Comparative Endocrinology	
446/537-var.	Biological Field Studies	
451/579-3	Population Genetics	
460/460-2	Advanced Classification of Flowering Plants	
480/580-3	Plant Growth and Development in sterile culture	
483-4	Laboratory Genetics	
-3	Human Genetics (Note 10)	new course
492-1-3	Independent Research in EPOS	
499-1-3	Independent Study	
4 -3	<u>Advanced Environmental Biology I</u>	
	Forest Ecology	16 of these courses (8 from I and 8 from II) will be taught each year. Max. 20 students/class. Animal Ecol. 443-4 is substituted.
	Grassland Ecology	
	Tundra Ecology	
	Vertebrate Ecology	
	Insect Ecology	

Number	Name	Remarks
	Ecology of Flowering Plants	was 331-3
	Arctic and Alpine Environments	was 345-3
	Microbial Ecology	was 425-3
	Stream Biology	was 611-3 and 429-3
	Palynology and Environmental History	was 476/576-3
	Ecology of Arid Lands	
4__-3	<u>Advanced Environmental Biology II</u>	
	Ecology of Water Pollution	was 523-2
	Environmental Law	
	Pesticides and Ecology	
	Ecology of Natural Resource Management	was 517-2
	Environmental Assessment	
	Ecology of Wildlife Management Systems	
	Biology of Fish Populations	was 548-3
	Applied Environmental Microbiology	was 201-3
	Soil Microbiology	
4__-3	Aquatic Microbiology	
505-var.	Advanced EPO Biology	
506(1-3)	Independent Study EPOB	
507(2-3)	Teaching Advanced Biology	
509-3	Concepts in Behavioral Genetics	
510-3	Avian Communities of Colorado and New Mexico	
511-3	Birds of the World	
512-3	Animal Geography	

Number	Name	Remarks
515-2	Environmental Measurement and Control	
519-2	Techniques in Aquatic Biology	
524-3	Tropical Biology and Insular Biogeography	
531-2	Peripatetic Biology	
539(1-3)	Independent Research in Environmental Biology	
-3	Benthic and Aufwuchs Biology	was 613-3
-3	Mammalian Physiology (Note 11)	new course
-3	Plant Nutrition (Note 12)	new course
562-3	Advanced Ethology	
553-3	Developmental Plant Anatomy	
555-3	Lichenology	
564-3	History of Biology	
569(1-3)	Independent Research in Organismic Biology	
573-3	Taximetrics	
575-3	Principles and Practice of Biological Taxonomy	
-3	Simulation and Modelling (Note 13)	new course
582-3	Advanced topics in Population Genetics	
583-3	Ecological Genetics	
-3	Cytogenetics	new course
-4	Plant Population Biology	
-3	Plant Biosystematics	new course
599-var.	Independent Research in Population Biology	

Listing of Seminar Courses

Quantitative Ecology	624-2
Seminar in Ecology of Fungi	625-2
Seminar in Polar Ecology	626-2
Seminar in Adv. Insect Tax.	627-2
Seminar in Adv. Vert. Ecol.	628-2
Seminar in Ecology and Business	692-2
Seminar in Environmental Biology	633-2
Seminar in Comparative Neurophysiology	641-2
Seminar in Environmental Physiology	642-2
Seminar in Endocrinology	643-2
Seminar in Reproductive Biology	652-2
Seminar in Dev. Physiology Concepts	653-2
Seminar in Vistas in Botany	654-2
Seminar in Ecoenergetics	655-2
Seminar in Spec. Topics in Microbiology	657-2
Seminar in Organismic Biology	663-2
Seminar in Ergonomics	664-2
Seminar in Population Studies	693-2
Seminar in Evolutionary Ecology	615-2
Seminar in Ecological Plant Physiology	621-2
Seminar in Reproductive Biology of Flowering Plants	651-2
Seminar in Applied Microbiology	662-2
Plant Population Biology	683-4
Seminar in Evolution and Speciation	692-2
Seminar in Ecophysiology of Arctic and Alpine Plants	6__-2
Seminar in Biology of Social Insects	6__=2

Seminar in Microbial Systematics and Evolution	6__-2
Seminar in Research Design	6__-2
Seminar in Advanced Organismic Genetics	6__-2
Seminar in Human Behavioral Genetics	6__-2
Seminar in Plant Evolution and Biogeography	6__-2
Seminar in Physiology of Special Groups	6__-2
Seminar in Advanced Ethology	6__-2

Notes:

1. EPOB 202 will be a team-taught survey of plants (higher & lower) and animals (invertebrates and vertebrates). 101 will include Genetics, Cell Biology, and Evolution, while 102 will include Ecology, Survey, Behavior, Physiology and Development. Because of financial exigencies, the labs have been dropped in 102.
2. Principles of Environmental Biology. A 4-hour course in Principles of Environmental Biology (2 hours of lecture, recitation, and a 3-hour lab). This is to be team-taught with lectures under 200 and labs at 20. The object here would be to present most of the basic principles to the students and "get it out of the way." At this time there is strong criticism that there is too much repetition of these principles from one course to another. Everyone knows that students need repetition, but ecological principles are deceptive in their complexity and it takes a long time for anyone to realize this. A large number of small advanced courses has been proposed to get around this problem. These are divided into two groups--Advanced Environmental Biology I which would include the basic subjects and Advanced E.B. II to include the more Applied and technique-oriented areas. These would have a maximum of 20 students, one section, and would allow for real interchange between faculty and students. There would be 1 lecture and 2 labs, illustrating the philosophy that, after the students have been given the Principles, they most need to get into the lab and field and do something. There is agreement among many faculty members that they would be most willing to spend more contact hours this way than in courses with 60-100 students where there is still inadequate contact with the students. There would be no

TA's for these small classes but adequate (?) permanent staff to take care of lab preps and the organizational details for field trips. There would be 8 of these courses taught each semester with a listing in the Schedule of the title and instructor. At present, the following have been suggested for these courses with a surplus from which 8 would be picked. This arrangement will make it flexible; faculty will not be locked into one subject but will be able to have some variety in the field.

In addition, Plant Ecology and Limnology will be taught separately with 60 students and 3 lab sections in each.

Advanced Environmental Biology I

- Forest Ecology
- Grassland Ecology
- Tundra Ecology
- Vertebrate Ecology
- Insect Ecology
- Ecology of Flowering Plants
- Arctic and Alpine Environments
- Microbial Ecology
- Stream Biology
- Palynology and Environmental History
- Ecology of Arid Lands

Advanced Environmental Biology II

- Ecology of Water Pollution (with help from Civil Engineering)
- Environmental Law (with help from the Law School)
- Pesticides and Ecology
- Ecology of Natural Resource Management
- Environmental Assessment (with help from Engineering)
- Ecology of wildlife management systems (possibly with help from CSU)
- Biology of fish populations
- Applied Environmental Microbiology
- Soil microbiology
- Aquatic microbiology

3. Essentials of Physiology. A team-taught course covering Plant, Animal and Microbial Physiology. To give students basic principles of Physiology and the fundamentals for the advanced courses.
4. Human Physiology. Primarily a service course for those in the Pre-Allied-Health programs, but open to selected majors. Enrollment would have to be carefully controlled.

5. A 2-semester sequence covering the organisms commonly placed in the Protista. First

semester to cover viruses to blue-green algae, the second to cover algae, protozoa and fungi.

6. A laboratory techniques course to give some training for those who would be going to try to get jobs as Lab Technicians. To include microtechniques and the use of analytical methods and tools.
7. Course to provide some practical training for students trying to get into the area of assessment of the physiological effects of environmental factors.
8. A broadening of Pathogenic Microbiology to include diseases of other animals and plants, rather than restricting it to human diseases.
9. Problems in Biomathematics. Mathematical approaches to the analysis of biological data.
10. Human Genetics. Application cytological and population genetic principles and methods to humans.
11. Mammalian Physiology. An advanced course that would primarily introduce the student to the specialized techniques in this field. (It will require a highly specialized lab, however)
12. Plant Nutrition. To cover the nutritional requirements and utilization of inorganics in plants in detail.
13. Simulation and Modelling. This would be a detailed examination of modelling of biological systems and the use of computers to test these models.

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LRPC Meeting, Mar. 9, 1976. Present: Fuller, Rogers, Telleen, Winston

Most of the meeting was devoted to the questionnaire and the thoughts generated by it. Consensus was that it was a good one and that many students would be ready and willing to provide some input. A few minor changes in wording have been instituted and the pilot copy all ready set up for EXIR by our indefatigable student members. This will be given to about fifteen students in an advanced class to iron out any other bugs. The questionnaire will be optional for nonmajors. A space was added at the end for additional comments, suggestions of additional courses, and a spot for volunteers for curriculum work.

Wilson Crumacker has asked us to initiate a poll of majors to find those with parents who might be willing to help us "Educate" the Legislature and the State Gov't to the needs of this Dept., especially concerning the new building. Unfortunately he was not able to come to our meeting, but we did get a start on it. He has agreed to write an explanatory note to the questions. These will be on a sheet that is separate from the big questionnaire and will be collected separately. I will go over this note with him and the information that is wanted. It was agreed that this approach could be fruitful, but that there could be pitfalls.
TW

There was considerable discussion of requirements and Marilyn and Steve suggested that there were too many outside requirements. This is ~~adding~~ something that we must discuss at length and soon. Dave pointed out that the Math 181-182 (Math. for the Life Sciences) appears to be shaping up as the kind of thing we need. The needs for this and statistics pose great problems and I think we are going to have to give people a choice rather than having a single requirement. There was great student enthusiasm for the second-year course in Chemistry combining Organic and Biochemistry, which we have been stewing about for many years.

It was also agreed that we need to get a Departmental consensus and input from everyone on a Dept. plan. The strengths we have and where we need to fill them out. Where should we push and ~~where~~ what areas should not be emphasized. This covers both research and teaching. Dave suggests that the best way is for us to reach a consensus on this; send it out to the Faculty with the suggestion that they modify it if they see the need to. This would reduce the generalities that usually come out of this kind of discussion.

Be thinking about the whole thing and how different areas will interrelate. E.G., We can't have a taxonomic specialist in every field, but what are the ones that will strengthen areas that need pushing? Thus, Phycology would be of great importance for the Aquatic Biology program and for Microbiology in general, as well as for the Botany program.

Next meeting will be on Tuesday, March 30 at 4:00 1600 hrs., hopefully in Dave Roger's place.

Paul Winston

Feb. 27
Version

POTENTIAL QUESTIONS FOR
CURRICULUM DEVELOPMENT

Matric Number _____

CLASS: Freshman _____ Sophomore _____ Junior _____ Senior _____

General Area of Interest:

Anatomy _____

Behavior _____

Ecology _____

Genetics _____

Microbiology _____

Physiology _____

Why are you majoring in biology?

_____ General Interest

_____ Professional goals

_____ Concern for World problems

_____ I don't know

_____ I am not a major (what major are you?) _____

_____ Other (Please Specify) _____

What do you want to do when you get out?

_____ Medical, dental or nursing school

_____ Other medically related careers (i.e., med. tech., lab tech., etc.)

_____ Research related job outside of medicine

_____ Sales for pharmaceutical or medical equipment company

_____ Environmental impact and planning

_____ Water quality and treatment

_____ Food production and management

_____ Forestry, land, or wildlife management

_____ Teaching (What Level?) _____

_____ Graduate School (What Field?) _____

_____ Recreation and Conservation

_____ Other (Please Specify) _____

_____ Nothing Related to Biology

What is the main emphasis in the majority of laboratories you have taken?

_____ Laboratory Technique

_____ Re-enforcement of Lecture Material

_____ Presentation of New Material

_____ No Emphasis

How would you rate the success of the laboratory emphasis?

Excellent _____ Adequate _____ Poor _____ Unsuccessful _____

If you have had courses with field experience:

How were field techniques handled?

- ☐ Not enough techniques were presented
☐ Enough techniques were demonstrated but I would have like to practice doing them myself
☐ Enough techniques were presented and I was satisfied with the way they were presented

Would you like to have more courses with field experience? YES ☐ NO ☐

Do you feel competent to design and run a biology experiment?

Extremely ☐ Adequately ☐ Marginally ☐ Poorly ☐

How would you rate your EXPOSURE TO a relevant and up-to-date theoretical background in this department?

Superior ☐ Adequate ☐ Marginal ☐ Poor ☐

Do you feel you have been given a working UNDERSTANDING of the above theoretical background?

Superior ☐ Adequate ☐ Marginal ☐ Poor ☐

Did the Faculty:

Fulfill your expectations?	YES ☐	NO ☐
Raise your expectations?	YES ☐	NO ☐
Create new expectations?	YES ☐	NO ☐
Show you what you can do with your education?	YES ☐	NO ☐

Do you think the department should limit class sizes even though YOU may be closed out of courses? YES ☐ NO ☐

What do you think should be the maximum number of students per teacher for classes above the introductory level? _____

How would you rate the majority of lecture classes you have taken from the EPO Biology Department?

- ☐ Too little material covered
☐ Just Right
☐ Too much material covered

Would you prefer to have the lecture courses cover material in more detail even though it would mean more time and effort on your part? YES ☐ NO ☐

How would you describe the related courses in this department with respect to duplication of material?

- ☐ Too much duplication
- ☐ Only as much duplication as is necessary
- ☐ Not enough duplication to facilitate transfer from one course to another

Do you feel your education from this department will give you an advantage in obtaining a job or career?

- ☐ A great advantage
- ☐ Some advantage
- ☐ No advantage
- ☐ Will be a disadvantage

Do you feel competent to apply for a job with your degree from this Department? YES ☐ NO ☐

3/2

To The Long-Range Planning Committee: Dart, Fuller, Rogers, Segal, Telleen,
Winston

We started last week discussing the goals of the Curriculum, when we should have started on the Questionnaire. It engendered much discussion and I'm sending this out for you all to think about, chew on some more, and add your own definitions for our meeting on Tues. Mar. 3 in Room 211, Ramsley at 1600 hrs. Actually, the first item for discussion will be the questionnaire and then we'll get at the Report. If there is time we can worry about the Curriculum Goals. I just want them all out in front of us. Let us assume that there is a reasonable set of information, ideas, attitudes, and training that need to be given to the undergraduate students.

1. The basic "Principles of Biology" with enough facts to substantiate the principles.
2. An appreciation of the complexities of biological and environmental systems.
3. A good "scientific attitude", which should include the ability and inclination to question results and dogmas, and the need to search for the best answers to problems.
4. Some training in defining problems and then working out good research designs to solve them.
5. Some training in gathering data and analyzing them.
6. Within the framework of basic principles and fundamental research, we should give the students a feel for working on a problem-oriented piece of research (most of them will, later).
7. Some tools for using the basic Biology in a job. (Ag. and the old Engineering schools are examples of how purely practical course work leaves students inflexible and channelled, so we are certain that we can do better by them).

