

ENCLOSURE 3 - APPENDIX ICooperative Inter-American Program Under IBP for Study of
Convergent and Divergent EvolutionAdministrative

Program Administrator (\$20,000 year) 5 years	\$100,000
Secretary (\$4,200 year) 5 years	21,000
Administrative Travel	8,000
Supplies	<u>1,000</u>
Total	\$130,000

Program

Plans are to establish 7 centers for research under this program in South America and to identify existing centers in North America. The 7 centers in South America, chosen for biogeographical reasons and for existence of potential research contribution by the people there are:

1. Rio de Janeiro - Sao Paulo area: Eastern Serras and "restingas" of Brazil.
2. Belem - Manaus area: Amazon Basin
3. Buenos Aires: Chaco, Pampas
4. Mendoza - Santiago: Desert, Andes
5. Lima (Iparia Reserve, etc.): Andes, Amazonian headwaters, montane forest
6. Bogota: Andes, tropical forest
7. Caracas: northern South America

Basic Unit for Amphibian Research (at each of the 7 centers)Equipment

Sound Spectrograph	\$3400
Uher Tape Recorders (4)	2000
Ampex Tape Recorder	1500
Chromatocabs and Supplies	1000
Electrophoresis Unit and Power Supply	1000

Equipment con't

Research Microscope	\$5000
Photographic	1000
Supporting Electronic Gear	2000
Jeep Station Wagon (4-wheel drive)	3700
Supplies	<u>2000</u>
	\$22600

Personnel

Senior Scientist (US or SA)	\$20000
Two US Graduate Students	8000
Two Latin American Students	8000
One Latin American Student to US	<u>4000</u>
	\$40000

Travel

Transportation 3 US Personnel to SA	\$2400
Transportation one Latin American Student to US	800
Field work in South America	<u>1000</u>
	\$4200

Total Cost Per Center (First Year Only).....\$66,800

Basic Costs Per Year in Years 2 Through 5

Personnel	\$40000
Equipment	5000
Supplies	3000
Travel	4200
Publication	<u>1000</u>
Total Per Year	\$53200

Total Five-Year Cost Per Center

Initial year	\$ 66,800
Four subsequent years (\$53,200 x 4)	<u>212,800</u>
Total	\$279,600

Total Five-Year Cost of Amphibian Program

(\$279,600 x 7)	\$1,957,200
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Other Probable Programs (Gross Estimates)

Vegetation, Plant Communities, etc. (estimate at about level of amphibian)	\$1,900,000
Mammals	500,000
Birds	500,000
Insects and Invertebrates	500,000
Reptiles and fish	<u>500,000</u>
Total	\$5,857,200
Administration	<u>130,000</u>
<u>Grand Total</u>	<u>\$5,987,200</u>

The Research Program

Preliminary planning relative to the amphibian program has identified 10 major problems for attack under this cooperative program. All are of a nature that makes inter-country and inter-continental cooperation essential for their solution. These are identified in Appendix A. It is anticipated that comparable identification of problems involving other groups of organisms and involving communities or organisms will result from the Caracas conference in November, 1967.

It is also anticipated that the program relative to the physiology of colonizing species would be built around these same centers and would be under the same administrative organization, but would probably require one additional administrative person.

The Hylidae (a taxonomic group of frog species) were chosen for this program because they are common to extremely diverse environments, thus exhibiting a high capability of adaptation.

Major Problems Involving Anuran Amphibians
(especially New World forms)

1. What is the ecological and taxonomic diversity of the Hylidae in various very different ecological and geographical provinces? What is the relation to environmental diversity?

- a. Serras of eastern Brazil
- b. Serras of northern South America
- c. Headwaters (sub-Andean) of Amazon drainage
- d. Sierra Nevada Occidental of Mexico
- e. Mid-Amazon Basin (Manaus)
- f. Sierras de Costa Rica
- g. Andes
- h. Chaco, including cerrado
- i. Restinga
- j. Moist hardwood forests of Southeastern United States
- k. Australia

2. What are the relationships between the frogs (especially Leptodactylidae) of the Andean region and of the serras of eastern Brazil? Do these represent relationship or convergence?

Telmatobius (west)

Paratelmatobius (east)

Eupsophus (west)

Thoropa, Cyclorhamphus (east)

3. What are the evolutionary relations of the casque headed frogs? (Use all available methods, e.g., karyotypes, venoms, blood proteins, vocalization, behavior, osteology, larvae).

4. What is the level of hybrid (and other) speciation on the mesas of northern Brazil and of the Mato Grosso?

5. What are the relationships and ecological convergences of anurans of the Chaco, of the caatinga, and of the mesquital of Mexico and Texas? Is there evidence that occupancy of similar habitats has led to slow rates of change in common taxa?

6. What are the interrelationships and evolutionary history of the Hylidae (especially Hylinae) of the New World (use techniques of karyotypes, vocalizations, biochemical analysis, hybridization, eggs, larvae, life habits)?

7. What are the relationships of the leptodactyloid genera and what can be learned about the origin of the Bufonidae and of the Brachycephalidae (use all available methods)?

8. What is the degree of relationship between New World and Australian Leptodactylidae, Hylidae (especially biochemical analyses of e.g. the foam of leptodactylid nests)?

9. What are the relations of the New World Microhylidae to one another?

10. What are the phylogenetic relations of such genera of incertae sedis as Brachycephalus, Dendrophryniscus, Noblella, etc.

APPENDIX II-A

- Concerning the present and future U.S. program funding needs, please consider (a) is the US/IBP program in danger of faltering for lack of funds or for any other reason?

Answer: In his prepared statement of 12 July 1967, Dr. Ivan L. Bennett, Jr., described the U.S./IBP integrated research program, both those approved by the U.S. National Committee and those being developed for later submission to the National Committee (see enclosures 1 and 2 to Appendix I). The total U.S. program for the IBP will consist of (1) specific areas of new research identified by the U.S. National Committee as essential to the goals of the U.S. program. This area may be said to be the "heart" of the U.S. program. It is comprised of integrated research programs, described by Dr. Bennett as "action programs," plus a probable small number of individual proposals submitted in direct response to US/IBP subcommittee efforts; (2) new proposals voluntarily submitted by principal investigators and their institutions which result from opportunities for biologists to expedite their work through international cooperation in the IBP; and (3) on-going research submitted by principal investigators and their institutions and agencies which in the judgment of the National Committee should be included in the U.S. program.

It is the first area of specific research initiated by the USNC/IBP that will be in danger from lack of funds.

Funds for these purposes, according to advice from individuals on the Interagency Coordinating Committee, are not now in the budgets of the Federal agencies. Reorientations of existing budgets of granting agencies to provide sufficient funds seem improbable.

Without funds for these major integrated research programs, research identified with the U.S. program would be largely limited to that which would probably be done even if an IBP had not been established. Some reorientation of effort may occur, but not to a significant extent.

Considering the above, the Executive Committee of the U.S. National Committee for the IBP states that "the U.S. program is in a very critical stage with respect to funds. Lack of funds will endanger the major U.S. programs of the IBP."

APPENDIX II-B

Concerning the present and future U.S. program funding needs, please consider (b) what effect would any lapse of funds have on the international program as a whole and upon the prestige of American science and the United States in general?

Answer: The Executive Committee of the U.S. National Committee feels that a lapse in funds of this sort "would not greatly affect the prestige of American science." At the same time, this Committee carefully points out: experience during the last fifteen years has demonstrated that if any international scientific program is to be successful, the United States must take a strong and vigorous role. The Committee, in analyzing this question, applied the analogy of a "critical mass"; with added "fuel" the program will "go"; with decreased "fuel" the program will falter. The critical mass analogy in this case relates to the belief of the Executive Committee that biologists in many countries desire to establish and carry out the intensive coordination involved in this program.

Greater in importance than national prestige or prestige of U.S. science is the need recognized by scientists nationally and internationally to attain greater understanding of the interdependence of plants, animals and man and the environmental conditions and factors that influence their relationships. If such understanding is not attained, there may be destructive consequences for mankind and his environment and therefore a design for progress is urgent. This point was touched on by Dr. Roger Revelle in his prepared statement of 9 May:

"In our times of unprecedented change, biologists are well aware of the rapidly growing ability of their fellow human beings to alter the face of the earth through technology. But they are equally aware that these alterations can bring about far-spreading and often destructive changes in the web of life that is stretched so thinly over the surface of our planet. Our technology has out-paced our understanding, our cleverness has grown faster than our wisdom."

Dr. David Gates in his testimony of 3 August also described this urgent need. Both Dr. Revelle and Dr. Gates suggest that the IBP offers the initial opportunity for scientists nationally and internationally to create this design for progress.

The international character of this program and the urgency for multinational participation were described by Dr. Bennett in his prepared statement of 9 May:

"The objectivity of nature is not changed by national boundaries, and the criteria against which experimental observations and findings and scientific principles are judged, are not different in different nations.

"In short, the transnational character of science is intrinsic and is not merely a result of collaborative international agreements or the actions of governments. Hence, science can serve as a neutral portal to international understanding, quite apart from its specific disciplinary and intellectual content."

and continuing -

"While environmental change is not qualitatively new, today's problems and our concern are new because of the new quantitative aspect of the change - the scale, variety, and speed of the changes in man's physical and social environment. Another and most important characteristic of current environmental problems is the unanticipated ways in which changes interact, examples being the simultaneous adoption of the internal combustion engine and the surge to urbanization and untoward effects of advances in our ability to transport large quantities of raw materials."

