R. L. KIRK.

H.A. 60

INTERNATIONAL BIOLOGICAL PROGRAMME

GUIDE TO THE HUMAN ADAPTABILITY PROPOSALS

BY J. S. WEINER

CONVENER, HUMAN ADAPTABILITY SECTION

WITH A CONTRIBUTION BY

PAUL T. BAKER

Mutidisciplinary Studies of Human Adaptability:

Theoretical Justification and Method

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INTRODUCTION

This volume inaugurates a series of IBP Handbooks which will be published as material for them becomes available. Some of the series, such as this, will be general guides to the sectional activities of IBP. Others will be handbooks on methodology, a number of which will result from the symposia which are being held in a good many subjects during Phase I, that is the design and feasibility stage of IBP. It is not intended that the handbook series will contain the actual results of research undertaken under IBP, which would be published more appropriately in standard scientific journals.

The format of the handbooks has been chosen for convenience of transport and cheapness of postage. Since there is some urgency in spreading information around the world, and since some numbers in the series are likely to be of ephemeral value, to be replaced as the IBP programme unfolds, or new and better methods are evolved, speed of publication has been considered more important than perfection. However, within the limits of staff and finance available, every effort has been made to avoid error. The authors of handbooks and the Central and Sectional Offices of IBP are ready to answer any queries which arise.

August 1965

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CONTENTS

PREFACE

This Guide to the Human Adaptability part of the International Biological Programme is offered both as a progress report and a blueprint. It sets out the aims, scope and organization of the programme as these have developed up to August 1965 following 3 years of intensive consideration by human biologists from over 30 countries. Naturally, the guide is uneven in the precision with which the proposals are formulated in the different categories of research, but it is hoped that sufficient information is given here to make clear to National Committees and others what is intended in terms of actual research. It should be stressed that the companion volume to this guide will be a « Handbook of Agreed Methods » now under preparation. The proposals for « activities in the field » are given only in outline as the agreed techniques and procedures will be presented in the companion volume.

The scope of the Human Adaptability Programme has been endorsed now by human biologists, geneticists, physiologists, epidemiologists, anthropologists and medical scientists from many countries. The objectives of the programme, it is fair to claim, are realistic and eminently worthwhile. Already one can say that the realization of the IBP objectives now lies to a considerable extent with the administrators and politicians, for they have it in their power to make or mar the enterprise of scientists whose work takes them across national boundaries.

To put together this guide I have relied heavily on the contributions, spoken and written, already made to the project by many biologists. The names that appear in the text represent only a proportion of the people who are helping with such goodwill. I have incorporated (sometimes *verbatim*) material from contributions made by a number of colleagues to whom I have been able to appeal urgently because of their close geographical proximity - these include Prof. N. A. Barnicot (Disease and genetic selection); Dr. G. A. Harrison (High altitude studies); Dr. A. Mourant (Blood group surveys); Dr. D. F. Roberts (Demography and congenital defects) and Dr. J. M. Tanner (Growth and physique). I am indebted to Professor Lange Andersen (Working capacity) for his unstinted help. I am particularly grateful to Professor Paul Baker for preparing as a special contribution to this number a paper on multidisciplinary studies.

I acknowledge also the detailed advice from members of the H. A. Sectional Committee and of the Commission for Physiological Anthropometry set up by the International Union of Physiological Sciences (IUPS).

As Convener, I wish here to acknowledge my deep gratitude to all those colleagues, too numerous to mention by name, who are working through national groups and national committees, international working parties and conferences in these years of the International Biological Programme to bring to realization the exciting plans for the study of Human Adaptability.

August 1965

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I. HA: HUMAN ADAPTABILITY PROGRAMME

Scope

It is fitting that the International Biological Programme should include a section aimed at the world-wide comparative study of human adaptability. The IBP as a whole is concerned essentially with the functional relationship of living things to their environments, in the sea, in fresh water and on the land; it is conceived as a world-wide ecological study of communities of plants and animals: those still existing in relatively natural habitats and those in more disturbed or artificial conditions.

An analogous approach can be made to the ecology of mankind. At this stage of human history vast changes are affecting the distribution, population density, and ways of life of human communities all over the world. The enormous advances in technology make it certain that many communities which have been changing slowly or not at all will relatively soon be totally transformed. We are in a period when the biology of the human race is undergoing continuous change measured in terms of health, fitness and genetic constitution. The International Biological Programme provides a great opportunity to take stock of human adaptability as it is manifested at the present time in a wide variety of terrains, climates and social groups, to deepen our knowledge of its biological basis and to apply this knowledge to problems of health and welfare. To do all this satisfactorily, for communities ranging from the very simple to the highly industrialized, requires an integrated approach and an application of methods drawn from many fields, particularly those of human environmental physiology, population genetics and developmental biology aided by auxiliary disciplines, for example in medicine, anthropology, ecology and demography.