3/2

Steve Rogers : For the Development Committee - Nelson.

PROBABLE EFFECTS OF THE TEACHER CERTIFICATION ACT OF 1975
ON SCIENCE EDUCATION

Harold Anderson
January 15, 1976

This brief memo is intended to provide interested parties with information about some probable consequences of the passages of the Teacher Certification Act on science education. During the past two months, I attended meetings of the State Department of Education, where tentative decisions were reached concerning changes in the subject matter preparation of science teachers.

Prior to the present law, approval of programs of teacher education in this state was based on a comparison with the programs at five specified institutions including CU. In the past, programs of teacher education were approved by the State Board of Education upon recommendation by a visiting committee, whose criteria for making recommendations was not clearly specified. Under the provisions of the new law, institutions will be visited periodically and evaluated in terms of their compliance with the new standards. These standards are expected to be set by the State Board of Education after input from all levels of education. The Colorado State Board of Education will review the reports of the evaluating committees and approve individual institutional teacher education programs.

I am circulating this information to science department chairmen and a few interested professors in the expectation that consideration will be given to the requirements as science majors are revised. If there are undergraduates contemplating teaching as a career, this information may be important to them. As soon as I get the final criteria, I will circulate them to you.

The secondary teacher education program is an academic year operation from September to May, with students being admitted in February of the previous year. While there is little likelihood of the new criteria being enforced in 1976-77, the new requirements may well be in force by 1977-78.

The materials that follow are the decisions made at our last meeting, and will likely be accepted. Please be aware there is an endorsement for the area of science and for each specific science. A person may teach a subject area (e.g. physics) without the specific endorsement but placement is enhanced by having several endorsements. While we would like specific endorsements to be required, the small high schools would encounter serious problems.

If you have any questions, please feel free to call me at 492-7057. If beneficial, I will be happy to meet with departmental committees, etc.

HMA:csj

PROPOSED CERTIFICATION STANDARDS
REQUIRED BY TEACHER CERTIFICATION ACT OF 1975

Endorsement Area: Science

A candidate must have satisfied the following requirements:

- I. A bachelor's or higher degree from an accredited four-year degree granting institution of higher education.
- II. An approved program of study designed to develop competencies to a level normally attained in one year of study in each of the following areas:
 - A. General biology (including botanical & zoological content)
 - B. General chemistry
 - C. Earth science
 - D. Physics
 - E. Mathematics and applied computer science
- III. An applicant shall complete a concentration of preparation in a minimum of one of the following areas for specific endorsements.
 - A. Biology, emphasizing botanical and zoological content, which program shall include at least one course in lieu of these:
 1. Genetics
 2. Ecology
 3. Physiology
 4. Microbiology
 5. Bio or Organic chemistry
 - B. Chemistry, which program shall include preparation (may be one semester) in each of the following:
 1. physical chemistry
 2. organic
 3. quantity/quality
 4. math through calculus
 5. modern physics
 - C. Physics, which program shall include preparation in each of the following: (including some lab)
 1. modern physics
 2. computer science
 3. math including differential equations
 4. mechanics
 5. astronomy
 6. electronics
 - D. Earth-space science, which program shall include:
 1. astronomy
 2. meteorology
 3. geology, (both physical and historical components)
 4. conservation of resources
 5. plus study in two of the following:
 - a. physical geography
 - b. oceanography
 - c. mineralogy
 - d. stratigraphy

- E. Geology, which program shall include:
1. historical & physical geology
 2. geomorphology
 3. mineralogy
 4. earth resources
 5. study of any two of the following:
 - a. astronomy
 - b. oceanography
 - c. meteorology
 - d. stratigraphy
 - e. geography

Proposed certification standards required by Teacher Education Act of 1975, endorsement area: Science - Junior High. A candidate must have satisfied the following requirements:

- I. A bachelor's or higher degree from an accredited four-year degree granting institution of higher education.
- II. An approved program of study designed to develop competencies to a level normally attained in one-year of study in each of the following areas:
 - A. General biology, including botanical and zoological content.
 - B. General chemistry
 - C. Earth science
 - D. Physics
 - E. Mathematics
- III. The equivalent of eight semester hours of additional credit in three of the following four fields:
 - A. biological science
 - B. earth science
 - C. mathematics
 - D. physical science

UNIVERSITY OF COLORADO

BOULDER, COLORADO 80302

Department of Environmental,
Population and Organismic Biology

Dr. David Rogers
Hale 114

February 2, 1976

To: Pete List

Request for Revision in EPOB 101 and EPOB 102

It is our intention to separate the laboratory from general biology lecture because (1) we believe the particular laboratory experience offered is not necessary for students who do not plan to continue in biology courses (2) we can provide a better laboratory experience for fewer students taking the laboratory (3) we can reduce the cost of operating the course by reducing the number of graduate students required as teaching assistants. This new organization will allow the participation of all of our faculty in the teaching of introductory biology (EPOB 101, 102 and 202).

EPOB 101-3 General Biology. Three lect. per wk.

A concentrated introduction to molecular, cellular, genetic and evolutionary biology. Emphasis on fundamental principles, concepts, facts and questions. Primarily for students majoring in science. Students planning to take additional courses (especially EPOB 202) must take EPOB 110, General Biology Laboratory concurrently.

EPOB 102-3 General Biology. Three lect. per wk.

A concentrated introduction to organisms, development, homeostasis, behavior and ecology. For students not taking advanced courses in biology but will serve as prerequisite for selected advanced courses specifically designed for non-majors such as EPOB 201, 251, 283, 435.

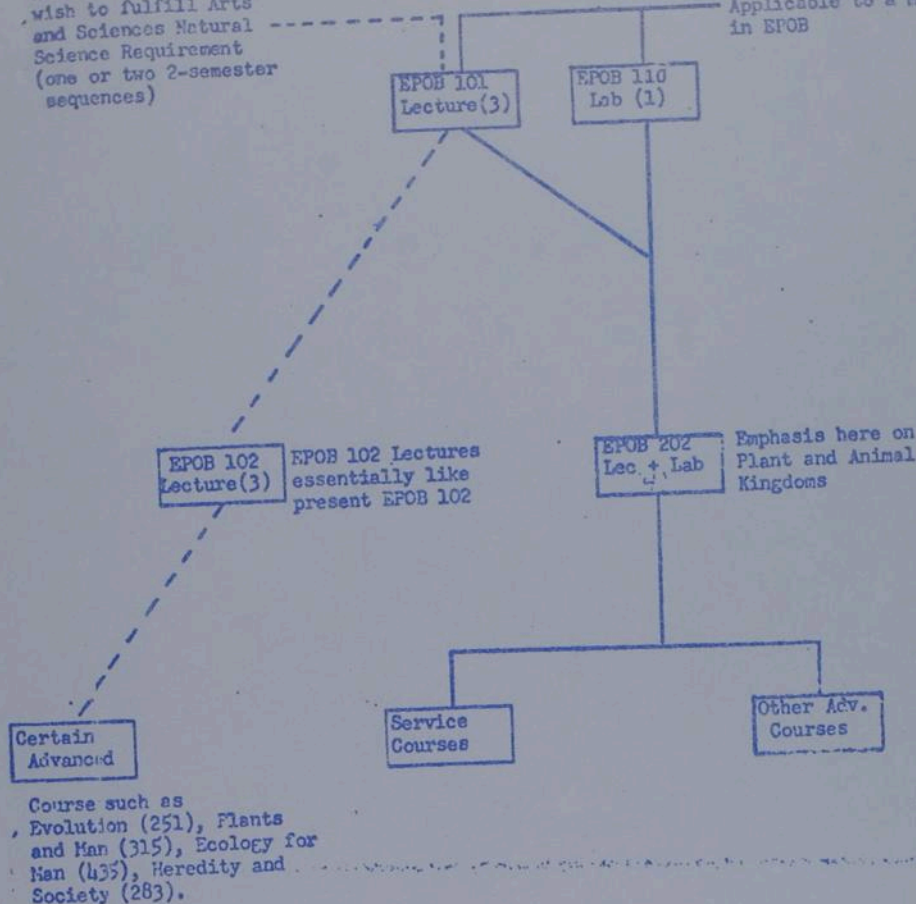
EPOB 110 General Biology Investigations
(Course proposal attached)

EPOB 202-4 Organismic Biology. Three lect per wk., 1 lab per wk.

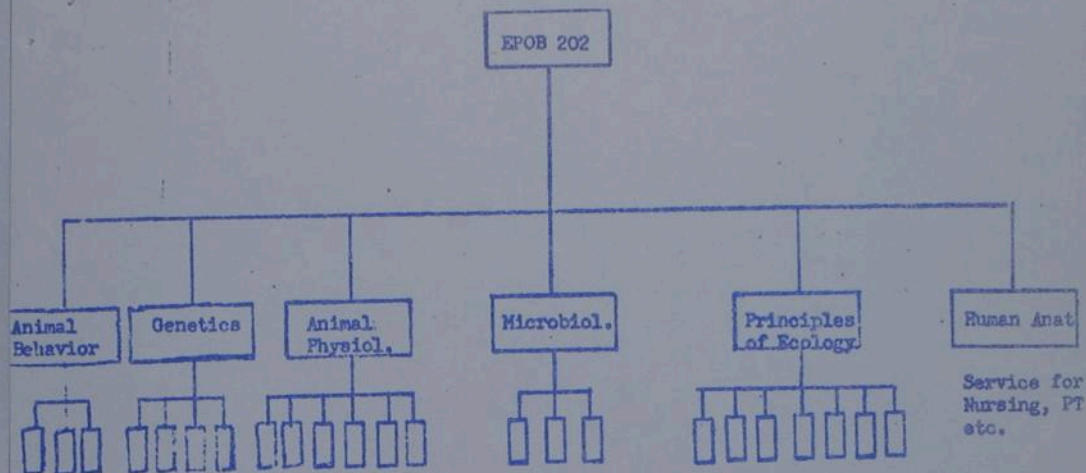
A comprehensive survey of lower plants, higher plants, invertebrates and vertebrates. Required of all EPOB majors and is prerequisite for all other courses in the Department (except where noted).
(Course proposal attached)

Non-majors who simply wish to fulfill Arts and Sciences Natural Science Requirement (one or two 2-semester sequences)

Advanced Course Work Applicable to a major in EPOB



200-300-400 Level Courses



Advanced 400/500-level courses leading directly from the above 300-level courses

In addition, there are many generalised courses included in the curriculum and small pathways not listed. For example, Plant Physiology and Advanced Plant Physiology course, various tax courses (Ornithology, Mammalogy, Invertebrate Zoology, etc.), aquatic biology courses etc.

TO: EPO Biology Faculty
FROM: D. W. Crumpacker
Subject: College Seminar Program

Date: February 16, 1976

Each of you recently received a document entitled "Marginal Literacy and the College Student" from Paul Levitt and Elissa Guralnick of the English Department. They are going to ask the faculty of the College of Arts and Sciences to institute a program designed to improve the writing ability of students by (1) requiring a minimum score of 450 on the verbal section of the SAT test for entrance to Arts and Sciences, (2) remedial courses in composition administered by Continuing Education, and (3) a College Seminar program.

The College Seminar program is one in which faculty from a wide variety of disciplines teach writing through assignments and readings in their own areas of interest. If this program is approved, I assume we will all have to take our turns in conducting seminars designed to teach students to write competently on biological topics.

We should consider the implications of this and then discuss it. In this way we will be better prepared to vote on the program later this spring, when it is put before the College faculty.

Dr. David Rogers
Hale 114

Feb. 17, 1976 *Version*

POTENTIAL QUESTIONS FOR
CURRICULUM DEVELOPMENT

Steve Toller
Lynn Fuller

CLASS: Freshman Sophomore Junior Senior

General Area of Interest: Ecology, Physiology, Genetics, Behavior, Anatomy, Microbiology,

Why are you majoring in biology?

- ☐ General interest
☐ Professional goals
☐ Concern for world problems
☐ I don't know
☐ Other (please specify) _____

What do you want to do when you get out?

- ☐ Medical, dental or nursing school
☐ Other medically related careers (ie. med. tech., lab tech., etc.)
☐ Sales for pharmaceutical or medical equipment company
☐ Environmental impact and planning
☐ Water quality and treatment
☐ Food production and management
☐ Forestry, land, or wildlife management
☐ Teaching
☐ Graduate school (what field) _____
☐ Don't know
☐ Research related job outside of medicine
☐ Other (please specify) _____

How would you rate the practical experience you have recieved from this department in laboratories?

- ☐ Superior
☐ Adequate
☐ Marginal
☐ Poor

How would you rate the practical experience you have recieved from this department in field areas?

- ☐ Superior
☐ Adequate
☐ Marginal
☐ Poor

How would you rate your EXPOSURE TO a relevant and up to date theoretical background in this department?

- ☐ Superior ☐ Adequate ☐ Marginal ☐ Poor

Do you feel you have been given a working UNDERSTANDING of the above theoretical background?

- ☐ Superior ☐ Adequate ☐ Marginal ☐ Poor

Do you think the department should limit class sizes even though you may be closed out of courses? ☐ Yes ☐ No

What do you think should be the maximum number of students per teacher for classes above the introductory level? _____

How would you rate the majority of classes you ~~have~~ taken from the EPO
Biology Department? ☐ Easy ☐ Just right ☐ Difficult

Would you prefer to have the courses cover more difficult material even
though it may mean more time and effort on your part? ☐ Yes ☐ No

How would you describe the related courses in this department with respect
to duplication of material?

- ☐ Too much duplication
- ☐ Only as much duplication as is necessary
- ☐ Not enough duplication to facilitate transfer from one course to another

Do you feel your education from this department will give you an advantage
in obtaining a job or career?

- ☐ A great advantage
- ☐ Some advantage
- ☐ No advantage
- ☐ Will be a disadvantage

We also talked about questions on curriculum requirements and course offerings
but we were not able to come up with specific questions of a form that
will generate easy to handle answers. Any suggestions will be appreciated.

To: The Faculty of EPOB

Report of the Curriculum Synthesis Subcommittee of the Development Committee
Rogers, Segal, Windell, Winston

This is a preliminary report in a way because we are writing up more material for the Proposal for the new building. Here are the proposed course changes and substitutions, the new courses, and those we recommend to be dropped. This last category is probably too small, and we feel strongly that the department should begin to look at the total number of courses offered with an eye to pruning. More about this later.

In the list of proposed courses we have done some juggling - partly for P.R. purposes, especially in terms of what substitutes for what. First, please don't begin by berating us - it will do no good. Second, try to look at the overall picture and try to see how things fit or don't fit into a picture. All of this is open for discussion and change, and we hope the criticism will be constructive.