In summary it has been said that the United States has nothing to lose from lack of support of the IBP except the opportunity to gain tremendously, both materially and scientifically.

APPENDIX III

What is the estimate of the National Committee as to the amount of money needed for the U.S. in the IBP program for the next fiscal year?

Discussion: This question breaks down into four related questions:

- a. What "new" money does the US/IBP need in the next fiscal year for support of the integrated research programs?
- b. What "new" money does the program need for support of proposals submitted in response to publication of the US/IBP program?
- c. What "new" money does the program need for on-going research?
- d. What "new" money is required for IBP training?

Discussion of the ability of the ICC to provide funds from the programs of the Federal agencies (discussed in the next question following) will point out that those programs do not now include planned support of the US/IBP integrated research programs. The Federal agency program, however, will support research that is both included in the agency programs and that has been or will be accepted within the US/IBP. The term "new" money used above, therefore, defines the money needed for the US/IBP that is not now in the programs of the Federal agencies.

In attempting to answer these questions an analytical assessment, not only of the current status of the US/IBP, but also of the events, actions and decisions leading to that status, should be clearly stated. Many discussions and conferences on this program occurred during the U.S. planning phase. A cohesive program description emerged October 1966, when all active members of the U.S. National Committee-Subcommittee organization and other invited participants met in a four-day workshop to define program statements. During this time, participants challenged themselves and each other (1) to describe the broad elements of program statements and (2) to propose specific projects and programs that should be pursued in support of these statements. Several of the now identified integrated research programs were suggested and defended at that time. Among them were the Hawaii Program, the Program on Analysis of Ecosystems, the Study of Eskimo Populations, the Ecology of Migrant Populations, Divergent and Convergent Evolution, and others. The Subcommittee program

statements and the Report of U.S. Participation in the IBP by the National Committee fully met the first challenge stated above. Lacking with respect to the second challenge were answers to the question - how? That is, what institution should sponsor each program? What scientists would stand committed to undertake specific proposals? What individual or group would undertake the coordinating effort in each program? Who are the scientists who could and would accomplish the research?

Toward progress on these questions, further workshops in specific areas were planned. Since October 1966, 27 IBP workshops have been held and 9 are definitely planned during the remainder of 1967 and in 1968. The goal in each case is, and has been, to outline proposals for the research projects and programs in the specified area, and to obtain tentative or full personal commitments on the work involved.

a. "New" Money for Support of Integrated Research

Programs

With the above as background, the National Committee has approved 6 major integrated research programs, and is aware of the probable development of 9 additional such programs. The approved programs and the estimated funding needed for their support are:

<u>Program</u>	<u>Estimated 1st yr support in \$ millions</u>	<u>Estimated 5-yr support in \$ millions</u>
Aerobiology	0.250	16.0
Ecology of Migrant Populations	0.300	10.0
Hawaii Program	0.400	2.0
Analysis of Ecosystems	1.250	45.0
Eskimo Populations	0.100	2.0
Phenology	<u>0.100</u>	<u>2.0</u>
Total	2.400	77.0

The estimated first-year support assumes beginning of work in the current fiscal year, since 1 July 1967 was the beginning of the research phase of the IBP. If support is postponed until FY 69, it is estimated that first year support would be \$15 million: that is, one-fifth of the total integrated research programs needs as known at this time. Brief descriptions of both the approved and the developing integrated research programs are attached as enclosures 1 and 2 of Appendix I. Funding for these major programs will increase in FY 69 and later years by the amount required for the developing programs.

b. "New" Money for Support of Recently Submitted Proposals

Two hundred and ten new proposals have been submitted in addition to the 104 projects being published in Report No. 3. Of the 210 submitted, 56 have been accepted by the USNC/IBP for inclusion in the U.S. program. These proposals will be included when they are supported by a funding agency. Examination of these 56 indicates that (1) 25 were submitted in direct response to IBP program statements, and (2) originators submitted the remaining 31 within the framework of previously established programs. Thus, the latter group, although contributing to the goals of the IBP, would have been submitted in any event. The "new" money requirement for these proposals, therefore, is restricted to the first group of 25.

Experience of granting agencies shows a 50% rejection rate of all proposals submitted. Assuming (1) that the present rate of proposal submission will continue over the five year period of the IBP, (2) that the factor of 25/56 established above will remain fairly constant, (3) the average budget per proposal will also remain fairly constant, and (4) the overall rejection rate does not change, the estimate of "new" money for support of these IBP proposals is derived as follows:

<u>\$ Millions</u>		
	<u>1/2 Year Experience</u>	<u>Probable Annual Funding Requirements</u>
Budgets of the 56 proposals	10.00	20.00
Factored by 25/56-new IBP Based Projects	4.46	8.92
Factored by 50% rejection by Granting Agencies	2.23	4.46

<u>Five year estimate</u>	22.30	

c. "New" Money Needs for On-Going Research

The needs for additional money supporting these projects would be defined as that amount required for reorientations of on-going research to assure that the IBP criteria can be fulfilled.

These criteria are: the project shall -

- be relevant to the international objectives of the IBP
- be relevant to the USNC/IBP program
- benefit from international cooperation

US/IBP Committee members have conducted a significant amount of correspondence with principal investigators to assure understanding and application of these criteria. In no case has the principal investigator requested additional financial support. In view of the desires of principal investigators on funded projects to have their work included in the IBP, it seems unlikely that any "new" money requirements for IBP purposes will develop among these projects.

Previous estimates in answer to the question on total cost of the IBP have broadly included the total costs of all IBP identified programs and projects. In estimates described above, an attempt has been made to distinguish between the work planned because of the IBP and that work, although IBP related, which would be carried out in any event.

d. "New" Money Needs for IBP Training

Several attempts have been made to develop a reliable estimate for training needs. The US/IBP committee membership has been circularized twice on this question. Subjectively, training requirements may be differentiated as:

Individual training required to assure competent performance of investigators on specific projects - the cost of this training is included in the estimate cost of integrated research programs and IBP projects described in a and b above.

Training required to assure development of undergraduate and graduate students who would be available in later years to carry on and expand on research initiated by the US/IBP.

Implicit in this latter area is a recognized deficiency in the numbers of biologists now capable of selecting and

pursuing advanced research in ecology, environmental physiology and related fields. It has been estimated that the integrated research program on Ecosystem Analysis, if fully activated and manned, would require many newly trained ecologists in this country. The estimate of \$21 million previously given by Dr. Bennett is based on a general recognition of the small training base in our colleges and universities in these aspects of the biological sciences and on forecasts of greater numbers of scientists needed in these fields, particularly the need for ecologists. Twenty-one million dollars over 5 years to stimulate this educational base and to increase its output is a general, but essential, part of the US/IBP. One-fifth of that amount would be the first year requirement.

The US/IBP subcommittees have stated that the following additional personnel, in three categories, would be the minimum required.

FY 69-72 TRAINING ESTIMATES BY USNC/IBP SUBCOMMITTEES

	PT	PP	CT	PF	PM	HA	UM	Total	Cost @	Total Cost
Pre-doctoral	84	120	12	180	135	160	50	741	\$10,200	\$7,558,200
Post-doctoral	36	40	16	35	200	160	20	507	18,300	9,278,100
Technical	60	--	--	38	17	200	20	335	11,500	3,852,500
								1583		\$21,688,800

e. Summary of "New" Money Needed for the US/IBP

	<u>1st Year Support in \$ Millions</u>	<u>5 Year Support in \$ Millions</u>
Approved Integrated Research Programs	2.40	77.00
Developing Integrated Research Programs	0	77.00*
Individual IBP Proposals	4.46	22.30
Training	4.20	21.00
Contract Support by NAS	.40	2.00
Total	11.46	199.30

*It is estimated that the developing integrated research programs, included in the above will equal or exceed the approved integrated research programs. Enclosure 3 to Appendix I illustrates a possible budget of one of these plans.

APPENDIX IV

What is the view of the Interagency Coordinating Committee concerning the probability of being able to raise the necessary funds in the manner proposed?

Answer: Members of the Interagency Coordinating Committee (ICC) have stated that the presently budgeted funds are not adequate to support the integrated research programs of the IBP. They have pointed out that identification of program funds for the IBP in any agency budget requires Bureau of the Budget approval. The ICC has not discussed this problem with the BOB.

Dr. Bennett in his prepared statement of 12 July 1967, commented as follows concerning funds for the IBP:

"As I understand the Subcommittee's intent, it is desired to establish a focus of purpose for the IBP, and in so doing, to seek some assurance that it can be defended without endangering the overall support of the IBP research effort.

"In essence, the problem boils down to an exploration of the ways in which:

"1. Additional funds can be secured to support IBP activities.

"2. The specific purpose of the IBP can be highlighted in agency budgets.

"3. The budgetary identification of IBP funds can best be safeguarded during the authorization and appropriation process.

"Each of these three questions, of course, consists of two parts - one referring to the formulation of the President's budget for submission to Congress - the other to the Congressional actions on that budget.

"As to the second part, that of likely Congressional actions, I am in no position to speculate upon this question. Certainly, the members of this Subcommittee are in a far better position to deal with this matter than am I. I would hope that a Subcommittee

Report on the IBP would go far toward assuring sympathetic acceptance of this important program. I would also think that the judgments of the several involved agencies concerning the exact method used for highlighting the IBP in their budgets should be given due weight.

"I have sought the advice of the Bureau of the Budget concerning the problem of highlighting the IBP in the President's budget.