Further discussion of the scope of the programme will be found in the volume *The Biology of Human Adaptability* edited by Paul T. Baker and J. S. Weiner, Clarendon Press, Oxford (in the Press).

Categories of Research Activities

The problems of human biology which are appropriate for study within the IBP are manifold. At the Paris Assembly of IBP, it was agreed that these should be regrouped and that national contributions to IBP should be selected from amongst the following categories in accordance with the interest and resources of the countries concerned.

Category 1: *Survey of sample populations in conformity with a world scheme.*

The general aim is to carry out as rapidly as possible surveys on a wide geographical range using standardized methods. Surveys are intended to make good as rapidly as possible deficiencies in our present knowledge of the distribution of important population characteristics. A knowledge of the distribution of these characteristics will, in itself,

throw light upon many problems of human variability, adaptation and welfare.

a) Extensive surveys to determine gene frequencies of known polymorphic systems.
b) Extensive surveys on growth and physique.

Category 2: *Intensive multi-disciplinary regional studies based on habitat contrasts.*

The general aim is to elucidate physiological and genetic processes concerned in adaptation and selection in relation to climatic and other environmental factors which Professor Baker has explored in an incisive and stimulating essay included in this volume. The multidisciplinary approach appropriate to a particular research problem and area would necessarily be based on an integration of the following components:

i) A basic socio-demographic assessment of the community (for sampling, genetic and other purposes),
ii) A basic assessment of the environment,
iii) A general survey of genetic constitution (following Category 1(a) above),
iv) An assessment of medical status of the subjects,
v) An assessment of dental condition,
vi) An assessment of nutritional condition,
vii) A background description of the daily and seasonal activities,
viii) An assessment of physique and growth [following Category 1(b) above],
ix) An assessment of working capacity as an index of fitness,
x) Environmental physiological studies,
xi) Genetic studies.

Every population chosen is to be studied if possible by this comprehensive multi-disciplinary approach. The particular problems of interest will determine which elements are to receive special and sustained attention. The studies may be grouped for convenience as studies with emphasis on:

a) environmental physiology,
b) high altitudes,
c) genetic constitution,
d) nutrition,
e) growth and physique,
f) fitness (working capacity and respiratory function).

Clearly, certain of the special investigations of Category 3 could find a place in these multi-disciplinary studies.

Category 3: *Special investigations on selected populations.*

A number of problems requiring intensive study but on a less comprehensive basis than that of Category 2 have been selected for the consideration of national committees:

a) Studies of physiological fitness (working capacity and pulmonary function) of particular population samples, as far as possible on a longitudinal basis. Three groups in particular are of interest:
   i) Samples from urban industrialized populations.
   ii) Samples from non-industrialized populations.
   iii) Athletes.
b) Disease as a selective agent of genetic constitution.
c) Particular socio-demographic factors affecting genetic constitution.
d) Factors controlling population dynamics. (This proposal has still to be formulated in detail but aspects are included in b and c).
e) Special nutritional problems. (FAO has placed partciular emphasis on « calorie intake in different habitats »).

Category 4: *Investigations related to current WHO activities.*

It seems feasible in many cases to include in the above Categories certain observations which are complementary to current WHO interests, for example:

a) Surveys of blood pressure in relation to age, sex and occupation.
b) Haematological data (total red cell counts, etc.).
c) Antibody levels in blood.
d) Certain blood constituents (e.g. phospholipids, plasma proteins).
e) Congenital defects using a standard check list.

PHASE 1 (1964-1967)

i) Methodology, leading to production of the Handbook of Agreed Methods.
ii) Research required for establishing the methodology.
iii) Training programme.
iv) Formulation of the definitive programmes for Phase 2.
v) Pilot, design and feasibility studies.

PHASE 2 (1967 onwards)

During Phase 2 the survey work and multi-disciplinary regional studies as laid down under the 4 Categories of Research (*IBP News No. 2*) will be carried out, by national (or multi-national) teams in accordance with their national programmes.

II. GUIDE NOTES ON PHASE I

Methodology

The major aim is the production of a « Handbook of Agreed Methods ». The recommendation of such methods would not, of course, in any way preclude the additional use of any other technique favoured by an individual investigator or team. Some of the methods are required for observations which it is hoped will be made on a widespread basis (see below); others are methods recommended in cases where the technical resources are available, or for special investigations. The contents of the handbook will include all or most of the techniques given in the following list. (See also Proceedings of Kyoto 1965 Symposium).