The big thing still to come is working out some logical "streams" as guides for students and advisors. If you have any suggestions give them to Paul Winston.

The committee has tried to do some revising and some reorganization on the Dept. Curriculum without making really drastic changes. We have all felt under the gun for a long time to have more of a plan and we are going to have to make some decisions soon to get us out from under, at least partially. Also, we are not going to get enough space and faculty to do it all and we must decide where to cut and prune. In the main no sweeping changes are suggested but we are going to point out places where we feel that the Dept. must do some heavy thinking about what we can and can't afford to do.

First, the major changes will be explained and then we will present other aspects which must be discussed and decided on by the Dept. These are points that have come up from all over and then hashed over by the Committee, sometimes ad nauseum. In the suggested new courses we have not worked out all the details and ask that you not get sidetracked by small points. Let's look at the forest and hold the trees until later. We are going to need agreement (or not) on the broad philosophy of these changes first.

The first big change is to substitute a different course for Biology 102 for the Majors. This would be called 202 (or something else) and be a team-taught survey (possibly 5 hours) of the animals, microbes, and plants. There are several goals for this: (1) to get the students familiar with the major groups of organisms, (2) to give them a feel for the morphological bases of our understanding Evolution, and (3) to give them an introduction to the bases for Systematics. Majors would take 101 and then go into 202. Those who "pass" out of 101 would still take 202. Non-majors would take 102 as a terminal course. An anticipated objection is that those coming in to take courses without being majors would be at a disadvantage, but it seems that this just can't be helped. A student deciding to major after 102 would still have to take 202. There is such a strong feeling in the Dept. that the students need to be exposed to a strong dose of these subjects that this seemed to be the only solution. It is a compromise in that everyone feels that his or her own area surely needs a full semester (or 2) for a full and adequate treatment. It is our feeling that some of this is better than none and that the Principles involved are basically the same no matter what groups are being considered; that it is better given to majors alone rather than to the mixed groups of 102; that more detailed, intensive treatment should be reserved for advanced courses after the kids have had more background in Biology, which would point up to them the needs for this knowledge; and that we cannot require all majors to spend more time on specific areas than this. The advanced courses should then be available for those who need and want them. No one can say we don't have plenty of them.

The course would be team-taught by representatives from all sides of the fence. It is our feeling that this is the best solution to a big problem for us.

THE CORE REQUIREMENTS

The required core for Majors would be much like the present one: General Biology--101 and 202, Principles of Ecology--341, Essentials of Physiology--322, and Introductory Genetics--383. With the change to 202, the students would be introduced to four major fields of Biology, on which the advanced courses can build. See below for the changes in 341 and 322.

Ecology and Populations Biology

The Ecologists and many other interested people got together in the early Spring to try to work out some application of the plan that Carl Bock and others presented for the undergraduate instruction in this field. As four non-ecologists (almost) your committee suggests that there could be more agreement as to what should be done, but we have accepted the compromise that came out of that meeting. It is far from ideal and we would like to suggest that more time be spent profitably by those who are or will be teaching undergraduate courses in Ecology and Populations trying to work out the best pattern and techniques for teaching the undergraduates. For something so important, precious little time has been given to discussion by the group as a whole and we feel that this is necessary. It should not be "wasted time". We are far too large for each person to do just what he wants to do at the undergraduate level.

You all have received Carl's preliminary writeup on this but the final decisions of the group will be given here. A 4-hour course in Principles of Environmental Biology (2 hours of lecture, recitation, and a 3-hour lab). This is to be team-taught with lectures under 200 and labs at 20. The object here would be to present most of the basic principles to the students and "get it out of the way." At this time there is strong criticism that there is too much repetition of these principles from one course to another. Everyone knows that students need repetition, but ecological principles are deceptive in their complexity and it takes a long time for some people to realize this. A large number of small advanced courses has been proposed to get around this problem. These are divided into two groups--Advanced Environmental Biology I which would include the basic subjects and Advanced E.B. II to include the more Applied and technique-oriented areas. These would have a maximum of 20 students, one section, and would allow for real interchange between faculty and students. There would be 1 lecture and 2 labs, illustrating the philosophy that, after the students have been given the Principles, they most need to get into the lab and field and do something. There is agreement among many faculty members that they would be most willing to spend more contact hours this way than in courses with 60-100 students where there is still inadequate contact with the students. There would be no TA's for these small classes but adequate (?) permanent staff to take care of lab preps and the organizational details for field trips. There would be 8 of these courses taught each semester with a listing in the Schedule of the title and instructor. At present, the following have been suggested for these courses with a surplus from which 8 would be picked. This arrangement will make it flexible; faculty will not be locked into one subject but will be able to have some variety in the field. In addition, Plant Ecology and Limnology will be taught separately with 60 students and 3 lab sections in each.

Advanced Environmental Biology I

- Forest Ecology
- Grassland Ecology
- Tundra Ecology
- Vertebrate Ecology
- Insect Ecology
- Ecology of Flowering Plants
- Arctic and Alpine Environments
- Microbial Ecology
- Stream Biology
- Palynology and Environmental History
- Ecology of Arid Lands

Advanced Environmental Biology II

- Ecology of Water Pollution (with help from Civil Engineering)
- Environmental Law (with help from the Law School)
- Pesticides and Ecology
- Ecology of Natural Resource Management
- Environmental Assessment (with help from Engineering)
- Ecology of wildlife management systems (possibly with help from CSU)
- Biology of fish populations
- Applied Environmental Microbiology
- Soil microbiology
- Aquatic microbiology

Physiology

The proposed changes are less radical than the Ecologists' but there are some. First, the core course would be "Essentials of Physiology." This will be part plant, part animal, and part microbial. This is a large order, of course, but we feel that it can be done effectively. Plant and animal areas will be separated and taught by different people. They are so different that they come together only at the cellular level and this is where the students will get one dose of cell physiology. The cellular aspects will be worked in when they are needed rather than devoting a special section to the subject. An additional lot of cell physiology will come in with the microbial portion, especially certain biochemical aspects.

In this way students can be given a broad slug of Physiology which is not limited to "Plant or "Animal" or "Cell" in their first course. It is the kind of broad approach needed by those for whom it will be the only physiology course. We feel that it would be the best exposure to the subject for the ecologists who need a broader picture of the field than we are giving them now. The Principles and concepts of Physiology, and especially the attitudes of the physiologist can be presented in this way as well as in the more specialized framework we use now.

With this change we would have a separate course in Human Physiology (the name might have to be changed to keep down the numbers of premeds and such). This would be a service course primarily but one still open to selected majors to substitute for the core course.

The Physiology group has attempted to set things up to increase the offerings at the 400-level but in smaller, more restricted classes than are possible now. Cell Physiology would be dropped as such with the idea that the necessary cellular concepts will be introduced into the organismic Physiology

courses as the need for such treatment arises. It will have the added attraction of removing one glaring point that someone reviewing the Program might grasp and belabor, to the detriment of other, more important things. We can give our students what they need without having a course labelled with one of the titles of our sister Dept.

We are suggesting two new courses to contribute to the training of majors for jobs. One would be Techniques in Physiology and Anatomy and would be designed to give the background for working in a research lab. It would include for example, an introduction to Microtechnique. Many students want to go out to work in research labs and such; a basic course like this could cut down considerably on their on-the-job training and thus enhance their chances of getting the job in the first place. A second new course would be called Environmental Physiology and would be designed to help those going into areas where the physiological and medical effects of pollutants, drugs, additives, and such have to be evaluated. The people who have been and will be hired by Industry EPA, and other agencies are not going to have Ph.D.'s, (the two men working for the EPA out of Denver on this sort of thing have only B.A.'s) and we can help by giving our undergraduates and M.A.'s some practical background.

Microbiology Curriculum

The proposed microbiology curriculum is designed to broaden and integrate course offerings in this area of biological science in such a way as to reinforce the various other disciplines in the Department of EPO Biology. The following proposals are intended to accomplish this goal.

Procarvotic and Eucaryotic Microbiology

1. Expansion of the scope of microbiology by inclusion of all of the unicellular, microscopic organisms, i.e. both procaryotic and eucaryotic microorganisms. Following an introductory survey in the 202 course, it is proposed that the study of these two main groups be divided into a 2 semester sequence. The justification for this proposal is that a common methodology and ecology underlies both groups. Furthermore in recent years there is growing acceptance of the proposal to unite them in a third kingdom, the Protista. The first semester, involving the study of procaryotic microorganisms, would include the following orders: (a) the blue-green "algae", recently given the name Cyanobacteria; (b) the bacteria; (c) the rickettsia, the mycoplasma and the chlamydia, the smallest and simplest of living cells; (d) and the non-cellular viruses, the simplest of biological entities. The second semester would include the study of eucaryotic microorganisms: algae, protozoa and fungi. The present course offerings dealing separately with each of these special tasca would continue to be taught at an advanced level.

Aquatic and Soil Microbiology

2. Integration of microbiology with our expanded ecological program by including in the latter the sub-disciplines of aquatic and soil microbiology. Microbiology has an as yet unfulfilled contribution to make in the development of ecological science.

Infectious Diseases of man, other animals, and plants

3. Integration of the study of infectious diseases so as to include microbial diseases of plants, animals and man. The central theme of this proposed course would be a study of the host-parasite relationship as a unifying

concept, with equal emphasis being placed on the diverse manifestations of this phenomenon. As in the case of the other proposals in microbiology, this course would have to be team-taught. The present courses in Pathogenic Microbiology and Parasitology could be continued at an advanced level. However consideration should be given to the possibility of offering them as separate course sections of a broad course in infectious diseases.

4. Continuation of courses in Microbial Physiology and Immunobiology both to satisfy the needs of majors in microbiology and of majors in related biological disciplines.
5. Expansion of the offerings of advanced seminars in specialized aspects of the field of microbiology.

Quantitative Biology

It has long been obvious that the Dept. needs more mathematical and statistical material for the students (and faculty?). Several new courses have been proposed and we would like to suggest that a required course be set up at the 200 or 300 level comparable to Quantitative Methods in Biology. This could include Statistics, Research Design, Data Storage, and Data Manipulation.

*Proposed
Courses*

A list of the proposed courses follows with the changes, substitutions and some explanations. If we have left your favorites out, please let us know. Cross-listed courses and those taught elsewhere (e.g. Embryology) are not included, for the most part.

Number	Name	Remarks
101-4	General Biology	for all
102-4	General Biology	for non-majors
202-5	Advanced General Biology (note 1)	for all majors
219-3	Human Anatomy	a service course
251-2	Introduction to Evolution	for non-majors
283-3	Heredity and Society	for non-majors
300-1	Applications of Medical Technology	
-4	Prokaryotic Microbiology	} note 1 subst. for 301-4, Aquatic Botany 523-2, Algology 554-3, Morphology of Non-Vascular Plants 311-4
-4	Eucaryotic Microbiology	
303-4	Introduction to Entomology	
312-4	Morphology of Vascular Plants	
315-3	Plants and Man	
-4	Essentials of Physiology 749 3	subst. for 322-4 (in part), 423-4 (all majors to take this), 321-4 (in part)
-3	Human Physiology note 1	subst. for 322-4 (in part); mostly for non-majors
341-4	Principles of Environmental Biology (note 2)	some subst. for 443 (in part); all majors to take this

Number	Name	Remarks
383-3	Introductory Genetics	all majors to take this
400/500-3	Teaching Modern Biology	
405-2 } 406-2 }	Teaching Laboratory Biology I and II	
-3	Parasitology	w/302-3
408-3	Principles of Comparative Vertebrate Anatomy - Lecture (3) and Lab (2)	
411-5 (526)	Invertebrate Zoology	
414-3	Mycology	
418/518-3	Limnology <i>Lectures only</i>	
421/521-3	Dynamics of Mountain Ecosystems	
422-4	~~Evolutionary Biology~~ <i>Vertebrate Physiology</i>	
424-3	Introduction to Animal Behavior	
428/528-2	Laboratory in Animal Behavior	
-4	Plant Physiology	was 321-4 - same enrollment
-4	Microbial Physiology (Lecture and Lab)	was 561-3 and 568-2
-4	Comparative Invertebrate Phys- iology	was 543-3 and 544-3 should be 40/yr.)
-3	Animal Ecophysiology	new course - 40-60/yr.
-3	Plant Ecophysiology	was 621-3; 20-40/yr.
-4	Research Methods in Physiology and Anatomy <i>note 4</i>	new course; should be 40; was 565-3
-3	Applied Environmental Physi- ology <i>note 7</i>	new course; 40/yr.
-4	Immunobiology	was 549-3 and 550-2
430-4	Classification of Flowering Plants	
431-4	Insect Taxonomy	
432-3	Biology of Amphibians and Rep- tiles <i>e</i>	
433-2	Lab - Herpetology	
434-3	Ornithology	
435-2	Ecology for Man	
436-4	Infectious Diseases of Man, other Animals, and Plants <i>(note 5)</i>	was Pathogenic Microbiology
437/533-4	Mammology	

Number	Name	Remarks
438/538-3	Biometry	
-3	Survey of Quantitative Methods in Biology	was 505-3 (sect. 1)
-3	Problems in Biomathematics <i>note</i>	new course
441/541-4	Plant Ecology	
444/545-3	Comparative Endocrinology	
446/537-var.	Biological Field Studies	
451/579-3	Population Genetics	
460/560-2	Advanced Classification of Flowering Plants	
480/580-3	Plant Growth and Development in sterile culture	
483-4	Laboratory Genetics	
-3	Human Genetics <i>note</i>	new course
492-1-3	Independent Research in EPOB	
499-1-3	Independent Study	
4-3	<u>Advanced Environmental Biology I</u>	16 of these courses (8 from I and 8 from II) will be taught each year. Max 20 students/class. Animal Ecol. 443-4 is ~~cancelled~~ <i>substituted</i> was 522-3
	Forest Ecology	
	Grassland Ecology	
	Tundra Ecology	
	Vertebrate Ecology	
	Insect Ecology	
	Ecology of Flowering Plants	was 331-3
	Arctic and Alpine Environments	was 345-3
	Microbial Ecology	was 425-3
	Stream Biology	was 611-3 and 429-3
	Palynology and Environmental History	was 476/576-3
	Ecology of Arid Lands	
	<u>Advanced Environmental Biology II</u>	
4-3	Ecology of Water Pollution	was 523-2
	Environmental Law	
	Pesticides and Ecology	
	Ecology of Natural Resource Management	was 517-2
	Environmental Assessment	
	Ecology of Wildlife Management Systems	