"I was told that, in principle, there is no objection to the identification of funds for a program such as the IBP. The fact that the IGY was circumscribed and involved a single year commitment whereas the IBP is intended to extend over a larger period may pose certain difficulties. In general, however, rather than a single "line item" which would be highly vulnerable to paring, the inclusion of a series of specific programs in the budget which could be identified as IBP activities in an overall analysis was suggested as a feasible approach. Indeed, it was pointed out that such a procedure might very well be backed up by including a special analysis of IBP activities in the overall administrative budget, thus highlighting the program without making funds specifically vulnerable.

"I neither sought nor received assurance that additional funds might be forthcoming for the IBP. This is a matter that will be up to the agencies involved as will be the presentation of arguments for according the IBP this type of identification.

"Without going into further detail, I would say that a report from this Subcommittee could be a major factor in assuring that the IBP would be accorded the attention it deserves."

APPENDIX V

Concerning program models, in what respects, structurally, will the management of the IBP be similar to or different from the IGY?

Answer: The management of the IBP and the management of the IGY in many respects are quite similar. In both programs, the National Academy of Sciences, based on (1) its membership in the International Council of Scientific Unions (ICSU) and (2) its role in the U.S. scientific community, established national committees. The National Committee for the IGY established 20 technical panels. The National Committee for the IBP has established 9 subcommittees, 2 panels and 6 integrated research programs and has recognized that additional major programs will be approved as program definitions, personal commitments and sources of support are developed. The activities of the US/IGY technical panels are generally comparable to those of the US/IBP subcommittees, panels and integrated research programs.

Generally, however, administration of the US/IGY was more centralized than that now planned for the US/IBP. There are valid reasons for this difference:

a. The physical scientists participating in the IGY were generally unified in identifying the problem areas for research. In contrast, probably the greatest problem of the IBP has been concerned with this identification. It has proceeded (1) from a broad statement of IBP purpose by The International Council of Scientific Unions to (2) a broad statement of purpose by the U.S. National Committee to (3) broad statements of program goals within functional areas by the US/IBP subcommittees to (4) the development of integrated research programs and individual research proposals. This entire effort, by no means yet complete, has been voluntary on the part of many well recognized scientists, both of the U.S. and of other nations. It is logical to center the coordination involved in each US/IBP major program under the control of the director of that program.

b. Funds supporting the US/IGY were handled and controlled quite differently than they now are for the US/IBP. Like the IBP, the total IGY effort was comprised of (1) coordination of on-going work (e.g., Weather Bureau, Coast and Geodetic Survey, Navy, Air Force, Army and many others) (2) reorientations of that work as recommended by the NAS/USNC/IGY and (3) new research initiated by the NAS/USNC/IGY. The "new" money requirement for the

IGY was primarily for this third category. The Congress appropriated funds for these purposes and they were specifically identified in the budget for the National Science Foundation. Disbursements of these funds were in general, at the request of the Academy USNC/IGY technical panels. Evaluations and decisions supporting these disbursements were made by these panels.

In contrast, financial support to US/IBP and projects will be provided, if available, directly to the proposal originator by the appropriate granting agency on the basis of evaluations and decisions made within the agency. Integrated research programs accepted and funded by granting agencies, will include provisions for the administrative staffs required for program support.

c. The operational phase of the IBP is considerably longer than that planned for the IGY, which had a formal operational period of 18 months (July 1957 - December 1958), with a low-key extension of one more year (1959) of normal work in participating countries, no new funds or programs being involved. Although several other international programs developed on the model of the IGY, e.g., IQSY, the World Magnetic Survey, The International Indian Ocean Expedition, and others, the IGY itself concluded its work on schedule and dissolved. The IBP is expected to generate a significant number of successive international programs lasting many years. The flexibility of decentralized control seems advantageous toward promoting the complex program goals of the IBP.

APPENDIX VI

Has any other international program been managed in the manner which is proposed for the IBP?

Answer: The answer to this question is "yes," in the sense that U.S. participation through the NAS is a well tested operational device. The differences are in detail - witness the participation in the IGY, discussed previously. Attached is a listing of major international scientific programs now under way or being initiated with brief descriptions of purpose, sponsoring and participating bodies, budgets for administrative support, and indications of the types and sources of participation from the U.S. (These tables are duplicated from pages 15 through 26 of a report by the Legislative Reference Service, Library of Congress to The Chairman of The House Subcommittee on Science, Research and Development. The report was transmitted by letter dated 22 December 1966. The budgets given in most cases are partial and incomplete).

TABLE II.—Committee on Data for Science and Technology of the ICSU (CODATA)—Continuing program

Purpose	International organization		U.S. participation	
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRC	U.S. Government
Liaison and voluntary coordination, among scientific unions and countries, of programs for compilation of critically evaluated numerical data.	The ICSU Committee on Data for Science and Technology was established at the ICSU General Assembly in January 1969 and organized in June 1969. At present, the Committee consists of 6 national representatives (France, West Germany, Japan, United Kingdom, United States, and U.S.S.R.) and 10 U.S. representatives (IUPAC, IUPAP, IUPUG, IUPAC, IUPAP, IUPAM, and URSI). The Chairman of the Committee is Prof. Frederick D. Rossini, dean of the College of Sciences of the University of Notre Dame. The central office of the Committee will be housed at the NAS-NAE-NRC for the first 2 years and will then be moved to Europe.	About \$65,000 per year for the central office—about 50 percent from the United States and the balance from the other 5 countries.	Prof. F. D. Rossini is U.S. national representative. He is supported by a 7-man U.S. National Committee from the NAS-NAE-NRC.	Dr. Allen V. Astin, Director of the National Bureau of Standards, is an ex officio member of the U.S. National Committee.
				Proposed U.S. share is about \$35,000 per year.

NOTE.—For further information, contact Dr. Guy Waddington, Executive Director, central office of the ICSU Committee on Data for Science and Technology (NRO address for mail).

TABLE III.—*Cooperative Study of the Kuroshio and Adjacent Regions (CSK)—1st stage: July 1965 to February 1966; 2d stage: July 1966 to February 1967*

Purpose	International organization		U.S. participation		
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRO	U.S. Government	Budget
(a) Synoptic surveys of the whole Kuroshio system on twice yearly basis or more often, if possible. (b) Studies of time and space scales of short-term fluctuations of the Kuroshio. (c) Study of fisheries resources of the area. The Kuroshio is a narrow, swift current flowing north on the western edge of the Pacific and forms a part of the clockwise circulatory system of the North Pacific, which includes the southward flowing California current.	Sponsor: Intergovernmental Oceanographic Commission. International Coordinators: Dr. Kiyomasa Hata, Director of the National Research Institute for Disaster Prevention, Japan. Assistant International Coordinator for Fisheries: John C. Marr, Bureau of Commercial Fisheries, Honolulu, Hawaii. Participating countries are China, Japan, Korea, Philippines, United Kingdom (Hong Kong), United States, U.S.S.R., and Vietnam.	Current information not available at time of publication.	No direct NAS-NRO responsibility. The Committee on Oceanography of the NRC Earth Sciences Division maintains informal contact with the U.S. Government about the CSK.	U.S. National Coordinator: Mr. John C. Marr, Bureau of Commercial Fisheries, Honolulu, Hawaii.	The budget of the Bureau of Commercial Fisheries, which is the most actively participating governmental agency, is as follows: Fiscal year 1967, \$8,957,000; fiscal year 1968, \$9,644,000.

NOTE.—For further information, contact Capt. T. K. Trendwell, Deputy Director, U.S. Naval Oceanographic Office.

TABLE IV.—Committee on Space Research of the ICSU (COSPAR)—Continuing program

Purpose	International organization		U.S. participation	
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRC	Budget
To further internationally the progress of all kinds of scientific investigations which are carried out with the use of rockets or rocket-propelled vehicles. COSPAR is divided into the six following Working Groups: I. On tracking, telemetry and the dynamics of artificial bodies in space. II. On the design of experiments and their coordination with ground-based operations. III. On data and publications (e.g., international exchange through World Data Centers in the United States, Europe, and Japan). IV. On basic reference data for the atmosphere. V. On space biology. VI. On the lower atmosphere, its circulation and effect on weather.	Member Unions are IAU, IUGG, IUPAC, URSI, IUPAP, IUBS, IUTAM, IMU, IUPS, IOB. In addition, the national scientific institutions of 35 countries adhering to ICSU are represented.	The expenditures of COSPAR in 1955 were approximately \$93,000.	The Space Science Board of the NAS-NRC serves as the U.S. National Committee for COSPAR. The Chairman is Dr. H. H. Hess, Department of Geology, Princeton University, Princeton, N. J. COSPAR is Dr. R. W. Porter, General Electric Co., New York City.	Liaison is maintained through DOD, FCC, NASA, NSF, OST, and State representatives to the Committee on International Relations of the Space Science Board. Dr. R. W. Porter is Chairman of this Committee. The U.S. contribution to COSPAR is \$10,000 annually. The expense of research is borne by participating organizations.

NOTE.—For further information, contact Mr. George A. Derbyshire, Secretary, Space Science Board, NAS-NRC.