In some cases, marked with an asterisk, detailed recommendations are available in documents prepared by working parties or advisers and these will be made available by the Convener.

Any offers of help in connection with the methods listed below, particularly those still to be agreed upon, will be gratefully received by the Sectional Committee and the Convener.

Contents of Handbook of Agreed Methods - Present Position

I. Genetics

(Interim proposals by working parties and advisors in HA 23, HA 25/1, HA 25/2, HA 29)

a) *Methods receiving attention*

*1. Blood collection.
*2. Transport of blood specimens.
*3. Division of blood into subsamples.
*4. Long term storage of blood.
5. Collection of saliva and transport.
*6. PTC testing.
7. Skin colour by spectrophotometry.
*8. Acetylation test (sulphamethazine).
*9. Colour vision by anomaloscope.
*10. Basic list of congenital defects.

b) *Methods requiring attention*

1. G6PDD in the field.
2. Collection of hair samples for colour and form.
3. Eye colour.
4. Collection, storage and transport of urine for amino acids.
5. Finger and palm prints.
6. Cytogenetics.

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* Draft available.

II. Anthropometry and Anthroposcopy

(Interim proposals by working parties and advisers in HA 22, HA 22/1)

a) *Methods receiving attention*

*1. Limb, trunk and whole body longitudinal measurements.
*2. Do. circumferences.
*3. Skinfold measurements.
4. Eye form (a) direct observation (b) close up photography.
5. Ear form (a) do. (b) do.
6. Body hair distribution.

b) *Methods requiring attention*

1. Somatotype assessment.
2. Radiographic technique for calf, thigh and arm.
3. Body weight - (suitable balances).
4. Head and face measurements.
5. Male sex characters.
6. Female sex characters.
7. Body density by underwater weighing or displacement.
8. Skeletal age in children.
9. Measurements for body composition.

III. Work Capacity and Pulmonary Function

(Interim proposals by working parties and advisers in HA 19)

a) *Methods receiving attention*

*1. Direct maximal aerobic work capacity.
*2. Indirect and sub-maximal tests.
*3. Anaerobic capacity.
*4. Forced expiratory volume.
5. Forced vital capacity.
6. Total lung capacity and subdivisions.
7. Anthropometry in relation to working capacity and pulmonary function.
8. Assessment of habitual physical activity.

b) *Methods requiring attention*

1. Tests of isometric muscle strength of (a) handgrip (b) legs (c) back.
2. Size of heart by X-ray.
3. Cardiac output.
4. Performance tests.

IV. Thermal Tolerance

(Interim proposals by working parties and advisers in HA 18, HA 20)

a) *Methods receiving attention*

*1. Whole body sleeping test for cold tolerance.

2. Whole body waking test for cold tolerance.
*3. Cold pressor test.
*4. Cold induced vasodilatation test.
*5. Anthropometry in relation to heat and cold.
6. Heat tolerance test.
*7. Comfort assessment.
*8. Counting of sweat glands.
9. Salt and water balance.

b) *Methods requiring attention*

1. Thyroid activity.
2. Thermal pain threshold.
3. Environmental assessment.

V. High Altitude

(Interim proposals by working parties and advisers in HA 31)

Methods requiring attention

Specific physiological tests.

VI. Epidemiological: Nutritional

(Interim proposals by working parties and advisers in HA 25, HA 26, HA 33, HA 34)

a) *Methods receiving attention*

*1. General medical examination.
*2. Demographic assessment.
3. Dental examination.
*4. List of congenital defects.

b) *Methods requiring attention*

1. Nutritional assessment.
2. Calorie usage.
3. Protein usage.
4. Blood pressure determination.
5. Haematological examination.
*6. Blood collection for blood constituents.

Reserach and Development Required for Establishing Methodology

The following development problems are being given attention by the scientists concerned, who would be glad to have any help or comments. These can be forwarded through the Convener.

Working Capacity: Comparison of different methods (stepclimbing, bicycling, treadmill) under examination by Dr. C. H. Wyndham, South Africa.

Strength tests under examination by Professor K. Lange Andersen, Norway.
Portable equipment for respiratory tests under development by Dr. Cotes, U.K.

Cold Tolerance: Detailed specification of sleep test provided by Dr. H. T. Hammel, U.S.A.
Further examination of whole body tests being carried out by Dr. L. Carlson, Dr. Eagan and others.
Endocrine (thyroid) field methods being examined by Dr. O. Wilson, Sweden.