Number	Name	Remarks
	Biology of Fish Populations	was 548-3
	Applied Environmental Micro- biology	was 201-3
	Soil Microbiology	
	Aquatic Microbiology	
505-var.	Advanced EPO Biology	
506(1-3)	Independent Study EPOB	
507(2-3)	Teaching Advanced Biology	
509-3	Concepts in Behavioral Genetics	
510-3	Avian Communities of Colorado and New Mexico	
511-3	Birds of the World	
512-3	Animal Geography	
519-2	Techniques in Aquatic Biology	
524-3	Tropical Biology and Insular Biogeography	
531-2	Peripatetic Biology	
539(1-3)	Independent Research in Environmental Biology	
-3	Benthic and Aufwuchs Biology	was 613-3
-3	Mammalian Physiology	new course
-3	Plant Nutrition	new course
562-3	Advanced Ethology	
553-3	Developmental Plant Anatomy	
555-3	Lichenology	
564-3	History of Biology	
569(1-3)	Independent Research in Organismic Biology	
573-3	Taximetrics	
575-3	Principles and Practice of Biological Taxonomy	
-3	Simulation and Modelling	new course
582-3	Advanced topics in Populations Genetics	
583-3	Ecological Genetics	
-3	Statistical Genetics	new course
-3	Cytogenetics	new course
-3	Plant Population Biology	new course
-3	Plant Biosystematics	new course

Number	Name	Remarks
599-var.	Independent Research in Population Biology	

Listing of Seminar Courses

Quantitative Ecology	624-2
Seminar in Ecology of Fungi	625-2
Seminar in Polar Ecology	626-2
Seminar in Adv. Insect Tasc.	627-2
Seminar in Adv. Vert. Ecol.	628-2
Seminar in Ecology and Business	629-2
Seminar in Environmental Biology	633-2
Seminar in Comparative Neurophysiology	641-2
Seminar in Environmental Physiology	642-2
Seminar in Endocrinology	643-2
Seminar in Reproductive Biology	652-2
Seminar in Dev. Physiology Concepts	653-2
Seminar in Vistas in Botany	654-2
Seminar in Ecoenergetics	655-2
Seminar in Spec. Topics in Microbiology	657-2
Seminar in Organismic Biology	663-2
Seminar in Ergonomics	664-2
Seminar in Population Studies	693-2
Seminar in Evolutionary Ecology	615-2
Seminar in Ecological Plant Physiology	621-2
Seminar in Reproductive Biology of Flowering Plants	651-2
Seminar in Applied Microbiology	662-2
Seminar in Evolution and Speciation	692-2
Seminar in Ecophysiology of Arctic and Alpine Plants	6__-2
Seminar in Biology of Social Insects	6__-2
Seminar in Microbial Systematics and Evolution	6__-2
Seminar in Research Design	6__-2
Seminar in Advanced Organismic Genetics	6__-2
Seminar in Human Behavioral Genetics	6__-2
Seminar in Plant Evolution and Biogeography	6__-2
Seminar in Physiology of Special Groups	6__-2
Seminar in Advanced Ethology	6__-2

February 10, 1976

To EPO Biology Botanists:

The botanists concerned with the teaching of "Lower Plants" and "Higher Plants" in the proposed 202 course have met at the instigation of the designated coordinators (Shushman and Bonde, resp.) to begin the planning required.

Several initial conclusions were reached:

1. We need to know as soon as possible what subject matter concerning plants will be specifically covered in 101 before we can do much further planning.
2. We view 202 as a survey of the plant and animal kingdoms, at least the first year, with appropriate anatomical, morphological, ecological, and evolutionary features considered as time permits.
3. Even if we botanists teach sections of 250 students in General Biology in addition to our present courses (which we of course cannot do), we still will fail to meet what may be considered a "full load" in terms of SCH. We continue to object to this highly unfair measure of teaching contribution.
4. It appears from the information available that majors taking the 101-202 pathway will not be given any ecology, embryology, physiology, or behavior.
5. Pat Webber has kindly agreed to be chairman of both these plant committees so that we may have maximal coordination in our planning phases.

Any comments and suggestions from botanists not present at this meeting will be welcomed.

Erik

Erik Bonde
Secretary pro tempore

P.S. Who, or what, is Pete List?

Nov. 13, 1975

Paul-

I was asked by Wilson if we could take up the problem of keeping up with our alumni in our committee. I said I would take it up with you and Willie at our next meeting.

I made one suggestion on this topic - that there is a whole organization on campus - the Alumni Center - that is supposed to handle such matters. But apparently these people don't know much about what each alumnus is doing, and that is what Wilson wants to know about.

Let's talk about it - okay?

Dave

Long Range Planning Committee

(formerly - Development Committee - Now Subcommittee for Development)

Next meeting will be on 18 November, 4 p.m. in Ramaley 211.

We'll continue looking at the curriculum as a means of instituting and implementing Departmental Goals.

Two aspects of this for us to concentrate on for a shorttwhile are (1) the things the curriculum can do for the student, and (2) how can we make it better for them to get jobs? We will have some extra brins to add input and we can always use that.....

I am looking forward to it.

Paul Winston

cc: ✓ Rogers
Segal
Talleen
Dart
Michele Pelanne

Paul -
Some comments
on your report. E.N.
Subcommittee of the Development Committee

How is used credit transferred for advanced placement?
do they still get 6 hrs credit but must take 202? Or do we give only 3 hrs credit?
for majors but 6 for non-majors??
Student previously at 103-104 would also take 202?

The first big change is to substitute a different course for Biology 102 for the Majors. This would be called 202 (or something else) and be a team-taught survey (possibly 5 hours) of the animals, microbes, and plants. There are several goals for this: (1) to get the students familiar with the major groups of organisms, (2) to give them a feel for the morphological bases of our understanding Evolution, and (3) to give them an introduction to the bases for Systematics. Majors would take 101 and then go into 202. Those who "pass" out of 101 would still take 202. Non-majors would take 102 as a terminal course. An anticipated objection is that those coming in to take courses without being majors would be at a disadvantage, but it seems that this just can't be helped. A student deciding to major after 102 would still have to take 202. There is such a strong feeling in the Dept. that the students need to be exposed to a strong dose of these subjects that this seemed to be the only solution. It is a compromise in that everyone feels that his or her own area surely needs a full semester (or 2) for a full and adequate treatment. It is our feeling that some of this is better than none and that the Principles involved are basically the same no matter what groups are being considered; that it is better given to majors alone rather than to the mixed groups of 102; that more detailed, intensive treatment should be reserved for advanced courses after the kids have had more background in Biology, which would point up to them the needs for this knowledge; and that we cannot require all majors to spend more time on specific areas than this. The advanced courses should then be available for those who need and want them. No one can say we don't have plenty of them.

The course would be team-taught by representatives from all sides of the fence. It is our feeling that this is the best solution to a big problem for us.

THE CORE REQUIREMENTS

The required core for Majors would be much like the present one: General Biology--101 and 202, Principles of Ecology--341, Essentials of Physiology--322, and Introductory Genetics--383. With the change to 202, the students would be introduced to four major fields of Biology, on which the advanced courses can build. See below for the changes in 341 and 322.

Ecology and Populations Biology

The Ecologists and many other interested people got together in the early Spring to try to work out some application of the plan that Carl Bock and others presented for the undergraduate instruction in this field. As four non-ecologists (almost) your committee suggests that there could be more agreement as to what should be done, but we have accepted the compromise that came out of that meeting. It is far from ideal and we would like to suggest that more time be spent profitably by those who are or will be teaching undergraduate courses in Ecology and Populations trying to work out the best pattern and techniques for teaching the undergraduates. For something so important, precious little time has been given to discussion by the group as a whole and we feel that this is necessary. It should not be "wasted time". We are far too large for each person to do just what he wants to do at the undergraduate level.

You all have received Carl's preliminary writeup on this but the final decisions of the group will be given here. A 4-hour course in Principles of Environmental Biology (2 hours of lectures, recitation, and a 3-hour lab). This is to be team-taught with lectures under 200 and labs at 20. The object here would be to present most of the basic principles to the students and "get it out of the way." At this time there is strong criticism that there is too much repetition of these principles from one course to another. Everyone knows that students need repetition, but ecological principles are deceptive in their complexity and it takes a long time for some people to realize this. A large number of small advanced courses has been proposed to get around this problem. These are divided into two groups--Advanced Environmental Biology I which would include the basic subjects and Advanced E.B. II to include the more Applied and technique-oriented areas. These would have a maximum of 20 students, one section, and would allow for real interchange between faculty and students. There would be 1 lecture and 2 labs, illustrating the philosophy that, after the students have been given the Principles, they most need to get into the lab and field and do something. There is agreement among many faculty members that they would be most willing to spend more contact hours this way than in courses with 60-100 students where there is still inadequate contact with the students. There would be no TA's for these small classes but adequate (?) permanent staff to take care of lab preps and the organizational details for field trips. There would be 8 of these courses taught each semester with a listing in the Schedule of the title and instructor. At present, the following have been suggested for these courses with a surplus from which 8 would be picked. This arrangement will make it flexible; faculty will not be locked into one subject but will be able to have some variety in the field.

In addition, Plant Ecology and Limnology will be taught separately with 60 students and 3 lab sections in each.

Advanced Environmental Biology I

Forest Ecology
Grassland Ecology
Tundra Ecology
Vertebrate Ecology
Insect Ecology
Ecology of Flowering Plants
Arctic and Alpine Environments
Microbial Ecology
Stream Biology
Palynology and Environmental History
Ecology of Arid Lands

Advanced Environmental Biology II

Ecology of Water Pollution (with help from Civil Engineering)
Environmental Law (with help from the Law School)
Pesticides and Ecology
Ecology of Natural Resource Management
Environmental Assessment (with help from Engineering)
Ecology of wildlife management systems (possibly with help from CSU)
Biology of fish populations
Applied Environmental Microbiology
Soil microbiology
Aquatic microbiology

Physiology

The proposed changes are less radical than the Ecologists' but there are some. First, the core course would be "Essentials of Physiology." This will be part plant, part animal, and part microbial. This is a large order, of course, but we feel that it can be done effectively. Plant and animal areas will be separated and taught by different people. They are so different that they come together only at the cellular level and this is where the students will get one dose of cell physiology. The cellular aspects will be worked in when they are needed rather than devoting a special section to the subject. An additional lot of cell physiology will come in with the microbial portion, especially certain biochemical aspects.

In this way students can be given a broad slug of Physiology which is not limited to "Plant or "Animal" or "Cell" in their first course. It is the kind of broad approach needed by those for whom it will be the only physiology course. We feel that it would be the best exposure to the subject for the ecologists who need a broader picture of the field than we are giving them now. The Principles and concepts of Physiology, and especially the attitudes of the physiologist can be presented in this way as well as in the more specialized framework we use now.

With this change we would have a separate course in Human Physiology (the name might have to be changed to keep down the numbers of premeds and such). This would be a service course primarily but one still open to selected majors to substitute for the core course.

The Physiology group has attempted to set things up to increase the offerings at the 400-level but in smaller, more restricted classes than are possible now. Cell Physiology would be dropped as such with the idea that the necessary cellular concepts will be introduced into the organismic Physiology

I still believe such an introductory course will satisfy more - will the student buy 3 textbooks? Treatments will be superficial I suspect. Would mention both pro & con argotes?

courses as the need for such treatment arises. It will have the added attraction of removing one glaring point that someone reviewing the Program might grasp and belabor, to the detriment of other, more important things. We can give our students what they need without having a course labelled with one of the titles of our sister Dept.

We are suggesting two new courses to contribute to the training of majors for jobs. One would be Techniques in Physiology and Anatomy and would be designed to give the background for working in a research lab. It would include for example, an introduction to Microtechniques. Many students want to go out to work in research labs and such; a basic course like this could cut down considerably on their on-the-job training and thus enhance their chances of getting the job in the first place. A second new course would be called Environmental Physiology and would be designed to help those going into areas where the physiological and medical effects of pollutants, drugs, additives, and such have to be evaluated. The people who have been and will be hired by Industry EPA, and other agencies are not going to have Ph.D.'s, (the two men working for the EPA out of Denver on this sort of thing have only B.A.'s) and we can help by giving our undergraduates and M.A.'s some practical background.

Microbiology Curriculum

The proposed microbiology curriculum is designed to broaden and integrate course offerings in this area of biological science in such a way as to reinforce the various other disciplines in the Department of EPO Biology. The following proposals are intended to accomplish this goal.

Procarvotic and Eucaryotic Microbiology

1. Expansion of the scope of microbiology by inclusion of all of the unicellular, microscopic organisms, i.e. both procarvotic and eucaryotic microorganisms. Following an introductory survey in the 202 course, it is proposed that the study of these two main groups be divided into a 2 semester sequence. The justification for this proposal is that a common methodology and ecology underlies both groups. Furthermore in recent years there is growing acceptance of the proposal to unite them in a third kingdom, the Protista. The first semester, involving the study of procarvotic microorganisms, would include the following orders: (a) the blue-green "algae", recently given the name Cyanobacteria; (b) the bacteria; (c) the rickettsia, the mycoplasma and the chlamydia, the smallest and simplest of living cells; (d) and the non-cellular viruses, the simplest of biological entities. The second semester would include the study of eucaryotic microorganisms: algae, protozoa and fungi. The present course offerings dealing separately with each of these special tasca would continue to be taught at an advanced level.

Aquatic and Soil Microbiology

2. Integration of microbiology with our expanded ecological program by including in the latter the sub-disciplines of aquatic and soil microbiology. Microbiology has an as yet unfulfilled contribution to make in the development of ecological science.

Infectious Diseases of man, other animals, and plants

3. Integration of the study of infectious diseases so as to include microbial diseases of plants, animals and man. The central theme of this proposed course would be a study of the host-parasite relationship as a unifying

concept, with equal emphasis being placed on the diverse manifestations of this phenomenon. As in the case of the other proposals in microbiology, this course would have to be team-taught. The present courses in Pathogenic Microbiology and Parasitology could be continued at an advanced level. However consideration should be given to the possibility of offering them as separate course sections of a broad course in infectious diseases.

4. Continuation of courses in Microbial Physiology and Immunobiology both to satisfy the needs of majors in microbiology and of majors in related biological disciplines.
5. Expansion of the offerings of advanced seminars in specialized aspects of the field of microbiology.

Quantitative Biology

It has long been obvious that the Dept. needs more mathematical and statistical material for the students (and faculty?). Several new courses have been proposed and we would like to suggest that a required course be set up at the 200 or 300 level comparable to Quantitative Methods in Biology. This could include Statistics, Research Design, Data Storage, and Data Manipulation.

A list of the proposed courses follows with the changes, substitutions and some explanations. If we have left your favorites out, please let us know. Cross-listed courses and those taught elsewhere (e.g. Embryology) are not included, for the most part.