TABLE V.—*Global Atmospheric Research Program (GARP)—Tentatively scheduled for 1972*

Purpose	International organization		U.S. participation	
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRO	U.S. Government
To develop and test advanced technological means of measuring the motions of the entire lower atmosphere (below 30 kilometers) so that it can be studied as a single physical system, permitting verification of the possibility of long-range weather prediction. Scientific attention to (a) tropical disturbances, (b) radiation, (c) earth-atmosphere exchange, (d) numerical models, and (e) technological development (measurement, sensing and communication platforms).	The ICSU/UQG Committee on Atmospheric Sciences, in association with COSPAR and WMO. The Chairman is Prof. B. Bolin, European Space Research Organization, Paris; and the Secretary General, Dr. Thomas F. Malone of the Travelers Insurance Co., Hartford, Conn. It has been proposed that, as a next step, a planning conference be held at Stockholm from June 12 to July 14, 1967.	The Committee will require approximately \$250,000 over the next 1 or 2 years for planning the program.	Committee on Atmospheric Sciences, with the American Geophysical Union and the American Meteorological Society. The Chairman is Dr. T. F. Malone, Secretary General, International Committee.	ESSA, NSF, and NASA. Budget estimates are now being established.

NOTE.—For further information, contact Mr. John R. Sievers, Executive Secretary, Committee on Atmospheric Sciences NAS-NRO.

TABLE VI.—*International Biological Program (IBP)—Phase I: 1965–67, design and feasibility studies; phase II: Mid-1967–72 (approximate), operational program*

Purpose	International organization		U.S. participation	
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRC	U.S. Government
Worldwide study of the biological basis of productivity and production on land, sea and fresh water, and potential uses of new and existing natural resources; (2) human adaptability to changing conditions.	Special Committee for the International Biological Program (IBP) is composed of the following: IUNS, IUI, IUPS, IQU, IUNS, and IUGN. There are 7 Sectional Committees: Productivity of Terrestrial Communities; Productivity of Fresh-Water Communities; Conservation of Marine Resources; Human Adaptability to Changing Conditions; Biological Resources; IBP Central Office, 7 Marylebone Rd., London, N.W. 1, Scientific Director, E. B. Worthington; Executive Secretary, H. A. W. Southton.	The 1966 budget of SCIBP was estimated at \$178,000 on Sept. 1, 1966.	The U.S. National Committee for IBP, of which the Chairman is Dr. Roger Revelle, Director, Center for Population Studies, Harvard University School of Public Health.	The Interagency Coordinating Committee for the IBP, of which the Chairman is Dr. Harro J. Carlson, Director of the Division of Biological and Medical Sciences, NSF. Participating agencies: AEC, Agriculture (Cooperative State Research Service, Forest Service, Agricultural Research Service), Commerce (Bureau of Oceanography, AR Office, Scripps Institution of Oceanography, Research Army Research Office), HEW (NIH, PHS/Environmental Health, Office of Education), Interior, State (SCI, AID), NASA, the Smithsonian.
				The IBP budget for 1966 is \$1,000,000, of which \$100,000 is U.S. dues to SCIBP and \$90,000 is special contribution to SCIBP, being matched by other participating countries.

NOTE.—For further information, contact Dr. Michael R. DeCarlo, Assistant Executive Secretary or Mr. Richard H. Oliver, Division of Biology and Agriculture, NRC.

TABLE VII.—*International Hydrological Decade (IHD)—1965-74*

Purpose	International organization		U.S. participation	
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRC	U.S. Government
(1) To strengthen the scientific and technological bases for water development, use, and conservation; (2) To improve water science and technology; and (3) to improve the ability of developing countries to cope with their own problems.	UNESCO: Division of Natural Resources Science and Research, Department of Advancement of Science. The Coordinating Council for IHD is composed of 21 members named by member states of UNESCO. Mr. P. R. Abulja of India, is Chairman. The ICSU Scientific Committee on Water Research serves as advisory body to IHD. Dr. A. Veker, of the Netherlands, is Chairman.	UNESCO budget for IHD, 1965-66: Regular program, \$300,000; technical assistance, \$201,300; total, \$501,300. Proposed UNESCO budget for IHD, 1967-68: Regular program, \$395,000; technical assistance, \$228,000; total, \$623,000.	The U.S. National Committee for the IHD, of which the Chairman is Dr. Raymond L. Nace, of the U.S. Geological Survey. Dr. Nace is also U.S. member of the UNESCO Coordinating Council for the IHD.	The Geological Survey is now the most active agency, but others such as the Agricultural Research Service of Agriculture, the Weather Bureau of ESSA, and the NSF are extending their participation. State and other regional institutions are prepared to cooperate in the near future.
				Budget Proposed but not yet appropriated: fiscal year 1967, \$2,600,000; fiscal year 1968, \$3,000,000; fiscal year 1969, \$9,000,000.

NOTE.—For further information, contact Dr. L. A. Heindl, Executive Secretary, U.S. National Committee for IHD, Division of Earth Sciences, NAS-NRC.

TABLE VIII.—*International Years of the Quiet Sun (IQSY)—Operational phase, Jan. 1, 1964, to Dec. 31, 1965; present phase, analysis of results; final general assembly and symposium, London, July 1967*

Purpose	International organization		U.S. participation		
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRC	U.S. Government	Budget
To observe and study, during a period of minimum solar activity: (1) Geophysical and solar system phenomena ¹ in which the sun is an important controlling factor, and correlations with conditions on the sun; (2) the effects of ionospheric disturbances on radio activity; (3) biological effects on the effects of solar activity.	ICSU Special Committee for the IQSY with representation of IAU, IUGG, IUPAP, and URSI. Cooperating organizations include WMO, CIG (world data centers in the United States, Europe, and Japan), International Union of Pure and Applied Physics, World Meteorological Service, COSPAR, and SCAR. There are participating scientists in 71 countries. The Chairman of the IQSY Special Committee is Prof. W. J. G. Beynon, Department of Physics, University of Wales.	The 1966 budget of the ICSU Special Committee for the IQSY is approximately \$33,000.	Committee for IQSY of the Geophysics Research Board. The Chairman of the Committee is Dr. M. A. Pomerantz, Bartol Research Foundation, Franklin Institute, Philadelphia, Pa. Dr. Pomerantz is also 1 of 3 Vice-Chairmen of the ICSU Special Committee for the IQSY.	DOD, ESSA, Geological Survey, NASA, and NSF. The coordinator is Dr. Clayton Clark, Aeronomy Program Director, Division of Environmental Sciences, NSF.	Between \$10,500,000 and \$11,000,000 in NSF grants from the beginning of the program to November 1966. Other governmental agencies have spent some tens of millions of dollars on contributed programs.

¹ Encompassing the following fields: Aeronomy, aurora, cosmic rays and geomagnetically trapped radiation, magnetism, geophysics and radio astronomy, meteorology, the sun and the interplanetary medium.

Note.—For further information, contact Dr. E. R. Dyer, Jr., Executive Secretary, U.S. National Committee for IQSY Geophysics Research Board, NAS-NRC.

TABLE IX.—Scientific Committee on Antarctic research on ICSU (SCAR)—Continuing program

Purpose	International organization		U.S. participation	
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRC	Budget
International coordination of research in the Antarctic in biology and medicine, communications, geodesy and cartography, geology, geomagnetism, glaciology, logistics, meteorology, oceanography, solid-earth geophysics, and upper atmosphere geophysics.	SCAR consists of members representing IOU, IUHRS, IUGG, IUGS, IUPAC, IUPS, URSI, and WMO, and of national delegates representing the 12 original signatories of the Treaty on Antarctic Research (Argentina, Australia, Belgium, Canada, France, Japan, New Zealand, Norway, South Africa, United Kingdom, United States, U.S.S.R.). The President of SCAR is Dr. L. M. Gould, Department of Geology, University of Arizona, Tucson, Ariz.	Budget for meetings and secretariat currently \$20,000 to \$25,000 per annum.	Committee on Polar Research. The Chairman is Dr. L. M. Gould, who is also President of SCAR.	NSF grants and Naval Operation Deep Freeze run to over \$25,000,000 per annum, not counting the expenditures of other governmental agencies.

NOTE.—For further information, contact Mr. Louis DeGoes, Executive Secretary, Committee on Polar Research, NAS-NRO.

TABLE X.—Upper Mantle Project (UMP)—Phase II: Jan. 1, 1985, to Dec. 31, 1987, operational phase; phase III: 1988-70, terminal phase; analysis and interpretation of data will be emphasized; programs will be developed more fully, especially in countries slow to start

Purpose	International organization		U.S. participation	
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRC	U.S. Government
Study of UM and its influence on development of Earth's crust. Main programs: (1) Regional and related studies; geophysical-geochemical studies; geophysical-geochemical studies; thermal history of crust and UM; earth-tide studies of viscosity and mechanical behavior of UM; rocks and minerals at high temperatures and their relations to tectonics; paleomagnetic and paleoclimatic studies on continental drift hypothesis; (2) deep-drilling for scientific purposes; (3) world rift system; (4) continental margins and island arcs.	ICSU project coordinated by the Upper Mantle Committee, an IUGG committee set up jointly by IUGG and IUGS in association with IGU, IUPAC, IUPAP, IUTAM, and SCOR. UNESCO has also named a representative to the Committee. The committee is concerned with CIG World data centers are repositories of results.	The figure for the total amount being spent by all countries is not available. Samples: Canada, \$3,000,000; Japan, \$3,000,000; Federal Republic of Germany, \$400,000; USSR, \$400,000. UNESCO budget allocation of \$30,000 for 1985-86.	Upper Mantle Committee of the Geophysics Research Board, NAS-NRC. Chairman of the Committee is Prof. Leon Kropotkin, Department of Physics, University of Kentucky. It is also Secretary-General of the International UM Committee.	Interagency Upper Mantle Committee, coordinated by NSF (Dr. William E. Benson, Head, Earth Sciences Section, Division of Environmental Sciences).
				The U.S. contribution to the UMP consists largely of ongoing programs of universities and governmental agencies with some support from NSF. Approximate annual expenditure is \$3,000,000 to \$10,000,000.