Heat Tolerance: Mobile hot room being developed by Dr. C. H. Wyndham, South Africa; test procedures for heat tolerance — consultation in progress with Professor B. Metz, France, and Professor H. S. Belding and Dr. Lee in the U.S.A.

Genetic Observations: Long term storage; investigations by Dr. H. Lehmann, U.K.; production of rare sera; investigations proposed by Dr. Moore-Jankowski, U.S.A.

Anthroposcopic Observations: Codified atlas begun by Mr. D. R. Brothwell, U.K. on basis of consultation and new material.

Medical Assessment: Proposals and pro forma tried out by Dr. I. Polunin, Malayasia, in the field. HA 26/2.

Habitual Activity: Portable methods using miniature tape recorders are being explored by Professor Lange Andersen, using a novel electrolytic miniature recorder by Mr. H. Wolff, U.K.

Dental Observations: Procedure to be put forward by Dr. Brabant, Belgium, Mr. Brotherwell and others.

Socio-demographic Studies: Proposals by WHO, HA 25, and by Dr. D. F. Roberts, U.K., HA 25/1, 25/2.

Design and Sampling: Proposals by Dr. W. J. Schull, U.S.A. - and also by Mr. M. J. R. Healy, U.K. HA 34.

Training

The HA Sectional Committee has recommended that training should normally be in the form of Postgraduate Fellowships held for a year, during which time the Fellow would receive instruction in specific methods appropriate to his interests in the Human Adaptability Project. This instruction should, however, form part of an advanced 1-year course in the subject (e.g. environmental physiology, genetics, nutrition, etc.) concerned. It is necessary to find out which laboratories would be willing to engage in training on this scale and also how many individuals should be trained to make possible national HAP programmes in both Phases,

as far as can be foreseen at the present time. Training Fellowships, it is hoped, will be available in all or nearly all countries from existing local resources, but it may be necessary to make arrangements, through SCIBP, for the establishment of a certain number of Fellowships which could be allocated from a central pool.

For fully qualified workers, short courses on Methodology would also be arranged.

The Sectional Committee looks forward to receiving offers for training both in one-year and short courses on the many aspects of the HA projects, namely in genetic studies, growth studies, environmental physiology (heat and cold tolerance), working capacity, respiratory physiology, high altitude physiology, nutritional studies.

Pilot and Feasibility Studies

The Convener is prepared to supply all available details on field methods, instruments and design to teams or individuals carrying out pilot, feasibility or other trials along IBP lines, so that these techniques may be tried out under field conditions. Information for these purposes has been provided in 1962-65 to a number of expeditions - the Canadian Easter Islands Expedition, the U.K. Expedition to Ainu, the U.S.A. Expedition to Peru, the Netherlands Expedition to Mali, and the Franco-Belgian Expedition to Chad. Trials of IBP methods are planned for future Kalahari expeditions with Professor Tobias and Dr. Wyndham (South Africa); Hokkaido (U.S.-Japanese expedition); and Bhutan (U.K. expedition). Other trials to be arranged at the Kyoto meeting.

Summary of Methodology Documents Available

H.A.18. IBP Working Party on Assessment of Cold Tolerance. Meeting held 1st-4th November, 1963, at Rauland, Nr. Oslo, Norway.

H.A.19. IBP Working Party on Physiological Indices of Fitness, held at Rauland, Nr. Oslo, Norway. 4th-5th November, 1963.

H.A.20. IBP Working Party on Assessment of Heat Tolerance, held on 11th-12th November, 1963, at the Ciba Foundation, London.

H.A.22. IBP Recommendations on Anthropometry of Growth and Physique, based on discussions held at a meeting of a working party on Anthropometry of Growth and Physique, 6th August, 1963, at the Ciba Foundation, London.

H.A.22/1 Draft Recommendations of Sub-Committee on Anthropometry for IBP.

H.A.23. IBP Recommendations on Genetic Observations.

H.A.25. IBP Recommendations on Demography and related Socio-Cultural Factors.

H.A.25/1 D. F. Roberts' Demography Pro Forma.

H.A.25/2 Recommendations re 25/1.

H.A.26/2 « The Collection of Morbidity Data in Studies of Traditionalist Populations ». Working Paper for the Human Adaptability Project of the IBP. By I. Polunin.

H.A.29. Mourant - Organization for Field Research - Blood Collection. (Pergamon).

H.A.33. Note on « Sampling problems in human physiological investigations » by A. Cochrane (Cardiff).

H.A.34. Note on Sampling Problems in Human Physiological Investigations, prepared by M. Healy, Rothamsted.

H.A.51. Contents of Handbook of Agreed Methods 21-4-1965.

H.A.70. Proceedings of the Kyoto Symposium (in press).