Number	Name	Remarks
101-4	General Biology	for all
102-4	General Biology	for non-majors
202-5	Advanced General Biology	for all majors
219-3	Human Anatomy	a service course
251-2	Introduction to Evolution	~~for non-majors~~
283-3	Heredity and Society	for non-majors
300-1	Applications of Medical Technology	
-4	Prokaryotic Microbiology	subst. for 301-4, Aquatic Botany 523-2, Algology 554-3, Morphology of Non-Vascular Plants 311-4
-4	Eucaryotic Microbiology	
303-4	Introduction to Entomology	
312-4	Morphology of Vascular Plants	
315-3	Plants and Man	
-4	Essentials of Physiology	subst. for 322-4 (in part), 423-4 (all majors to take this), 321-4 (in part)
-3	Human Physiology	subst. for 322-4 (in part); mostly for non-majors
341-4	Principles of Environmental Biology	some subst. for 443 (in part); all majors to take

Should not be a course for non majors but for majors!

Fifth grade!

Number	Name	Remarks
383-3	Introductory Genetics	all majors to take this
400/500-3	Teaching Modern Biology	
405-2 406-2 }	Teaching Laboratory Biology I and II	
-3	Parasitology	w/302-3
408-3	Principles of Comparative Vertebrate Anatomy - Lecture (3) and Lab (2)	
411-5 (526)	Invertebrate Zoology	
414-3	Mycology	
418/518-3	Limnology	
421/521-3	Dynamics of Mountain Ecosystems	
422-4	Vertebrate Physiology	
424-3	Introduction to Animal Behavior	
428/528-2	Laboratory in Animal Behavior	
-4	Plant Physiology	was 321-4 - same enrollment
-4	Microbial Physiology (Lecture and Lab)	was 561-3 and 568-2
-4	Comparative Invertebrate Physi- ology	was 543-3 and 544-3 should be 40/yr.)
-3	Animal Ecophysiology	new course - 40-60/yr.
-3	Plant Ecophysiology	was 621-3; 20-40/yr.
-4	Research Methods in Physiology and Anatomy	new course; should be 40; was 565-3
-3	Applied Environmental Physi- ology	new course; 40/yr.
-4	Immunobiology	was 549-3 and 550-2
430-4	Classification of Flowering Plants	
431-4	Insect Taxonomy	
432-3	Biology of Amphibians and Rep- tiles	
433-2	Lab - Herpetology	
434-3	Ornithology	
435-2	Ecology for Man	
436-4	Infectious Diseases of Man, other Animals and Plants	was Pathogenic Microbiology
437/533-4	Mammalogy	

Number	Name	Remarks
438/538-3	Biometry	
-3	Survey of Quantitative Methods in Biology	was 505-3 (sect. 1)
-3	Problems in Biomathematics	new course
441/541-4	Plant Ecology	
444/545-3	Comparative Endocrinology	
446/537-var.	Biological Field Studies	
451/579-3	Population Genetics	
460/560-2	Advanced Classification of Flowering Plants	
480/580-3	Plant Growth and Development in sterile culture	
483-4	Laboratory Genetics	
-3	Human Genetics	new course
492-1-3	Independent Research in EPOB	
499-1-3	Independent Study	
	<u>Advanced Environmental Biology I</u>	16 of these courses (8 from I and 8 from II) will be taught each year. Max 20 students/class. Animal Ecol. 443-4 is submitted. was 522-3
	Forest Ecology	
	Grassland Ecology	
	Tundra Ecology	
	Vertebrate Ecology	
	Insect Ecology	
	Ecology of Flowering Plants	was 331-3
	Arctic and Alpine Environments	was 345-3
	Microbial Ecology	was 425-3
	Stream Biology	was 611-3 and 429-3
	Palynology and Environmental History	was 476/576-3
	Ecology of Arid Lands	
	<u>Advanced Environmental Biology II</u>	
	Ecology of Water Pollution	was 523-2
	Environmental Law	
	Pesticides and Ecology	
	Ecology of Natural Resource Management	was 517-2
	Environmental Assessment	
	Ecology of Wildlife Management Systems	

Number	Name	Remarks
	Biology of Fish Populations	was 548-3
	Applied Environmental Microbiology	was 201-3
	Soil Microbiology	
	Aquatic Microbiology	
505-var.	Advanced EPO Biology	
506(1-3)	Independent Study EPOB	
507(2-3)	Teaching Advanced Biology	
509-3	Concepts in Behavioral Genetics	
510-3	Avian Communities of Colorado and New Mexico	
511-3	Birds of the World	
512-3	Animal Geography	
519-2	Techniques in Aquatic Biology	
524-3	Tropical Biology and Insular Biogeography	
531-2	Peripatetic Biology	
539(1-3)	Independent Research in Environmental Biology	
-3	Benthic and Aufwuchs Biology	was 613-3
-3	Mammalian Physiology	new course
-3	Plant Nutrition	new course
562-3	Advanced Ethology	
553-3	Developmental Plant Anatomy	
555-3	Lichenology	
564-3	History of Biology	
569(1-3)	Independent Research in Organismic Biology	
573-3	Taximetrics	
575-3	Principles and Practice of Biological Taxonomy	
-3	Simulation and Modelling	new course
582-3	Advanced topics in Populations Genetics	
583-3	Ecological Genetics	
-3	Statistical Genetics	new course
-3	Cytogenetics	new course
-3	Plant Population Biology	new course
-3	Plant Biosystematics	new course

507
Should be
limited to
grads only -
do we have a
double listing??

Should be 599 to be
consistent with
University of
departments

put all three of
these research
courses together
in numbering
like 595-596-597
or something

new
599

Good 23 course
and semi 32

Number	Name	Remarks
599-var.	Independent Research in Population Biology	

Listing of Seminar Courses

Quantitative Ecology	624-2
Seminar in Ecology of Fungi	625-2
Seminar in Polar Ecology	626-2
Seminar in Adv. Insect. Tasc.	627-2
Seminar in Adv. Vert. Ecol.	628-2
Seminar in Ecology and Business	629-2
Seminar in Environmental Biology	633-2
Seminar in Comparative Neurophysiology	641-2
Seminar in Environmental Physiology	642-2
Seminar in ^{Vertebrate} Endocrinology	643-2
Seminar in ^A Reproductive Biology	652-2
Seminar in Dev. Physiology Concepts	653-2
Seminar in Vistas in Botany	654-2
Seminar in Ecoenergetics	655-2
Seminar in Spec. Topics in Microbiology	657-2
Seminar in Organismic Biology	663-2
Seminar in Ergonomics	664-2
Seminar in Population Studies	693-2
Seminar in Evolutionary Ecology	615-2
Seminar in Ecological Plant Physiology	621-2
Seminar in Reproductive Biology of Flowering Plants	651-2
Seminar in Applied Microbiology	662-2
Seminar in Evolution and Speciation	692-2
Seminar in Ecophysiology of Arctic and Alpine Plants	6__-2
Seminar in Biology of Social Insects	6__-2
Seminar in Microbial Systematics and Evolution	6__-2
Seminar in Research Design	6__-2
Seminar in Advanced Organismic Genetics	6__-2
Seminar in Human Behavioral Genetics	6__-2
Seminar in Plant Evolution and Biogeography	6__-2
Seminar in Physiology of Special Groups	6__-2
Seminar in Advanced Ethology	6__-2

Examples of 5 hours for Physiologically oriented undergrads.
all take the core which = 20 hours at the moment.

Animal Physiology - Human-Mammalian oriented.

Comparative Vertebrate Physiology - 4

↓
Microbial Physiology - 4

Vertebrate Embryology - 4

Cell + Tissue Biology - 4

Biochemistry - 4

Microbiology - 4

This counts up to 44 hours
of Biochem in total so far -
it would be 40.

Also need - Comp. Vert. Anat.

Ecological Animal Physiology

Comparative Invert. Physiology - 4

↓
Animal Ecophysiology - 4

41 hours

Microbiology - 4

Advanced Ecology - 2 courses - 6
1 course in Biology of Special
groups. 3

Environmental Physiologist

Comp. Vertebrate Physiology - 4

Microbial Physiology - 4

Applied Environmental Physiol. - 3

Microbiology - 4

2 courses in Appl. Ecology - 3

38 hrs.

~~Quantitative Biology~~
~~Quantitative~~ Biology

100

200

300

400

Survey of Quantitative Methods in Biology
Biometry + Research Design
Problems in Biomathematics

500

Quantitative Ecology
Taximetrics
Simulation & Modelling

1

600

Research Design

General Biology

100 General Biology 101 (for all).
General Biology 102 (non-majors)
General Biology 202 Majors ^{4th} Bot + Zool.

200 - —

300. ~~Teaching~~ —

400.
Teaching Laboratory Biology
Independent Research in Biology
Independent Study in Biology
Teaching Modern Biology

500

History of Biology
Peripatetic Biology
Advanced Biology (505-var.)
Teaching advanced Biology Lab
Independent Study in Biology

Biocytinetics

Principles & Practice of Biological Teaching

600- Seminars in all areas

Genetics & Evolution

- 200- Heredity & Society
Introduction to Evolution
- 300 Introductory Genetics
- 400 Behavioral Genetics
Human Genetics
Genetics Laboratory
- 500 Statistical Genetics
Cytogenetics
Population Genetics
Ecological Genetics
Plant Population Biology
Advanced Topics in Population Genetics
Modern Theories of Evolution
Ind. Research in Pop. Biology
- 600 Evolution & Speciation
Plant Evolution & Biogeography
Advanced Topics in Population Genetics
Advanced Palynology
Human Behavioral Genetics
Advanced Organismic Genetics

300

~~Ecology~~
Ecology
Principles of Environmental Biology

400.

Plant Ecology
Ecology for man
Limnology
Techniques in Aquatic Biology
Mountain Ecosystems

Advanced Ecology I

Desert Ecology
Grassland Ecology
Tundra Ecology
Forest Ecology
Vertebrate Ecology
Insect Ecology
Advanced Ecology of
Flowering Plants
Aquatic Ecology
Microbial Ecology
Stream Biology

Advanced Ecology II

Water Pollution
Environmental Law
Pesticides & Ecology
Ecology of Natural Resources
Environmental assessment
Wildlife Ecology
Fisheries Ecology
Applied Microbial Ecology
Environmental Measurement & Control

500

Animal Geography
Tropical Biology & Insular Biogeography
Adrian Communities of Colorado & New Mexico
Independent Research in Environmental Biology

Functional Biology

300 - Essentials of Physiology ($\frac{1}{3}$ Cell $\frac{1}{3}$ Plant $\frac{1}{3}$ animal)

Human Physiology
Applications of Med. Technology

400.

Plant Physiology
Microbial Physiology
(Comp.) Vertebrate Physiology
Comp. Invertebrate Physiology
Animal Ecophysiology
Plant Ecophysiology
Research Methods in Physiology + Anatomy
Applied Environmental Physiology
Immunobiology

Behavioral
Biology
Lab. in An. Behav.

501

Plant nutrition
Comparative Endocrinology
Mammalian Physiology
Plant Growth + Devel.
in sterile culture
Indep. Research in Org. Biol.

Advanced
Ethology

600.

Reproductive Biology of Flowering plants
Physiology of special groups
Reproductive Biology of Vertebrates

- 200- Human Anatomy
- 300- { Prokaryotic Microbiology
 { Eucaryotic Microbiology
 Introduction to Entomology
 Morphology of Vascular Plants
 Plants + Man
- { Host-Parasite Relationships
 { Infectious diseases of plants, animals, + Man
 { Animal Parasitology
- 400- Invertebrate Zoology
 Comparative Vertebrate Anatomy (Heart + Lungs)
 Classification of Flowering Plants
 Herpetology - Rept + Amph
 Ornithology
 Insect Taxonomy
- 500- Developmental Plant Anatomy
 Lichenology
 Mycology
 Mammalogy
 Advanced Palaeontology
 Birds of the World
-
- 600- Special Topics in Microbiology
 Advanced Insect Taxonomy

Objectives--divided into 3 categories (a) general, (b) undergraduate, (c) graduate.

(a) General

1. To provide a thorough grounding (both theoretical and practical) in the areas of the department's responsibility for environmental, organismic, and population biology.
2. To provide several curricular options within the above framework of disciplines.
3. To give the student a life-long vocational opportunity, at the same time providing the student with a well-rounded liberal arts education.
4. To be certain that the student has become acquainted with the most impressive human problems of the environment, population explosion, food and nutritional problems, and has some capabilities to work towards solutions of these problems.

(b) Undergraduate

1. To insure the student an understanding of the principles of the major biological disciplines (genetics, physiology, morphology, anatomy, ecology, taxonomy, and behavior, even though not every biological discipline is represented by a faculty member.
2. To assure that the student is given the most modern understanding of quantitative methods in biology, as well as computerized data management techniques.
3. To provide several curricular options in ecology, physiology, microbiology, genetics, ethology, and taxonomy.

(c) Graduate

1. To provide masters or doctoral degrees in selected areas of the department's strength.
2. To ascertain that the student is given broad principles in several selected directions, and that the student has an interdisciplinary understanding for problem-solving.

3. To emphasize the department's strong capabilities in quantitative or descriptive microbial, plant, or animal ecology, aquatic biology, economic botany, plant and animal physiology, morphology and taxonomy of special groups.

Oct 13, '75

Paul--Here's a summary of what I think we said last time.

Dave

We spent most of the time on generalities about objectives for the department, but we did suggest that there be different sets of objectives in our curriculum. These different sets are related to undergraduate and graduate curricula. In the undergraduate area, our service courses to the University must be so oriented as to give any student a feeling of respect for all living things; to give students more understanding about requirements for living things (remember Willie's discussion about running an aquarium?); to give students an understanding of the diversity of living things, etc., etc.

The remaining undergraduate curriculum (aside from the service areas, and more in line with an undergraduate major) we must try to give a balanced program, though not try to cover all things biological. In this vein, we must not try to have a faculty member for each variation in biological discipline, but expect that understandings of the major disciplines can be achieved by a well-balanced mix of presently offered courses. That is, a student can gain something about the various disciplines--genetics, physiology, taxonomy, ecology, etc., by proper guidance. No student, in his undergraduate program, should escape without at least one introductory course in each of the disciplines, no matter whether he be desirous of being an ecologist, or what.

We further discussed the requirement that our students be well-grounded in quantitative methods, and that all students should have some core courses in math applications and in computing.

Can't think of anything more at the moment, but if I have discerned the meaning of our last meeting, then we have, herein, the basis for discussions continuing.

OGT 0 3 1975

To: Executive Committee

From: Subcommittee on Development
Rogers, Segal, Winston

The Subcommittee has met once and plans to meet regularly. This is a report on some of the ideas we discussed at that time. We feel that the best way to serve the Executive Committee is by the formulation of long-range goals and objectives for the Department to consider. By working with all members one or two at a time as we did on the Curriculum Revision, we can bring everyone into it. Because of the extended, continuing nature of this effort, we would like to suggest that the name be changed to Subcommittee for Long-Range Planning.