¹ Especially, ARPA, Coast and Geodetic Survey, Geological Survey, Navy Oceanographic Office.

NOTE.—For further information, contact Dr. Pembroke J. Hart, Secretary, U.S. Upper Mantle Committee, NAS-NRC.

TABLE XI—World Magnetic Survey (WMS)—Data are still being collected, and the cutoff date has not been finally fixed. The WMS is considered to be part of the IQSY effort; it is expected that this program will be repeated at approximately 10-year intervals

Purpose	International organization		U.S. participation	
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRC	Budget
To map the earth's main magnetic field during a period of relative solar quiet when solar perturbations are infrequent and small; and, in particular, to fill in gaps in previous coverage, e.g., above certain parts of the ocean. The map is to serve as a basis for continuing large-scale magnetic field work is to be carried out by geomagnetic stations, field surveys, oceanographic vessels, survey aircraft, and satellites.	Coordinated by the World Magnetic Survey Board of the IUGG, in association with COSPAR, SCA R, and SCOR. The Chairman of the Board is Prof. V. Laursen, Meteorologist, Institut, Charlottenlund, Denmark. The WMS Secretariat is located at the offices of the Geophysics Research Board, NAS-NRC. Dr. E. H. Vestige, Chairman of the NAS-NRC Panel on WMS, is Secretary General of the WMS Board.	The Board's running expenses are absorbed by participating organizations. The Board has also received funds from UNESCO for various projects.	Panel on WMS of the Geophysics Research Board, NAS-NRC. Chairman of the Panel is Dr. E. H. Vestige, Rand Corp., Santa Monica, Calif.	Meetings and secretariat expenses amount to about \$6,500 which is funded by NSF. The expense of research is borne by participating organizations.

For further information, contact Dr. E. R. Dyer, Jr., Secretary, U.S. Panel on IS, Geophysics Research Board, NAS-NRC.

TABLE XII.—*World Weather Watch (WWW)*—While certain aspects of this program are now in effect, most of them are still being planned

Purpose	International organization		U.S. participation	
	Sponsorship and participating bodies	Approximate annual budget	NAS-NRO	Budget
To develop a greatly improved and modernized international capability for meteorological observations, communications, data analysis and processing; to incorporate new technology of proved value into the international operational functions of the World Weather Watch.	The World Meteorological Organization and member states. The Secretary General is D. A. Davis. This year's Chairman of the Advisory Committee on the WWW is K. Y. Kondratiev, Institute of Chemical Physics, Moscow.	Approximately \$500,000 in WMO funds.	-----	Budget estimates are now being established.
			Interagency Committee for International Meteorological Programs. The Chairman is Dr. J. Herbert Hollomon, Assistant Secretary of Commerce for Science and Technology. Other participating agencies are DOD, NASA, NSF, and State.	

NOTE.—For further information, contact Dr. R. E. Hallgren, ESSA Headquarters, Washington Science Center.

ACRONYMS USED IN THE SUMMARY TABLES

ABC	Atomic Energy Commission	NAE	National Academy of Engineering
AF	U.S. Air Force	NAS	National Academy of Sciences
AID	Agency for International Development	NASA	National Aeronautics and Space Administration
ARPA	Advanced Research Projects Agency	NBS	National Bureau of Standards
AS	Association of American Geographers	NCH	National Research Council
GIG	Committee International de Géophysique	NIE	National Institutes of Health
GOSPAR	Committee on Space Research, ICSU	NSF	National Science Foundation
DOD	Department of Defense	ONR	Office of Naval Research
ESSA	Environmental Science Services Administration	OST	Office of Science and Technology, the White House
FAA	Federal Aviation Agency	PHS	Public Health Service
FCC	Federal Communications Commission	SCAR	Scientific Committee on Antarctic Research, ICSU
GARP	Global Atmospheric Research Program	SCI	State
HEW	Department of Health, Education, and Welfare	SCIBP	Special Committee on the International Biological Program
IAGU	International Astronomical Union, ICSU	SCOR	Scientific Committee on Oceanic Research, ICSU
ICSU	International Biological Program	USIA	University of California, Los Angeles
ICU	International Council of Scientific Unions	USRA	International Scientific Radio Union, ICSU
IHD	International Hydrological Decade, ICSU	WMO	World Meteorological Organization
IOB	International Year of the Quiet Sun	WWS	World Weather Watch
IUB	International Union of Biochemistry, ICSU		ADDENDA
IUGN	International Union of Biological Sciences, ICSU		
IUGG	International Union for the Conservation of Nature		
UGS	International Union of Geodesy and Geophysics, ICSU		
IUNS	International Union of Geological Sciences, ICSU		
IUPAC	International Union of Nutritional Sciences		
IUPAP	International Union of Pure and Applied Chemistry, ICSU		
IUPP	International Union of Pure and Applied Physics, ICSU		
IUTAM	International Union of Physiological Sciences, ICSU		
	International Union of Theoretical and Applied Mechanics, ICSU		
		CSK	Cooperative Study of the Kuroshio and Adjacent Regions
		IMU	International Mathematical Union
		IUCr	International Union of Crystallography
		IUPAB	International Organization for Pure and Applied Biophysics
		UMP	Upper Mantle Project

APPENDIX VII

What nations are formally participating in the IBP?

Answer: The participating nations in the IBP are:

North America:	United States**	
	Canada**	
	Mexico*	
South America:	Argentina*	
	Brazil*	
	Chile*	
	Venezuela*	
	Peru*	
Europe:	Austria**	Hungary*
	Belgium**	Ireland, Republic of*
	Bulgaria**	Italy**
	Czechoslovakia**	Netherlands**
	Denmark**	Norway**
	Finland**	Poland**
	France**	Spain**
	Germany, Federal	Sweden**
	Republic of**	Union of Soviet Socialist
	Germany, Democratic	Republics**
	Republic of**	United Kingdom**
	Greece*	Yugoslavia**
Asia:	China, The National	
	Republic of*	
	Hong Kong	
	India**	
	Indonesia**	
	Israel**	
	Japan**	
	Korea, Republic of**	
	Malaysia	
	Nepal	
	Philippines, The**	
	Thailand*	
	Vietnam, Republic of*	
Africa:	East Africa* (Uganda, Kenya, Tanzania)	
	Ethiopia	
	Ghana*	
	Malawi	
	Nigeria**	

Africa: (con't)

Rhodesia*

South Africa, The Republic of**

Australia**

New Zealand**

*Countries with National Committees

**Countries with National Committees and Programs

There have been substantial additions to the list previously furnished by letter of 15 May. It is hoped that Ethiopia, Hong Kong, Malawi and Nepal will organize National Committees in the near future.

What is the extent of this participation in terms of leadership, manpower, and funds?

Answer: The International Council of Scientific Unions has established a Special Committee for the IBP (SCIBP), consisting of more than thirty distinguished scientists. This committee is responsible for organizing and implementing the program. Its organization is as follows:

President: Professor Jean G. Baer, Switzerland (Inst de Zoologie, Universite de Neuchatel)

Vice Presidents: Sir Otto H. Frankel, Australia (Chief, Division of Plant Industry, Commonwealth Scientific and Industrial Research Organization)

Professor G. Montalenti, Italy (Professor of Genetics, Citta Universitaria, Rome; Member, Accademia Nazionale dei Lincei)

Professor K. Petruszewicz, Poland (Secy Section II, Polish Academy of Sciences, Professor University of Warsaw)

Dr. H. Tamiya, Japan (Tokugawa Institute for Biological Research, Tokyo)

Scientific Director: Dr. E. B. Worthington, United Kingdom

Members Representing International Non-Governmental Organizations in ICSU:

- (ICSU) Professor D. Blaskovic, Czechoslovakia (Virological Inst. of Bratislava)
- (IUBS) Professor C. H. Waddington, United Kingdom (Inst. of Animal Genetics, Edinburgh)
- (IUB) Professor M. Florkin, Belgium (Professor of Biochemistry, University of Liege)
- (IUPS) Professor S. Robinson, U.S.A. (Department of Anatomy and Physiology, University of Indiana)
- (IGU) Professor Carl Troll, (Germany, Federal Republic of) (Professor of Geography and Director, Geographical Institute, University of Bonn)

Convenors of Sectional Committees:

- PT Professor Francois Bourliere, France (Professor of Gerontology, University of Paris; President, International Union for Conservation of Nature and Natural Resources)
- PP Professor Ivan Malek, Czechoslovakia (Professor, Medical Microbiology, Charles University; Director, Institute of Microbiology, Czech. Academy of Sciences)
- CT Mr. E. M. Nicholson, United Kingdom (The Nature Conservancy, London)
- PF Professor A. D. Hasler, U.S.A. (Laboratory of Limnology, University of Wisconsin)
- PM Dr. B. H. Ketchum, U.S.A. (Oceanographic Institution, Woods Hole)
- HA Professor J. S. Weiner, United Kingdom (Royal Anthropological Institute, London)
- UM Dr. G. K. Davis, U.S.A. (Nuclear Science Department, University of Florida)

Members Representing International Non-Governmental
Organizations other than in ICSU:

- (IUNS) Dr. C. G. King, U.S.A.
(IUCN) Professor Jean G. Baer, Switzerland
(IUAES) Professor J. Hiernaux, Professor of Anthropology,
Belgium

Administrative and Financial:

- Dr. Roger Revelle, U.S.A., Director, Harvard Center for
Population Studies
Dr. R. W. J. Keay, United Kingdom (The Royal Society,
London)
Professor G. Montalenti, Italy (Professor of Genetics,
University City, Rome)

Regional Representatives:

- India: Dr. A. R. Gopal Ayengar, Atomic Energy Establish-
ment
Nigeria: Dr. A. E. Boyo, Department of Pathology, Lagos
University Medical School
USSR: Professor B. Bychowsky (Zoological Institute,
Leningrad)
U.S.A.: Dr. S. A. Cain (Assistant Secretary for Fish
and Wildlife and Parks, USDI)
Australia: Sir Otto Frankel (Chief, Division of Plant
Industry, CSIRO)
Sweden: Dr. C. G. Heden (Department of Bacteriology,
Karolinska Institute, Stockholm)
Poland: Professor K. Petrusewicz (Ecological Institute,
Warsaw)
Japan: Dr. H. Yamiya (Tokugawa Institute for Biological
Research, Tokyo)
South Africa: Dr. C. A. du Toit (Department of Zoology,
University of Stellenbosch, South Africa)
Brazil: Dr. M. Vannucci, Instituto Oceanografico da
Universidade de Sao Paulo

Members Representing Scientific Committees of ICSU:

- SCAR Dr. M. W. Holdgate, United Kingdom (The Nature
Conservancy, London)

SCOR Dr. O. H. Oren, Israel (Sea Fisheries Research Station, Haifa)

The countries that have established national committees for action under the International Biological Program are listed below with the committee chairmen.

Argentina:	Professor Osvaldo Boelcke, Department of Botany, University of Buenos Aires
Australia:	Sir Otto Frankel, CSIRO
Austria:	Dr. Wilhelm Kuhnelt, Zoologisches Inst., Vienna
Belgium:	Professor M. Florkin, Professor of Biochemistry, Liege
Brazil:	(Chr unnamed), Conselho Nacional de Pesquisas, Rio de Janeiro
Bulgaria:	Professor N. Stojanov, Inst. of Botany, Bulgarian Academy of Sciences
Canada:	Dr. T. W. M. Cameron, Division of Biosciences, NRC, Ottawa
Chile:	Dr. Francesco di Castri, National Research Council, Santiago
China (Rep of):	Dr. Hsien-Wen Li, Institute of Botany, Taipei
Czechoslovakia:	Professor Ivan Malek, Professor, Medical Microbiology, Charles University
Denmark:	Dr. H. M. Thamdrup, Zoological Institute, Aarhus Universitet
East Africa:	Dr. F. A. Mutere, East African Academy, Nairobi (Kenya, Tanzania, and Uganda)
Finland:	Professor Hans Luther, Helsingin Yliopiston, Kasvitieteen Laitos, Helsinki
France:	Professor Andre Th. Monod, Museum National d'Histoire Naturelle, Paris

Germany, Fed Rep of:	Professor H. Ellenberg, University of Gottingen
Germany, Dem Rep of:	Professor Hans Stubbe, Institute fur Kulturpflanzenforschun, Gatersleben
Ghana:	Dr. C. O. Easman, Ghana Academy of Sciences, Accra
Greece:	Professor G. Athanasiades Novas, Akademia Athinon, Athens
Hungary:	Professor Dr. J. Balogh, Budapest
India:	Professor B. R. Seshachar, Department of Zoology, University of Delhi, Delhi
Indonesia:	Dr. Otto Soemarwoto, National Biological Institute, Bogor
Ireland, Rep of:	(Chr unnamed), Royal Irish Academy, Dublin
Israel:	Professor Jonathan Magnes, Department of Physiology, Hebrew University, Jerusalem
Italy:	Professor C. Barigozzi, Istituto di Genetica, University of Milan, Milan
Japan:	Dr. Hiroshi Tamiya, University of Tokyo, Tokyo
Korea, Rep of:	Professor Yung Sun Kang, Department of Zoology, Seoul University, Seoul
Malaysia:	(Chr unnamed), University of Malaya, Kuala Lumpur
Mexico:	Dr. Guillermo Soberon, Cuidad Universitaria, Mexico
Netherlands:	Professor Dr. G. J. Vervelde, Nederlandse Akademie van Wetenschappen, Amsterdam
New Zealand:	Professor G. A. Knox, Department of Zoology, University of Canterbury, Christchurch

Nigeria:	Professor Eni Njoku, University of Nigeria, Nsukka
Norway:	Professor Rolf Vik, Zoologisk Museum, University of Oslo, Oslo
Philippines:	Dr. Deogracias V. Villadolid, University of Philippines, Quezon City
Poland:	Professor K. Petrusewicz, Polish Academy of Science, Warsaw
Rhodesia:	Professor E. Bursell, Dept. of Biological Sciences, University College of Rhodesia, Salisbury
South Africa:	Professor C. A. Du Toit, Dept. of Zoology, University of Stellenbosch, Stellenbosch
Spain:	Professor A. Carrato, Consejo Superior de Investigaciones Cientificas, Madrid
Sweden:	Professor C. G. Heden, Bakteriologiska Institutionen, Karolinska Institutet, Stockholm
Thailand:	Mr. Insee Chandrastilya, Agricultural University, Bangkok
United Kingdom:	Professor A. R. Clapham, Royal Society, London
U.S.A.:	Professor Roger Revelle, National Academy of Sciences, Washington
USSR:	Professor B. E. Bychowsky, Zoological Institute, Leningrad
Vietnam, Rep of:	Mr. Pham-Hoang-Ho, Biological Society of Vietnam, Saigon
Yugoslavia:	Dr. Branko Miletic, Institute "Rudjer Boskovic", Zagreb

According to the latest information available, twenty-six of these countries contribute to the support of SCIBP and the total of that support is \$50,800 for this year. The United Kingdom has provided a Central Office and the services of a coordinator and staff for the International Biological Program. Support of SCIBP is also provided by ICSU and other international

organizations. Extensive joint projects with the United Nations Educational, Scientific and Cultural Organization (UNESCO) are coordinated by a UNESCO-IBP Liaison Committee. Close working relationships are maintained with the World Health Organization (WHO) for the Human Adaptability Section (HA) and with the Food and Agricultural Organization (FAO) for the Productivity of Freshwater Communities (PF), the Productivity of Marine Communities (PM) and the Use and Management of Biological Resources (UM) Sections.

The scientific manpower active on international committees and working groups total 220 and those on the many national committees total approximately 950. The numbers will vary with the size and scientific strength of the participating countries. It is not possible to estimate total participating manpower, but more than 2,000 active projects are now listed internationally and the number is constantly increasing. As more countries complete their organizations, and convene working groups, the number of scientists active in the IBP will eventually number many thousands.

APPENDIX VIII

What is, and will be, the role of the USSR and Communist bloc nations in Phase I and in Phase II?

Phase I - The Presidium of the Academy of Sciences of the USSR created, on March 19, 1965, a Soviet National Committee for the IBP comprising 32 distinguished scientists. Academician B. E. Bykhovsky is Chairman. He is also Regional Representative for the USSR on the Special Committee for the IBP (SCIBP), the Committee of the International Council of Scientific Unions for this program. Professor K. Petruszewicz of Poland, is a Vice President of SCIBP. The International Council of Scientific Unions is represented on SCIBP by Professor D. Blaskovic of Czechoslovakia. The Sectional Committee of the SCIBP on Production Processes is headed by Professor Ivan Malek of Czechoslovakia.

The following IBP conferences have been held, or are planned in communist bloc nations:

1965

- 20-23 April - First meeting of the Sectional Committee on Production Processes, and the Subcommittees on Photosynthesis and Utilization of Solar Energy and on Nitrogen Fixation. Chaired by Academician Ivan Malek in Prague.
- 26-28 April - First meeting of the Sectional Committee on Human Adaptability, in conjunction with the Polish Human Adaptability Conference, organized by Professor Wanke, Anthropological Institute, Wroclaw. Twenty-two of the thirty-five scientific papers were from bloc countries.
- 26 August - Meeting of the Sectional Committee on Productivity of Freshwaters, Polish Academy of Sciences, Warsaw. This was followed by the Polish Subcommittee, chaired by Z. Kajak.

1966

- July - Meeting of the USSR Nitrogen Fixation Subcommittee in Moscow.
- 26-27 August - Symposium on Novel Protein Sources in Warsaw sponsored by the Subcommittee on Use and Management of Biological Resources.

- 30 Aug-6 Sept - Conference in Warsaw on Principles and Methodology of Secondary Productivity of Terrestrial Ecosystems, organized by Professor K. Petrusewicz.

1967

- 4-7 April - Conference in Prague, on Secondary Productivity in Freshwater Communities.

1968

Moscow. SCIBP meeting on Measurement of Productivity in Root Systems.

Trebon, Czechoslovakia. Symposium on Evaluation of Photosynthesis in Crops Stands.

Bulgaria, Czechoslovakia, Yugoslavia, the German Democratic Republic, Hungary, Poland and the USSR have organized their National Committees and with exception of Hungary completed their subcommittee organizations with IBP plans.

Phase II - There is no doubt of the deep interest of the communist bloc nations in the International Biological Program. In the May 1967 issue of VESTNIK, published by the Academy of Sciences of the USSR, a detailed comment on the program was presented. The importance of IBP research to all of the scientific organizations and institutions of higher learning within the republics of the Soviet Union was emphasized. Plans of Bulgaria, the German Democratic Republic, Czechoslovakia, Poland, and Yugoslavia have already been published and those of the USSR are known to be in preparation. A complete translation of this article is attached as enclosure 1 to this appendix.