It is necessary for us to have a clear set of objectives - something not easy to come by in such a diverse group and such a broad subject. When we deal with University administrators, legislators, and government officials, it would be most advantageous for us to have something solid to say to them. The same statement of goals would help in our dealings with the Public, with students, and above all with ourselves. We need to be able to present plans and proposals to the outside, which will implement and strengthen a known set of objectives. This would be our strongest front to the world - something we have only recently begun to show.

Such a set of objectives would not be a rigid formula to be maintained forever but more like a set of solid hypotheses which must be constantly tested and examined. We have some time (3-4 years) to refine these and to develop the curriculum to fit our new facilities. We have a good start, but only a start, on the Curriculum and much remains to be done.

The Curriculum forms the central core of the Department and is the best framework on which to form our objectives.

Please comment + return
Paul

9/26/75

Paul:

Here are some of my ideas that you might use in a report to the Ex. Comm. on the "development" subcommittee.

1. Perhaps a substitution of titles for our work would be appropriate--long range planning, rather than development.

2. One of our tasks is to formulate a set of objectives for the department in its functions, particularly with regard to the curriculum. The purpose of formulating the objectives is to give a clear picture to others what we in the department can do, hope to do, how much of biology we intend to cover, (and what not), more to guide orderly development than to restrict any part. The objectives will be useful to guide students, to aid in proper selection of new faculty, and give the administration some knowledge of what the department is and intends to be.

3. This work is derived from the considerations that have already been made on the curriculum, and new considerations of curricular needs. Remember that we have a about 3-4 years before we move to the new quarters, and we should have things well-ordered by that time. It might be well to give the administration a run-down on our aspirations, telling them that the department is now fully anticipating the new building, and expending considerable energy to merge our pedagogical activities to facilities--so the administration won't let us down by putting our building priority down.

4. This subcommittee could serve the Ex. Com. by considering some of the long-range needs, in advance of the time when the long-range needs become immediate requirements.

Dave

DATE RECEIVED: SEP 15 1975

Routing:

		<u>Initial</u>
Abbott, Lois	_____	_____
April, Jay	_____	_____
Bailey, Mark	_____	_____
Bishop, Judy	_____	_____
Hanley, Jim	_____	_____
Hersh, Gil	_____	_____
Louis, Joan	_____	_____
McArthur, Greg	_____	_____
Mount, Janet	_____	_____
Rogers, Connie	_____	_____
Rogers, Dave	_____	_____
Saldana, Jose	_____	_____
Schiffman, R.	_____	_____
Slater, Chuck	_____	_____
von Borstell, G.	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Filing:

Original ? _____

Copies: _____

In

Out

Internal

Administration

Fiscal/Contract

Organization

Project

Proposal

COMMENTS:

SEP 15 1975



Department of
Biological Sciences
79968

The University of Texas at El Paso

September 11, 1975

Dr. Patrick Webber
Institute of Arctic and Alpine Research
University of Colorado
Boulder, Colorado 80302

Dear Pat:

I think your memo of Sept. 8th to Telleen et al raises one awfully important point for both scientists and students: the unmonitored use of programs by those unable or unwilling to verify the computations. With a limited computer expertise in the department (any department), how can the advising committee have confidence in a student's computations...particularly if he too is untrained?

A few comments are needed:

1. The programs have not been copyrighted, and NO statement of restraint has ever been made.
2. Bollinger, myself and the computing center made all of the changes to convert B AND C to ASPEN. NO INSTAAR support was involved.
3. As to the ERRORS, do you imply that the thesis work of Arp and Goodhue is defective? I monitored their use of these programs, and, as you say, I was aware of the problems. The problems did NOT degrade the thesis work. I cannot comment on Bollinger's, perhaps you could check with his committee.
4. I understood, and I may be wrong, that my financial support early in the B AND C work was on a project with co-principal investigators: you and Dr. Jane Bock. Please check with her.

5. The versions of B AND C and ASPEN you have been improving had hundreds of hours of programming effort after my brief supported tenure with INSTAAR...either as a research assistant or as an hourly employee.

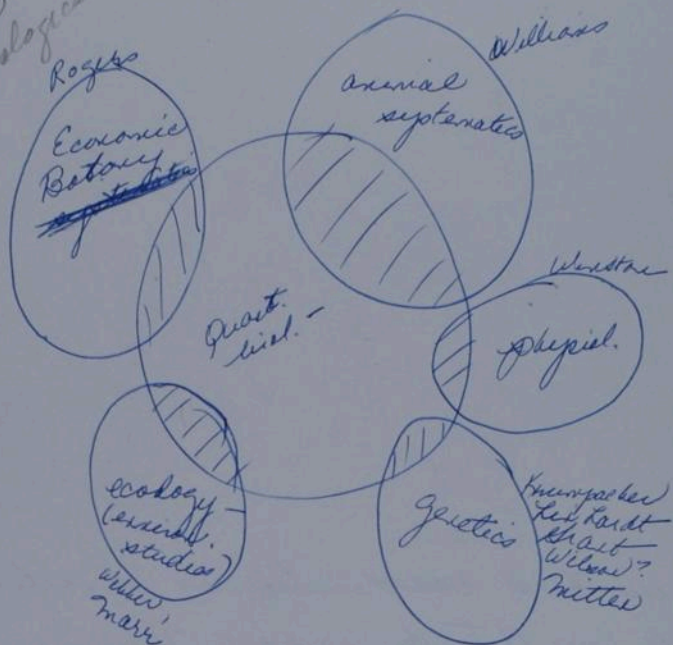
Yours sincerely,

William H. Reid, PH.D.

WHR/cs

cc: Jack Ives (INSTAAR),
Steve Telleen
Larry Lepthein
Jeff Mitton
Wilson Crumpacker
Dave Rogers
Jane Bock (EPOB)

Done -
 How about this
 as an idea for the
 relationship of the
 biology to the other areas
 of the biological curriculum?
 R.G.



Non-shaded quart. biology could
 be considered introductory and
 "service" courses such as:

{ data management
 introductory statistics (200 level)
 computer use
 mathematics for biologists

Shaded areas should be the quart.
 methods. Particularly related to that discipline.
 and contrasted with that curriculum area →

However, some coordination is essential -
for ex., is NT taught as a technique in
classification or as a part of the
NTS/S biometrics package of multivariate
techniques?

Dave Rogers

SEP 15 1975

MEMORANDUM

September 10, 1975

TO: EPOB Botanists, Curriculum Committee, Carl Bock, Ruth Bernstein,
Professor Crumpacker and 441/541 T. A.'s.

FROM: Pat Webber

RE: Fall 1975, Status of EPOB 441/541 - Plant Ecology

This type of memorandum seems to be becoming a regular occurrence from me. It is prompted each semester by revelations emanating from my first few days of contact with a new class. This semester I have the privilege and pleasure of teaching Plant Ecology while Professor Marr is on leave.

During my first two-hour lecture with this class I gathered their vital and academic statistics, and I also gave a 15 minute quiz to gauge their knowledge and preparation for a senior ecology class.

The attached statistics indicate (to me) that this 400 level course is being taken, as intended, by students with the correct prerequisites of EPOB 101 and 102 and also by juniors and seniors. Please be reminded that the Environmental Biology major no longer requires EPOB 341 (Principles of Ecology). Also that EPOB 341 is not a prerequisite to EPOB 441 (Plant Ecology).

The quiz consisted of writing one or two sentences concerning or defining 20 ecologic terms. These terms are commonplace ecological notions; they were as follows: Ecology, Autecology; Synecology, Ecosystem, Ecotone, Ecotype, Energy flow, Nutrient cycling, Entropy, First Law of Thermodynamics, Autotroph, Heterotroph, Liebig's Law (of the Minimum), Shelford's Law (of Tolerance), Friederich's Law (of Holocoenosis), Gause's Law (of Competitive Exclusion), Carrying capacity, Density dependent factor, Ecological niche, Ecological succession. The quizzes were graded and returned only to those students who requested them. No grades were kept.

Performance on the quiz was abysmal. The reasons for this are probably many (bad quiz!; forgetful students, new material, etc.). Nevertheless I shall need to cover rather more basic ecology in the early days of the course than I had intended. Perhaps, in the future, we need to reconsider the prerequisites and or the content of this Plant Ecology course.

I would appreciate any comments you may have.

Thank you.

PW/cb

Class Statistics (as of Sept. 8, 1975)

1. No. of completed forms: 140
2. Sex: Females 57 Males 83
3. Year: Soph. 10, Jun. 43, Sen. 83, Grad. 4
4. Majors: EPOB 110, Environmental Biol. 64, Other 30
5. Biology Courses taken:

EPOB 101	119
EPOB 102	119
Genetics	61
Principles of Ecology	36
Animal Physiology	35
Field Zoology	33
Animal Ecology	32
Animal Behavior	25
Ornithology	23
Other courses	28
5. Biology Courses Fall 1975 (other than 441/541):

Animal Ecology	48
Arctic and Alpine	9
Genetics	9
Mammalogy	8
Animal Behavior	8
Animal Physiology	7

P. J. Webber, Fall 1975

NATIONAL ASSOCIATION
OF STATE UNIVERSITIES
AND LAND-GRANT COLLEGES

Dave
Dave Rogers
H.C. Johnson
SEP 17 1975
INTERNATIONAL PROGRAMS OFFICE

Suite 710, One Dupont Circle, Washington, D. C. 20036 202 293-7120

INTERNATIONAL LETTER No. 122 - August 22, 1975

TO: Administrators and International Program Leaders
FROM: Persis Richter, Editor
Ann Gilder, Staff Assistant

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1. LEGISLATIVE NEWS

A) H.R. 9005 - "International Development and Food Assistance Act of 1975" -- House Bill Authorizing Foreign Economic Aid for FY 1976 and 1977 Containing the Findley Amendment to the New Title XII, the Provision for Funding University Cooperation on the Agricultural Research Problems of Developing Countries. The bill was reported to the House floor August 1 by the International Relations Committee. The Senate bill (S. 1816) authorizing foreign economic assistance is still the subject of hearings in the Foreign Relations Committee. It also contains a new Title XII (I.L. #120, item 13), but it is considerably less specific than that in the House bill. Further action on both waits on Congress' return from its August recess on September 3.

The House legislation is a departure from traditional practice in voting foreign aid; it is concerned solely with economic aid. Authorization for military foreign aid which is usually part of the package -- and is in fact included in the Senate bill -- has been left out. The House bill, in addition, specifies even more strongly than in recent years the view in Congress that U.S. aid should go to countries and activities "which effectively involve the poor (particularly the rural poor) in development..."

Title XII in H.R. 9005 -- "Famine Prevention and Freedom from Hunger" -- incorporates the approach of the Findley and Humphrey bills (I.L. #117, item 1B) in addressing the long-term problem of increasing world food production. U.S. Land-Grant and "other eligible universities" should become "effectively involved" in the effort to strengthen the capabilities of universities to assist in increasing agricultural production in developing countries; in institution-building programs to develop national and regional agricultural research capacity; in work with the international agricultural research centers; in contract research, and in research program grants.

Title XII would promote these activities by authorizing the strengthening of U.S. universities' capabilities in teaching, research and extension to enable them to assist in building institutional capacity in agriculturally developing nations.

It also authorizes program support for long-term collaborative university research on food production, distribution, storage, marketing and consumption; for specific problem-solving research projects at international agricultural research centers; and for strengthening national research systems in developing countries.

The mechanism for U.S. university participation is a permanent Board for International Agricultural Development authorized to carry out such programs. The programs would be operated through AID and funded through AID's Food and Nutrition budget. (Authorization for the food and nutrition category is \$628.8 million for FY 1976 and \$760 million for FY 1977. The actual appropriation for FY 1975 was \$300 million (I.L. #120, item 13).)

The Board is to consist of seven members, not less than four from universities and one of the seven is to be a member representing a non-land-grant university. The legislation authorizes appointment of a Joint Research Committee and a Joint Committee on Country Programs, as sub-units of the Board, to aid in carrying out Title XII programs.

The Board's duties would include:

- . Participating in formation of policy and procedures;
- . Drawing up and keeping current a roster of interested universities which are eligible under the terms of the legislation;
- . Recommending developing nations which could benefit from Title XII programs and determining which of them may be interested in "establishing or developing agricultural institutions which engage in teaching, research or extension activities";
- . Review of the terms and conditions of agreements between AID and participating universities;
- . Review for purposes of assuring compliance;
- . Recommending the apportionment of funds;
- . Assessing the success of programs in dealing with agricultural problems in developing nations.

An annual report to Congress of activities under Title XII is required. The legislation specifies that the Board "shall be consulted" in its preparation and in addition states that the annual report "may

include the separate views of the Board with respect to any aspect of the programs conducted or proposed to be conducted..."

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"Food Aid to Poor Countries" (Title II of the bill) consists of a number of amendments to the PL 480 "Food for Peace" law (long-term credit sales, or grants, of food aid to foreign countries). The amendments generally seek to tie PL 480 food aid more closely to the purposes of the foreign assistance law as Congress has written it since 1973 -- the channeling of aid into activities intended to benefit the poorest parts of nations' populations, especially rural poor.

For instance, a new section would require that 70 percent of food aid under PL 480 Title I (long-term credit) go to countries most seriously in need of food aid. The UN's list of countries "most seriously affected" should be used as a guide. A country not in the category of most seriously affected may receive PL 480 food aid if the President certifies the aid is for humanitarian purposes. There is also flexibility in the 70 percent requirement to take account of "significantly changed circumstances" but the Administration is required to justify them to Congress.

For grants under Title II of PL 480, there is a new requirement that 1½ million tons of commodities be made available for distribution in each fiscal year, with 1 million tons earmarked for distribution by non-profit, voluntary agencies and the World Food Program. The purpose is to assure some long-term continuity of supplies for the distribution programs of private and voluntary organizations.

Dollar amounts authorized for economic assistance are shown below. Comparable figures in the Senate bill and a comparison with FY 1975 appropriations appeared in I.L. #120, item 13.

Foreign Economic Aid
(in millions)

	<u>FY 1976</u>	<u>FY 1977</u>
<u>AID Development Assistance</u>		
Food and Nutrition	\$628.8	\$760.0
Population and Health	248.1	280.6
(at least 67% earmarked for population planning)		
Education and Human Resources	89.2	101.8
Technical Assistance, Energy, Research, Reconstruction and Selected Development Problems	99.55	104.5
(The above category replaces two which have been used heretofore: "selected development problems" and "selected countries and organizations")		
Intermediate Technology - \$20 million of development assistance funds authorized over a three-year period for "grants in support of... private effort to promote the development and dissemination of technologies appropriate for developing countries."		
Cooperatives - \$20 million earmarked for technical assistance in the development of cooperatives.		