What is the same role of the developing nations?

Answer: Several developing countries in Asia and Africa are participating in the IBP. The U.S. National Committee has recognized that one of the paramount needs of the program is to assure participation of the developing nations. More comprehensively however, most of the U.S. Committee's efforts have been concentrated on attempts to encourage participation by all nations of the Americas. Argentina, Brazil, Chile, and Mexico have established National Committees. In addition, scientists from Peru and Venezuela have participated on working groups convened by

U.S. scientists in the program. It is evident that there is a growing interest among all the states of the Americas and that many of the programs will require and will achieve a high degree of hemispheric coordination. All countries, including those developing, will benefit through accelerated development and application of biological information as sponsored by the IBP.

ENCLOSURE 1 TO APPENDIX VIII

THE INTERNATIONAL BIOLOGICAL PROGRAM

B. E. Bykhovskiy, Academician

L. E. Rodin, Doctor of Biological Sciences

(Translated from the Vestnik of the Academy of Sciences of the USSR, May 1967, pp. 69-72)

Not only is the population of our planet growing continually, but it is doing so at an ever increasing rate. During the 1920's and 1930's the population grew 11%, but from 1951 to 1960 this rate had already gone up to 19%. The number of inhabitants of the earth is now over 3 billion. By 1975 it will reach, according to the calculations of UN experts, almost 4 billion, and by the year 2000, around 6 billion human beings.

At that time, if the present rate of food consumption is taken as our point of departure, we will need about 2 times more food than now. At present, however, about every third inhabitant of our earth is not getting enough to eat, and about 500 million people are chronically and acutely suffering from hunger. Thus, to satisfy the whole world's need for food, it is necessary to increase food production more than twofold.

Since present production of all types of grain amounts to 900-950 million tons, it will be necessary by the year 2000 to raise the production of cereals to 2.5 billion tons, which is a 2.5 increase in 35 years.

The estimates of UN, FAO and UNESCO experts, based on the study of all aspects of the food problem allow us to hope that humanity will manage to feed itself, although this task will be very difficult. We have not by far made use of all the possibilities presented by science for increasing crops. In particular, much can be expected of genetics in developing much more productive types of plants and animals. Tremendous reserves of food lie hidden in the oceans and seas. Actually, humanity already has at its disposal such a number of ways of getting food that zealous use of them would make it possible to feed a population considerably larger than the one at present. For instance, the mere loss of grain and other agricultural products which is caused by vermin, rodents and disease amounts to almost one third of the world's gross agricultural production.

Besides food products, however, clothing, shelter and a thousand different objects are required to satisfy the material needs of man.

In 1961, products of plant and animal origin (food products, textiles, leather, wood, paper) comprised around 27% of the value of general world production. From 1950 to 1960 the value of the production of coal, metal, non-metallic minerals, electricity, and gas increased 6 to 9.5% annually, while the value of products of plant and animal origin increased in the range of 4.7 to 5.7%. There can be no doubt that, as the world's population continues to grow, the demand for products of organic biogenous (plant and animal) origin will be ever greater.

In this respect, data about wood consumption are characteristic. If consumption in 1951 is taken to be 100%, consumption in Europe in 1963 had risen to 129%; in the USSR, to 177% and in the whole world, to 133%. Since there is a tendency to use less wood for heating, it is expected that the amount consumed for heating in 1975, as compared to 1961, will be 69% in Europe, 74% in North America and 79% in the USSR. On the other hand, general consumption of wood during the same period will increase to 111% in Europe and the USSR, to 114% in North America, and to 123% in the world as a whole (on account of the sharp increase in the use of wood on other continents, for instance, an increase to 199%, compared with 1961, in Latin America).

It is a mistake to think that, because of successful physico-chemical synthesis, synthetic materials can completely replace textiles such as wool. The production of most synthetic materials requires raw materials of organic origin, and already in a number of cases these are insufficient.

As the population increases and more industries, cities, and roads are built, encroachment on the natural plant cover which is an important source of raw materials for many branches of industry is inevitable. In the USSR, the area of deforestation and that of reforestation are more or less in balance, but during the 25 years from 1940 to 1965 about 5 million hectares of forest were lost because of the construction of large dams, cities, industrial sites, power lines and so forth.

At the present time, 31% of the area of Europe is under cultivation, 11% in the USA, 10% in the USSR, 9% in Africa and only 4% in South America, but 70% in Indonesia (Java), the average for the world being around 10%. Certain experts think that the land under cultivation can be increased to a world average of 16% or 17% which would add around 45% to agricultural production.

Others, however, estimate that almost all land available for agriculture is presently under cultivation in every country in

accordance with its technological and economic level. The remaining natural areas which are not under cultivation can be divided into two categories: forests, pasturage, and fields mowed for hay which are sometimes even more valuable for the national economy as they are than they would be if they were plowed; and wastelands which it would not be practical to bring under cultivation, given the present state of technology and economic conditions in the countries concerned.

All this means that the exploitation of natural areas, primarily of plant communities, will increase.

The changes which are taking place in the structure of the biological resources of the earth are not only of a quantitative nature, as when the over-all production of organic matter decreases in a given area, but also of a qualitative nature, as when certain types of plants and animals disappear and their place is taken by other less valuable types. Historical experience shows that man's activity causes many natural areas to undergo important changes in a relatively short period of time, and that communities of plants and animals are replaced by others. In many cases where this happens (excluding man's creation of highly cultivated areas), the new communities are of less economic value than those preceding them (savannas in place of different types of tropical forests; aspens and birches in place of conifers and broad-leaved trees; vast areas of semideserts and deserts with a rich fauna of ungulates converted into areas of low productivity and sometimes into wastelands).

The mighty growth of technology and its application everywhere is now causing still more rapid changes of the natural plant cover and the animal population of terra firma as well as the plant and animal world of rivers, fresh-water basins, oceans and seas.

For these reasons it is necessary to make a deep, all-inclusive and global study of the productivity of organic matter on earth as the source of food and industrial raw materials to cover man's needs.

In 1960, international scientific associations to which scientists of the USSR belong (the International Union of Biological Sciences, the International Geographical Union, the International Council of Scientific Unions) pointed out the necessity of sharply increasing research on the biological resources of our planet. The decision was taken to organize international biological research in a way similar to research undertaken for the International Geophysical Year, a program which had existed for some years.

In accordance with this resolution, a special organization, the International Biological Program (IBP), was founded in 1964 at a meeting which was also the Program's first General Assembly. This Assembly, in which biologists representing more than 40 countries took part, adopted statutes and set the course for IBP activity.

The scientists of various countries who participate in the IBP will, as their basic task, conduct simultaneous research from 1967 to 1972 in accordance with generally agreed plans and with the use of standard and comparable methods. The subject of study will be the biological productivity of the plant and animal world on solid ground, in the sea and in fresh water (lakes and rivers) with the goal of establishing the basic laws of distribution, growth, yearly accretion, and renewal (reproduction) of organic material. Research will be conducted on the productivity of cultivated as well as natural communities for the purpose of clarifying conditioning factors and the possibility of increasing productivity to the maximum in the interest of man.

In accordance with the IBP research program the sectional committees were created in the international center and in the IBP member countries. They are productivity of terrestrial communities, production processes, conservation of terrestrial communities, productivity of fresh water communities, productivity of oceans and seas, human adaptability, use and management of biological resources.

The problem of studying biological productivity is many-faceted and must be attacked at various levels: the cellular (the processes of photosynthesis, synthesis and resynthesis of living matter, the selective assimilation of nutritional elements and so forth); the organic (the productivity of a species); the coenotic (productivity of the plant community and biogeocoenosis - ecosystems - as a whole).

The final task of studying biological productivity is to determine the balance of materials and energy, the laws of the biological circulation of matter and energy in cultivated as well as natural communities, and the scientific bases of increasing their productivity, reproduction and rational use.

Soviet scientists are taking an active part in IBP efforts.

On March 19, 1965, the Presidium of the Academy of Sciences of the USSR created a Soviet national committee for the International Biological Program, the membership of which comprises 32

distinguished Soviet scientists representing all branches of IBP activity. Academician B. E. Bykhovskiy was named chairman of the committee and his deputies are V. A. Kovda, Corresponding Member of the Academy of Sciences of the USSR, and Drs. N. K. Vereshchagin, A. A. Nichiporovich, and L. E. Rodin. (Translator's comment: Kovda was formerly the head of Unesco's Department of Science and is now the Scientific Secretary of the Advisory Committee on the Application of Science and Technology to Development, U.N. Economic and Social Council).

In January 1966, the committee called a meeting in Leningrad on biological productivity of terrestrial plant communities. More than 400 scientists from 56 scientific institutions of the USSR took part in this meeting. There were 153 reports on general, theoretical and methodological questions. In the course of the meeting, there were 3 symposia on the following subjects:

1. The Theoretical Bases of Photosynthetic Activity of Plant Cover.
2. Biological Productivity of Natural and Artificial Communities.
3. Biological Cycles of Chemical Elements in Plant Communities.

The meeting was called primarily to present results of work on the study of biological production of terrestrial plant communities, the biological cycle of ash elements and nitrogen, photosynthesis as a factor determining productivity of wild and cultivated plants and to set the direction for further development of these important branches of contemporary biology.