International Disaster Assistance	25.0	25.0
(A special coordinator is authorized to promote "maximum effectiveness" in the response of U.S. agencies and between the U.S. and other donors.)		
American Schools and Hospitals Abroad	25.0	25.0
International Organizations and Programs	194.5	219.9
(primarily UN and OAS; \$20 million earmarked for UNICEF)		

B. Background Information for Members of Congress Via Computer.
Within six months some 60 senators are expected to be using rented computer terminals in their offices on which they can order up information from computer bases in the Library of Congress, according to the Washington Post. In the Senate \$750,000 has been set aside by the Appropriations Committee for use of such terminals. In the House, members may rent them if they pay the cost of about \$100 monthly out of their office budgets. About 150 Representatives have expressed interest, the Post reports.

Services available through the computer hook-up with the Library of Congress will include, to start, short analyses and summaries of some 200 issues and/or lists of sources for research.

2. ASSOCIATION NEWS

The ARPAC (Agricultural Research Policy Advisory Committee) Food Research Conference - The Delegates' Assessment of Areas Where Research is Most Crucial for Dealing with World Hunger. The conference last month in Kansas City, sponsored by USDA and NASULGC and called in response to issues raised by the world food problem (I.L. #117, item 2B), drew some 400 delegates and participants -- agricultural scientists and farmers plus people from corporate and consumer groups (the users of farm products). They spent three days assigning priorities to approximately 1,000 specific research ideas.

The top five in a final computerized rating of 94 research topics considered of most importance were: energy, then improved soybean production, followed by more efficient use of water, basic problems in plant growth and reproduction, and fifth, human nutrient requirements.

Fifteen working groups at the conference took various categories for assessment. The international development category was divided into three areas in each of which the work group rated the 20 most important research problems.

In the sub-category of food production technologies and resource management, top priority was given to the need for developing high-yield, disease-resistant varieties of important food legumes and other vegetables (for instance dry beans, soybeans, cowpeas, peanuts, lentils).

In the food quality and distribution sub-group, first rank was given to the need to determine peoples' nutrient requirements.

In the third sub-category -- economic, political and international aspects of technology and research -- the work group voted as most important the need for research on comparison between costs and benefits of imported versus domestically-produced farm inputs such as fertilizer and machinery. Broader questions in this sub-category were ranked behind the farm input problem. For instance, number two priority was given to the need for developing a policy "for use of U.S. agricultural research resources on problems of developing countries, OPEC (oil exporting) countries, etc." Number three priority was given to the need to "assess the research resources and organizational requirements in developing countries."

Dean Orville Bentley of the University of Illinois College of Agriculture, co-chairman of ARPAC, the USDA/university group which initiated the conference, is scheduled to report its findings to Congress September 24 at a joint hearing of two sub-committees of the House Committee on Science and Technology.

A final report of the conclusions of the conference is scheduled to be ready for distribution in early fall.

3. CONFERENCES

Third Regional Conference (Asia and Oceania) of the International Soybean Program (INTSOY). The newsletter of the INTSOY program, based at the University of Illinois, reports that the conference will probably be held in Chiang Mai, Thailand, with the Thai government as host sponsor. Dates are February 23-26, 1976. Requests for official invitation to attend the conference should be sent to INTSOY, 113 Mumford Hall, University of Illinois, Urbana, Illinois 61801. Deadline for requests is October 15.

The meetings will bring together agricultural scientists of the two areas for exchanging information and, it is hoped, call attention to the importance of soybeans in human nutrition.

4. GENERAL

A) Census of Foreign Students - the Institute of International Education (IIE). More than 218,000 foreign students were enrolled in U.S. colleges and universities in 1974-75, according to figures released by a Joint Task Force on the Census, a cooperative effort of the American Association of Collegiate Registrars and Admissions Officers (AACRAO), the IIE and the National Association for Foreign Student Affairs (NAFSA).

The census, a major source of statistics of foreign students in this country, was conducted this time with an improved method of collecting data in which the first step was to query institutions directly for specific numbers. The second step involved reaching 40,000 foreign students in a selected sample, for more detailed information. Complete results of the census will be available in the fall, according to a release from IIE.

B. Cuba - OAS Nations Lift Embargo. Sixteen nations voted in late

July at an OAS meeting in San Jose, Costa Rica, to remove the 11-year-old resolution requiring members to boycott Cuba which had been attached to the 1947 Rio de Janeiro mutual defense treaty. The new resolution states that members are "free to normalize or conduct, in accordance with national policy and interests of each, their relations with the Republic of Cuba at the level and in the form that each state deems advisable." Cuba is not a member of the OAS, having been expelled in 1962. The recent action means only that nations which want to trade with Cuba are free to do so without violating OAS treaty obligations.

An attempt to lift the boycott last November failed by two votes at a foreign ministers meeting in Ecuador. At that time the U.S. abstained from voting (I.L. #114, item 4F).

Supporting the resolution, according to a report in the July 30 New York Times were: Argentina, Bolivia, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, the U.S., Haiti, Honduras, Mexico, Panama, Peru, the Dominican Republic, Trinidad and Tobago, and Venezuela. Opposed were Paraguay, Chile and Uruguay.

C. World Bank "Third Window" Loans - \$500 Million in This Fiscal Year. The Bank has approved arrangements for the subsidized loans (I.L. #121, item 4E) and the first specific loans will probably be made in the late fall, according to the Wall Street Journal. For FY 1976, the subsidy for the loans will amount to \$117 million from a special fund contributed by oil exporting countries and a few industrial countries. The U.S. has supported the idea, but has not contributed.

"Third Window" interest rates will be about halfway between the Bank's regular 8.5 percent and the interest-free rates of IDA, the World Bank's International Development Association.

Next summer the Bank will decide whether sufficient subsidy funds are available to go ahead with another \$500 million in loans for FY 1977. The "third window" loan fund is in addition to regular World Bank and IDA lending operations; eligible borrowers would be such countries as South Korea, Turkey, the Philippines, Bangladesh, India, Pakistan, Bolivia, Egypt, Jordan, Syria and Kenya -- countries where per capita income is less than about \$375 per year.

Nations that have contributed to the subsidy fund so far, according to the Journal, are Saudi Arabia, Kuwait, Qatar, Venezuela, Norway, Denmark, the Netherlands, Canada and Britain.

D. United Nations University Appointments. Two vice-rectors have been appointed to assist the Rector, Dr. James Hestor, who began full-time work for the University July 1 (I.L. #117, item 4A). They are: Ichiro Kato, former president of the University of Tokyo, vice-rector for administration; and Dr. Alexander Kwabong, vice chancellor of the University of Ghana, who is to be in charge of planning and development.

Present activities of the UN University are limited to initial organization and immediate staffing of the Tokyo Center, and to the publication of general information.

New York 10017; and Toho Seimei Building, 2-15 Shibuya, Shibuya-ku, Tokyo 150, Japan.

E. Law of the Sea - Draft Treaty. The tentative treaty -- three "unified texts" -- is the result of the efforts of the three main working committees into which the UN Conference on the Law of the Sea is divided at the international meeting last summer in Caracas. The Conference adjourned after 10 weeks and small progress at Caracas, but subsequent meetings took place for eight weeks in April and May in Geneva.

The documents will be the basis for the next meeting of the UN Conference, in March or April of 1976. (For background material on issues before the Conference, see I.L. #104, item 3B, and I.L. #109, item 3A.)

One text is an outline for an international sea-bed authority which would have power to regulate and manage the mining of minerals in international waters. According to a recent report in the UN publication, Development Forum, the authority would have an assembly, a council, a secretariat. The mining would be managed cooperatively with the participation of all nations and the benefits shared, with special regard for needs of poorer nations. The authority would have jurisdiction only over sea-bed mining, not over any other uses of ocean space.

There is a question whether, if the authority should come into being, it would make enough money in managing the one enterprise, sea-bed mining, to pay its expenses or have any left over for distribution for development. One school of thought believes that an international sea authority should deal with all economic uses of international waters, the Forum says.

Another text deals with national and international claims to the oceans, and while reflecting the current strength of nations' feelings about their sovereign claims, does recognize transnational interests such as scientific research, conservation of the marine environment and navigation. The draft calls upon international institutions to safeguard such international -- public -- interests anywhere in the oceans. Interests of landlocked nations are protected to some extent, according to the Forum, and transit through international straits "adequately protected."

A third text deals with scientific research, transfer of technology and environmental policy.

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The U.S. Position - In a speech to the American Bar Association early this month, Secretary of State Kissinger proposed a multinational organization for exploiting deep sea mineral resources, to allot mining rights and collect royalties using the money to finance development programs among the poorest nations. The international agency could also engage on its own in exploiting minerals and other resources to finance aid, according to Secretary Kissinger, but this government's position is that a major role in deep sea mining must be reserved for private and state corporations of individual nations.

As proposed, the new body would be under international control through a weighted voting system like that in the International Monetary Fund (IMF). The voting method would allow major industrial nations to

retain control of the agency, as they have of the IMF. There is, however, already pressure by developing countries for changes in voting rights in the IMF and World Bank which would give them more power (I.L. #121, item 4D). The voting system for international control of any sea-bed agency would probably have to be a compromise between one weighted in favor of industrial nations and the one-nation, one-vote system which developing nations would prefer.

The Secretary said that U.S. technological skill and naval power would permit this country to cope with unrestrained competition in exploiting the deep sea, but that failure to set fair rules to regulate exploitation will cause "rivalry (which) will lead to tests of power," according to an account of his speech in the Wall Street Journal.

He stated that the U.S. is prepared to accept a 12-mile limit for territorial waters and will support creation of a 200-mile offshore economic zone. In both areas individual nations would control fishing, petroleum and mineral rights but would have to agree to rules ensuring free navigation.

5. UNIVERSITY NEWS

A. The International Activities of Colleges of Agriculture at NASULGC Institutions. Dr. John Blackmore, director of the University of Minnesota's International Agricultural Programs, has released results of a study based on responses from 58 universities which shows that their colleges of agriculture have at present 5,200 foreign students on campus, about 4,000 of them in graduate work. More than 1,000 faculty are engaged in internationally-significant research and more than 2,800 faculty have foreign experience gained from service abroad in the last 10 years.

Nearly 1,400 faculty members have Latin American experience, more than 1,000 have worked in Asia and more than 700 in Africa. At present, however, only 320 faculty members from 44 of the 58 schools of agriculture are abroad on foreign assignments. Thirteen colleges have 10 or more abroad; 22 reported having from one to five overseas assignments. Fourteen reported none.

Using a composite index of eight factors, the study shows that the leading 10 institutions in international activities are, in order: Michigan State University; the University of California, Davis; University of Wisconsin; University of Florida; Cornell University; Purdue University; University of Minnesota; Oklahoma State University; Kansas State University; Iowa State University.

Factors in the index were: numbers of foreign students, visiting foreign professors, AID/FAO participants, resident faculty now on overseas assignments, faculty with overseas work experience, faculty carrying on "international" research, on-campus training programs for foreign groups, and cooperative programs with foreign institutions.

B. Auburn University, Alabama - AID Grant for Aquaculture Research. The two-year \$578,000 grant to the University's International Center for Aquaculture is the second from AID and is intended to help the University increase and improve the education and training capability of the Center, the largest such institution in the world.

The grant will finance a number of studies of aquaculture and small-scale fisheries -- enterprises of a size that might be combined with other small-scale farming in developing countries such as pig, cattle or duck raising, or rice cultivation, to contribute to their rural economy. Some of the funds are intended to help develop a professional network between the Auburn Center and developing country institutions, international development agencies and U.S. institutions.

AID says that over the next 25 years it might be possible to expand the land area used for aquaculture and improve techniques to the point where the annual production of fish in developing countries, from both fresh water and marine sources, could be increased from the present 5 million metric tons to 50 million tons.

C. University of Arizona - AID Contract. A \$45,000 three-year contract with AID, started July 30, will provide technical consultants to Ghana's Council of Scientific and Industrial Research (CSIR). The University will provide specialists in range ecology, hydrogeology, systems engineering, and remote sensing, and will assist in CSIR's Tamne River Basin desertification activities.

D. University of Iowa - World Order Studies Program. Beginning with the 1975-76 academic year, a new multi-disciplinary, non-degree course of study will offer students a chance to study four general categories of world problems -- war prevention, human rights, economic welfare and ecological stability -- from a variety of disciplinary perspectives.

The program, open to all students but intended mainly for undergraduates, is offered through the Center for World Order Studies. The Center was formerly a project of the Stanley Foundation in cooperation with the University of Iowa but now is part of the University.

The program has been designed for students who want generally to broaden their knowledge of world affairs, for those wanting a minor to a traditional degree program, or for those who seek to establish an area of concentration in the program leading to the Bachelor of General Studies degree. It is subject to requirements of a student's chosen department or college and to the regulations of the colleges or departments associated with the program.

Students may elect as much or as little of the curriculum as they wish, depending upon their interests and the requirements of their degree programs. The faculty is drawn from throughout the University. Further information is available from: Center for World Order Studies, 309 Jessup Hall, the University of Iowa, Iowa City, Iowa 52242.

E. University of Minnesota - Study Abroad. The Continuing Education and Extension Division will offer classes (for credit) in English literature and history in London in the fall quarter, September 29 to December 9. Courses will be taught by University faculty. There are no entrance or residence requirements. For information write: World Affairs Center, 306 Westbrook Hall, University of Minnesota, Minneapolis, Minnesota 55455.

offers qualified students a variety of courses in history, anthropology, literature, economics, international relations, sociology, philosophy and art history for which they can earn up to 15 hours credit. The Mexican institution is accredited in both Mexico and the U.S.

6. GRANTS

The University of Pittsburgh has received a \$1 million gift from the Japan Iron and Steel Federation as an endowment for Pitt's Asian Studies Program. Last year, the Asian Studies Program received \$50,000 from the C. Itoh Trading Company to expand its Japanese program. The gift will be used to finance visiting professorships in Japanese studies, lectures on Japan and an expanded collection of library materials. The Asian Studies Program originated in 1968 when the University Center for International Studies was established. Today, more than 120 courses dealing with Asia are offered to approximately 2,000 students.

7. NEWS OF AFRICA

- A. Algeria - Technical Assistance for Rural Development. A World Bank loan of \$8 million for pilot schemes to test different approaches to integrated development in the steppe zone of Ksar Chellala and in a mountain region in the wilaya of Aures where the population is extremely poor. It will also finance a pilot program to explore ways to create an effective agricultural extension service. The government has a national agrarian reform program, attempting to raise farm production, particularly among small farmers, and improve rural institutions and services.
- B. Cameroon - Credit for Traditional Enterprises. A \$3 million credit from IDA of the World Bank for technical assistance and investment incentives to aid traditional small business -- small-scale manufacturing, artisans, and service, transport, repair and construction enterprises. The credit will go to the government development bank. The project is the first of its kind in Africa to be supported by the World Bank.
- C. Egypt - \$114 Million AID Loan. A loan to finance imports of industrial raw materials and machinery and commodities for increased agricultural production, plus funds to help build two grain silos and improve port facilities for grain handling at Alexandria.
- D. Guinea - Credit for Pineapple Industry. A \$7 million credit from IDA to help establish a state-managed, irrigated pineapple estate near Kindia in lower Guinea, and to improve transportation facilities and fruit handling services of the government's fruit exporting company. The new estate is being planned to serve also as a demonstration center for introducing up-to-date farm practices to growers in the surrounding area.
- E. Liberia - Rural Development. Two AID loans totaling \$9 million, in combination with a World Bank credit of \$6 million. The AID financing will help establish a farmer credit and cooperative system to help small farmers grow more rice, coffee and cocoa in upper Lofa county. The AID money will also help improve or build rural roads for access to markets, schools and health services.

F. Nigeria - Cassava Workshop. Sponsored at Ibadan by AID and the International Institute of Tropical Agriculture (IITA). An outgrowth of a recently completed two-year AID-supported study by the University of Colorado on cassava and the food/nutrition system in southern Nigeria. A report for government officials and agricultural experts will stress the need for a national nutrition policy and will recommend setting up a national nutrition board. The report also proposes that the genetic base for breeding programs be broadened, that there be more effort to get improved, wilt-resistant cassava varieties to the farmers, that there should be an assessment of the economic impact of increased production.

G. Sierra Leone - Education. A \$7.25 million credit from IDA of the World Bank for enlarging and equipping 19 secondary schools and 3 trade schools and to set up training courses for technical and commercial teachers. Rural development specialists are to be trained at the government's social welfare and training center, and the loan will also finance studies of ways to broaden elementary education in rural areas by means of non-formal training.

H. Tanzania - AID Loan of \$12 Million to Increase Food Production. Financing for purchases of improved seed, fertilizer, pesticides, machinery and to build crop storage facilities to modernize farm practices in line with recommendations contained in a 1974 University of Missouri study of the Tanzanian agricultural sector.

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Dairy Development. A \$10 million IDA credit to help upgrade and expand commercial dairy farming on government-sponsored farms in five regions, plus a pilot program for adding dairying in experimental farm communities (ujamaa villages) which the government has sponsored. Included are funds for technical assistance to train managers and farmers, and for research in animal diseases.

I. Tunisia - Education. An \$8.9 million World Bank loan to expand manual training in primary schools and to convert some schools to train people for jobs in industry. It includes technical assistance money to help improve the government agencies involved in planning and assessing vocational training efforts. Two regional centers are to be established to offer non-formal education and job training to students who do not finish primary school.

J. Upper Volta - Rural Roads. A \$7.5 million IDA credit to build or improve some 3,300 kilometers of rural roads to aid food production and marketing.

8. NEWS OF ASIA

A. Indonesia - Fertilizer Distribution. A \$68 million World Bank loan to aid the government in getting fertilizer to the islands of Indonesia through a distribution system which it is hoped will be moving about 1.4 million tons by 1980 from the increased production of the state-owned fertilizer company. The project includes self-unloading ships, terminals and bagging plants at major ports, special rail facilities and adequate storage at the village level.

B. Philippines - Irrigation. A \$42 million World Bank loan and a

\$13.5 million Asian Development Bank loan for irrigation projects to increase rice production and reduce import needs. The former in the Cagayan valley of northern Luzon, and the latter for work in provinces of Mindanao.

C. Syria - AID Loan for Economic Development. Two low-interest loans totaling \$58 million for partial support of a project to modernize the water supply system of Damascus (\$48 million) and to finance purchase of U.S. machinery and services for agricultural development (\$10 million).

9. NEWS OF EUROPE

A. Cape Verde - AID Loan and Grants. An AID loan to support agriculture (\$3 million) and grants totaling \$2 million for food aid for the new island nation which became independent of Portugal July 5. The islands are suffering an eight-year drought, related to the West African Sahelian drought, which has cut farm output by about 75 percent. Portugal had been providing about \$30 million assistance annually until the archipelago became independent. The agriculture loan will be used for soil and water conservation work to protect and irrigate valley areas on which crops can be grown.

B. Portugal - AID Loan for Low-Cost Housing. \$13½ million in a housing development loan plus a \$20 million investment guaranty for low-cost housing. The government is investing \$150 million.

10. NEWS OF LATIN AMERICA

A. Inter-American Development Bank - Board of Governors' Recommendation for Increase in Bank Resources. A proposal that the 24 member countries contribute \$6.3 billion to meet the region's increased needs for development capital. U.S. representatives at a July meeting in Washington stated that the Administration would ask Congress to subscribe \$2½ billion, according to the Bank.

B. Central American Research on Woods. A \$131,000 technical assistance grant to make basic studies on drying and preservation procedures for Central American woods, a major export of the region. The research will be managed by the Central American Institute of Industrial Research and Technology. The grant is from the Inter-American Development Bank.

C. Colombia - Agricultural Development. A \$35.7 million World Bank loan for a project in the Department of Cordoba involving flood control and settling of landless families in community enterprises on land reclaimed or acquired under land reform laws. In addition, money will be used to provide agricultural and community services for small farmers.

D. Ecuador - Loan to Benefit Crafts and Small Industry. A \$3 million loan from the Inter-American Development Bank, half of it low-interest, to aid craftsmen and small industries through loans from the national development bank. About 40 percent of the resources will go to less-developed regions in the country.

E. Malawi - Help for Drought Area in Northwest. Rain and international relief efforts have reduced the threat of starvation to half a million

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people in the impoverished region, according to a report in the Washington Post. A food assistance program by U.S. private relief agencies and US/AID, plus an emergency aid effort under the FAO's World Food Program have been under way.

11. WHAT OTHERS ARE SAYING

Vernon Ruttan, President of the Agricultural Development Council,
New York City, in testimony July 21 before the House Committee on
International Relations in support of Title XII, in the FY 1976-77
authorization for foreign assistance:

"Effective commitment of U.S. scientific and professional resources to work on the problems of significance to agricultural and rural development in poor countries will require...a more dependable system of funding and staff commitment (which should take into account) the growing maturity of the agricultural research institutions in many developing countries. In many countries the old pattern of relationships that linked a national or a provincial university in a less developed country (LDC) with a state university in the U.S. (a Cornell with a Los Banos or a Purdue with a Vicos) is obsolete. The relationship is too confining for both U.S. and LDC institutions...(those) institutions with which we work must now demonstrate their value in terms of their contributions to (their own country's) agricultural and rural development...

"My own model of an appropriate institutional relationship is for a network of U.S. professional capacity organized around a leading U.S. research center (such as soybeans at the University of Illinois, in agricultural sector analysis at Iowa State, in fisheries and aquaculture at Auburn, and others) linked with a series of LDC universities and experiment stations. We might think of this as a decentralized international research system. In such a system the recently established international agricultural research institutes in the less developed countries could be expected to play an exceedingly important role in program leadership, coordination and information."

On Institution Building in Developing Countries - from the 1974
Annual Report of the Administrator of the UN Development Programme (UNDP).

"The efforts of the UNDP to promote technical, scientific and managerial self-reliance through the building and strengthening of appropriate institutions (should include) systematic efforts to establish more training arrangements between developing country institutions and allied institutions in developed or other developing countries. Many developing countries now possess the capacity to work fruitfully with high-level institutions abroad, and UNDP should offer its financing and its contacts in support of such exchanges."

(The Administrator's annual report contains a number of proposals to UNDP's governing council on ways the agency might broaden and sharpen the efforts of United Nations technical cooperation services. They were summarized in a recent issue of UNDP's publication, Action. The current Administrator is Rudolph Peterson, successor to Paul Hoffman.)

Labor Organization (ILO) estimates that in Africa, 80 to 90 percent of women live in rural regions and do 60 to 80 percent of all agricultural work. But the introduction of new technology to these regions has "... further contributed to women's marginality," according to an FAO report for International Women's Year. "Development projects, agricultural services, training in modern farming techniques and ownership of farming machinery and land have been aimed mainly at men..." Third World women are developing "negative attitudes toward participation in the social, economic and political life" of their changing societies.

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At an agricultural training center in a town near Mexico City where the UN International Women's Conference took place, 250 peasant women were invited from 18 Latin American countries to take part in a four-week training course in conservation of grain and seeds, one of the Mexican government's programs marking International Women's Year. According to the Washington Post the women - most of whom had never before left their villages - were asked what they would want to gain from International Women's Year. They were "almost unanimous (in saying) they wanted to study agriculture and to learn much more about the land..." We live off the land and we die on the land, but we don't know anything about it. I realize that as we take this course," a Panamanian woman said.

At the course, a woman from Peru who works in a commune outside Lima reported that there is a new law in Peru now giving men and women the same obligations and rights. "The last time we had a meeting of our commune we received an announcement. From now on the women had permission to speak up in the meetings, just like the men, it said."

12. WHAT OTHERS ARE DOING

Orbital Photos of African Deserts. Using new color-sensitive film developed for the U.S. navy and declassified for space flight use, the Apollo astronauts have filmed the spread of desert northward across Africa which has accompanied drought in the six-nation Sahel area. The photographs were taken July 20 to 24 after Apollo had completed its linkup with the Soviet spacecraft Soyuz, according to a report in the Washington Post.

New desert is expected to show up on the film as lighter -- yellow areas compared with the pinkish or reddish cast of old desert where wind and what little rain that falls have caused the iron in the sand to oxidize. Scientists at the Smithsonian Institution in charge of the orbital photography hope the film will show where the desert, and the drought, are heading. The photos may show, for instance, the success or failure of an Algerian experiment to halt the desert by planting a shelter belt of trees along its southern border.

An international air, ground and water support team included ships and planes from the U.S. 6th and 7th fleets, aircraft from Great Britain's air force, ground teams in Egypt, Paraguay and Qatar, a ship from the Guatemalan navy and two oceanographic vessels owned and operated by the state of Maine.

The project includes, in addition to desert photography, pictures

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of six cold and warm water ocean eddies -- one near Gibraltar, another in the Mediterranean between Tunisia and Sicily, a third east of New Zealand, another in the Coral Sea and two in the Caribbean. Scientists expect the eddies to appear either lighter or darker than surrounding water. The effort is tied to interest in the eddies as places where submarines might shelter because temperature and salinity differences confuse detection instruments which depend upon sound waves. One of the Caribbean eddies is thought to be responsible for the formation and speed of the Gulf Stream.

U.S.S.R. Contract with FAO for Fisheries Surveys. As part of a joint effort of the UN Development Programme (UNDP) and FAO, the surveys will assess offshore and deep-sea fishing resources of countries bordering the east and west coasts of Africa. The contract with the Soviet Union calls for a survey of the Indian Ocean area from Somalia to Mozambique, to begin in early October, and another in the East Central Atlantic from Cameroon to Angola, beginning next January.

The UN agencies believe the African countries in the Atlantic region could tap unexploited fish resources in some parts of that zone even though there is heavy fishing of certain stocks by the big fleets of developed nations. They also think that in the Indian Ocean region it would be possible to draw upon almost untapped deep-sea and coastal fish stocks. In both regions, however, there needs to be better coordination between national efforts and bilateral and multilateral aid.

In the USSR surveys, the crews of the Soviet research vessels will include international scientific teams to manage fishing trials, prepare fishing charts and collect catch data. Soviet experts are also to give on-the-job training aboard the vessels to the scientists and technicians from African and Asian countries.

The two studies are costing UNDP about \$1.5 million each and are part of four-to-five-year projects in the areas. In the Indian Ocean region, for instance, some 26 nations of Africa, Asia and the Middle East are taking part, and the \$3.7 million project includes several multilaterally and bilaterally funded surveys. For example, Norway and Japan are paying for studies of Arabian sea resources.

13. PERSONNEL: Charles H. Fleer named Director of AID's Office of International Training. Before joining AID he had held various executive positions in private industry and government agencies. He succeeds Arthur A. Kimball, who retired last December; Denis M. Neill made AID Assistant Administrator for Legislative Affairs. A law specialist, he joined AID in 1972, and since 1973 has been Assistant General Counsel for Legislation and Program Policy Coordination; Robert Spitzer, an agro-business executive since 1958, appointed AID's Food for Peace Coordinator. He succeeds Andrew J. Mair who retired; Garnett A. Zimmerly appointed Director of AID's Mission to the Philippines. Since 1958 he has served in AID's agricultural and economic assistance programs in Korea, Laos, and Vietnam, and recently in Washington in AID's Bureau for East Asia.

14. PUBLICATIONS

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Inventory of Population Projects in Developing Countries Around

the World, 1973/74, published by the United Nations Fund for Population Activities (UNFPA). Information on the varieties of population assistance provided 107 developing countries by more than 120 multilateral, bilateral and non-governmental agencies and organizations. More than 1,000 separate country, regional, interregional, and global entries. Includes brief descriptions of the major donor agencies. 397 pages, \$10.00 per copy, available from the United Nations Bookshop, United Nations Plaza, New York, N.Y. 10017.

Government Translations Microform/Index. An index plus microform of approximately 200,000 pages of translations of foreign documents translated by the Joint Publications Research Service (JPRS), a government agency which has been providing translations weekly for other Federal agencies since 1957. Most of these documents originate in communist and eastern-bloc countries and cover technical, economic, and political subjects. Available from Database Publications, 145 East 49th Street, New York, N.Y. 10017.

United Nations Demographic Yearbook 1973. Prepared by the UN Statistical Office, the Yearbook presents international statistics on area, population, birth, death, marriage and divorce, and life expectancy. As a special feature, the 1973 issue presents population census results received too late to be included in the 1971 and 1972 issues covering censuses carried out during 1965-1972. The data cover demographic and economic characteristics of the population, as reported in 161 censuses for 1965-1973. The latest edition is the twenty-fifth in a series begun in 1948. 858 pages. Price \$38.00 clothbound, \$30.00 paperbound. Order from Sales Section, United Nations, New York, N.Y. 10017, or major booksellers: Sales No. E/F.74.XIII.1.

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Two recent publications of the National Academy of Sciences: Products of Jojoba: A Promising New Crop for Arid Lands - A survey of existing knowledge of the Jojoba plant which grows wild over an extensive desert area of Southwestern United States and Northwestern Mexico. "Jojoba oil" is described as having properties with high potential for uses in industrial goods manufacture; The Winged Bean, A High-Protein Crop for the Tropics - A report on the little known vitamin/protein-rich winged bean (*Psophocarpus tetragonolobus*) presently growing as a backyard crop in Papua New Guinea and Southeast Asia. Its products are described as equal in nutritive value and digestibility to the soybean, with the advantage that all parts of the plant are edible. These publications of the Board on Science and Technology for International Development are available free from: Commission on International Relations (JH 215), National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.