For a long time, research on the productivity of the organic world has been conducted in our country. Research on the productivity of the Pacific Ocean, bodies of fresh water, terrestrial plant cover, and the processes of photosynthesis have been especially successful. Soviet scientists can make a serious contribution to the total sum of international research on these subjects. But it is necessary that these fields of IBP research receive the attention of institutes of the Academy of Sciences of the USSR, the All-Union Academy of Agricultural Sciences, the Academies of Sciences of the Republics, universities, and other institutions of higher learning. This research should occupy a central place in plans for the scientific activities of biological, agricultural, and certain mixed institutes (geographical, meteorological, etc.).

The fact that scientists of different countries are joining forces within the framework of the IBP presents an unprecedented opportunity to study the productivity of the organic world of all our planet and the factors conditioning this productivity, with the goal of rational use of the production of organic matter for the needs of humanity.

APPENDIX IX-A

Describe manpower and facilities in international training centers, collections and holding facilities, and field stations.

Review of publications of the ICSU Special Committee for the IBP, the "IBP News" series, indicates that no international training center has been formally identified or established. On the other hand, IBP organizations, internationally and nationally, not only within the U.S., but within the U.K., Australia, Canada and others pay special attention to the critical need for modern training in ecology, mathematics, biophysics, systems analysis including computer use and availability, and other related and supporting disciplines. During many of the IBP conferences and workshops in the U.S., participants have been urged to persuade their colleges and universities to up-date their curricula to include new courses and new sub-departments both in their undergraduate and graduate schools.

Dr. Gates in his testimony of 3 August strongly recommended the establishment of a National Institute for Ecology in which advanced training would be offered.

For trained personnel, IBP relies on two sources; (1) colleges, universities, and other institutions having strong programs in selected disciplines, and (2) training of individuals as part of specific IBP research projects.

Strong opinions have been expressed by many U.S. scientists concerning the difficulties in obtaining support for training foreign scientists in U.S. institutions. The U.S. National Committee for the IBP feels that barriers to such training should be greatly lowered or removed since the international program and particularly cooperative programs among the countries of North and South America depend on greater numbers of well trained biologists in the South American nations.

Related to the question on international training centers and to the questions on collections and holding facilities and field stations is the recognition of IBP Centers and Stations. Information contained in SCIBP's IBP "News No. 8" is quoted as follows.

"IBP CENTRES AND STATIONS

"Details of the centres and stations endorsed by SCIBP, on the recommendation of Section Committees, as appropriate for biological work within the framework of IBP are given

below. It is expected that the list of centres and stations so endorsed by SCIBP will grow during the years of IBP. It is not intended however that it should ever become exhaustive in the sense of containing every station and centre of major importance to the programme.

"SECTION PT

"Data and Information Centre for Small Mammals, Warsaw, Poland:

"This centre is to be established as the institute of Ecology of the Polish Academy of Sciences under the supervision of Professor K. Petruszewicz. It will serve as a reference point for ecological research on small mammals undertaken under IBP auspices, and will endeavour to ensure that the data collected under different research projects will be intercomparable. The basis for an international minimum programme of studies with small rodents, appropriate to temperate zone forests, has already been accepted at the technical meeting on secondary productivity studies of terrestrial ecosystems, Warsaw, September, 1966. Similar bases for programmes of small mammal productivity studies for grassland ecosystems in temperate lands, and for different habitats in the tropics, will be worked out by the centre.

"SECTION PP

"Computing centre at Canberra, Australia: The computing research section of the Commonwealth Scientific and Industrial Research Organization, at the initiation of the Australian National Committee, is placed at the disposal of Section PP. This arrangement is specifically for the standardized evaluation of the results from experiments carried out within the PP programme on photosynthesis and the use of solar energy.

"SECTION CT

"Data Centre for Biological Records, Huntingdon, England. This centre is being established at the Monkswood Experiment Station of the Nature Conservancy in charge of Dr. F. H. Perring. For United Kingdom purposes a biological records centre has existed here since 1963 with two objectives, namely:

- (1) to advise on methods of studying problems relating to the population and distribution of organisms and to encourage

these studies so as to build up a record of the diversity, abundance and range of the organisms which occur, and

(2) to process and edit the data received and add to them from national collections and the literature, so that the final results could be made available on request to all biologists.

"This centre is being developed by the addition of staff and equipment so that it can undertake the central storage and analysis of site data collected for Section CT throughout the world, and can play a leading part in the review of IBP areas.

"Jordan International Biological Station, Azraq, Jordan:

"During Phase I of the IBP this centre has been used as a testing ground for the concepts and techniques of CT Section, and also by scientists in other Sections. It is now placed on a continuous and effective footing throughout the period of IBP, after which it is expected to provide a link between the growing scientific community in Jordan and the scientific world generally.

"The University of Jordan at Amman, in consultation with the National Research Council, will serve as the station's base and will participate in its work, which will be organized by a Board of Trustees. Local facilities and staff for the station will be provided through Jordanian channels, while initially a director and a second resident scientist with up to six visiting scientists, together with a simple field laboratory will be provided and financed from outside sources. Responsibility for the station will pass wholly into Jordanian hands by progressive stages.

"SECTION PM

"Plankton Statistical Centre, Auckland, New Zealand:
This centre is being established at the University of Auckland under the supervision of Dr. R. M. Cassie. It is in response to the need for the development of more dependable methods for the design of sampling of plankton populations in space and time; also for the analysis of the results in ways which will give statistically significant information concerning the structure and distribution of the populations. The New Zealand Academy of Sciences and the University of Auckland are providing the centre with research space, computer time and technicians. Two senior fellows and two junior

fellows, some with rigorous mathematical backgrounds and others with experience in plankton studies, are needed for the proper fulfillment of the centre's purpose.

"SECTION HA

"Data Centre for Growth and Physique Studies, London. This centre is established at the Institute of Child Health, University of London, under the supervision of Dr. J. M. Tanner. At present it operates with part-time specialists and assistant staff, but as the work grows it may be necessary to expand both its accommodation and staff, and general facilities, which are at present provided by the Anthropometric and Statistical Laboratories of the Institute. These include facilities for the storage of growth data in punch card form.

"The facilities and experience for the planning of cross-sectional and longitudinal studies of human growth available at this centre are already widely used in the HA programme. As the projects get under way it is expected that they will be used particularly by workers in countries where facilities for training personnel and analysing data are at present limited.

"Compilation Centre for Blood Groups and Related Data, London: This centre is located at the Serological Population Genetics Laboratory, St. Bartholomew's Hospital, London. It is under the direction of Dr. A. E. Mourant and is financed by the Medical Research Council of the United Kingdom. The facilities include laboratory testing, retrieval of information from the literature, and statistical treatment of data. Blood samples collected on a population basis are tested for a wide range of red cell antigens and for a considerable and growing range of plasma and red cell proteins belonging to genetically determined systems. The centre has already collaborated with several IBP expeditions and international collaborative studies. Arrangements will in due course be needed for the long-term cold storage of numerous blood specimens.

"SECTION UM

"Proposed training centre in biological control, University of California: The University of California has proposed to establish, probably at Riverside, California, a training centre in the general subject of biological control, to be used for the purposes of IBP. The UM Section Committee,

appreciating the importance of biological control for many branches of IBP and the relative paucity of training facilities, advocated this centre for endorsement by SCIBP, while noting that action will depend on a measure of national support."

APPENDIX IX-B

Describe logistics (ships, aircraft, trucks, specialized vehicles, etc.).

Answer: Logistic planning and support for the US/IBP will be decentralized and will include facilities available in the colleges, universities, oceanographic institutions, Federal lands and experimental areas, research hospitals and institutes, Federal agency research facilities, and from others who support the US/IBP. Basically, this support will be defined, planned and committed as an essential element in each IBP research project; and within the integrated research programs will be more broadly planned to meet the needs of each program. Examples both general and specific will illustrate the development of logistic support and the plans therefor:

(1) Within the Marine Productivity program, project planning will include any needed use of the oceanographic research vessels such as the Alpha Helix, the Chain, the Atlantis II, the Crawford, the Gosnold, the Albatross, the Eastward, the Washington, the Thompson, the Pillsbury and others.

(2) Within Ecosystem Analyses, the facilities and equipment of the Hubbard Brook Experimental Forest of the U.S. Forest Service will be used, including watershed weirs and other gaging station equipment. In the Grasslands portion of these analyses, experimental grasslands administered by Agricultural Research Service, USDA, and other lands under the national control of the U.S., Canada and Mexico will be used. Computer facilities available at several universities are planned; e.g., the University of Michigan, the Colorado State University, Dartmouth College and others.

(3) In both the Ecosystem Analyses and the Program on Aerobiology, representatives from NASA, ESSA, NCAR, USDA-Beltsville, and others are participating in the planning. Through these representatives, consideration is being given to the use of data from remote sensing by satellite and existing observations available from the world-wide meteorological network, as well as the known effects of pathogens of unknown origin. Other data, facilities and equipment are being considered.

(4) In the Program on Eskimos, facilities available at the Arctic Research Laboratory of the University of Alaska are planned. Also facilities under Canadian control, both governmental and private, will be used since the program will be jointly developed by the U.S. and Canada. The Program Director, Dr. Frederick Milan, has been nominated by both the U.S. and Canadian National Committees for the IBP.

(5) Within the Freshwater Productivity Program, planning for the possible use of any one or more of the extensive fleet of vessels under control of the Bureau of Commercial Fisheries will be fully considered.

SUMMARY: Although specifics of logistics needs have not been identified, they are being considered and those existing will be utilized within developing projects. Needed non-existent logistic requirements will be identified within each project and integrated research program, and funds for acquisition will be specified in individual proposals.