III. GUIDE NOTES ON PHASE 2

INTRODUCTION

Although the scope of the IBP was considerably reduced, modified and regrouped [illegible] the programme still covers a very wide field.

[illegible]

[illegible]

OUTLINE GUIDE TO FIELD WORK

Studies involved in a world study (Category 1)

1. Scope and Aims

In the attempt to achieve a comprehensive world [illegible] survey, three main tasks are to be envisaged.

1. The compilation and tabulation of existing published data, many of them in journals of small or local circulation [illegible]
2. The collection, compilation and statistical treatment of [illegible]
3. [illegible]

C. Sectoral activities

1. Geographic coverage
   a) Rural? answers for rural areas
   b) Urban? answers for urban areas
2. Sample size (same as for total population)

Census and other data needed as a basis for sample design (Chapter III)

I. Social characteristics

Human populations differ greatly in the shape of body, mind, and physical, particularly in their ancestors, these groups. But the "traits" are still and similar between the ancestor and about and broad. Some heredity-related characteristics, such as eye color and blood type, are fixed at birth and do not change throughout life. Other characteristics, for example, the manner of growth of the children in these populations differ, for example, because of a part of the genetic structure. Some characteristics, for example, the manner of growth of the children in these populations differ, for example, because of a part of the genetic structure. Some characteristics, for example, the manner of growth of the children in these populations differ, for example, because of a part of the genetic structure.

The first aim of the IBP Section on Human Adaptability is to study these closely. For many of the populations differences in genetic relationship to the world and to these little known characteristics, genetic and environmental, which are responsible for them.

The physiological adaptations of populations studied on the basis of the genetic structure of the populations. Some of the genetic structure of the populations. Some of the genetic structure of the populations.

Genetic differences have been shown by many studies to be very important. But in many of the people populations of the world the genetic differences were greatly magnified in addition to the environmental conditions in which they evolved. The conditions of life present an obstacle to be able to live in modern populations the scientific study because adaptations have tended to distinguish a people or a race to know how to live under a variety of conditions.

These genetic differences are shown in such characteristics as blood type, by the immunological reactions during growth, and in physical characteristics such as the color of the skin, hair, and eyes. The genetic differences in the blood types of the world are of particular interest, and a considerable amount of the research and investigation of children should be a major concern of all governments in studies and communities' concerns. A second aim of the genetic and physical studies is therefore to relate results to the social and other characteristics of children in a way that is important and to use the information as a basis for studies of genetic differences, particularly in contagious diseases. From both the biological and the medical points of view, it is important to make comparisons not only between different populations, but between groups in the same population. Many factors affecting health and disease are genetic, and it is necessary to study the genetic factors in relation to the environment.

to other factors, because environmental differences may be responsible for many of the differences between populations. It is important to study the genetic factors in relation to the environment.

There have been in the last many anthropological descriptions of physical and social characteristics of human populations. But in general they are descriptive and do not provide the information needed for the study of the genetic factors in relation to the environment. The genetic factors in relation to the environment are important for the study of the genetic factors in relation to the environment.

II. Field Work - Choice of Methods

The methods required to carry out the investigations are given below. The details of the methods will be given in the Handbook. Generally, some methods require information which is required for the investigations mentioned below.

A. Primary methods

1) Sampling of populations. Where possible there should be a sufficient number of children of all ages and of adults to provide an accurate sample, i.e. a sample representing the whole population. Stratified, random and systematic methods should be used. Sampling may be of whole villages, or a number of villages, or of the whole community, or of the whole country. The method of choosing the sample

will vary from one country to another, but wherever [illegible] the sample must be carefully defined and not haphazard.

2) Ascertainment of age. Amongst children [illegible] every effort should be made to ascertain correct ages, if necessary by reference to local events.

3) Assessment of familial, nutritional and social circumstances. Some forms of nutritional examination (e.g. for parasite ova) will be impracticable for all individuals examined, but a sample of the [illegible] should be examined [illegible] the sample to be examined should be selected from a group [illegible] have established the basic facts.

4) Assessment of background daily work activities and [illegible] conditions, such as climate.

5) Anthropometric examination. The Handbook [illegible] into Primary and Secondary lists. The primary list consists of 12 measurements (including skinfolds) and the secondary list, to be done if time permits, a further 7. The measurements do not take more than a few minutes per subject; a careful study, particularly in [illegible], the collecting the subjects will occupy more time than the taking them.

6) Anthropometric examination. Particular attention should be paid to [illegible] of sexual development in children.

7) Dental examination, [illegible].

8) Menarcheal age [illegible] whether menstruation has begun or not.

B. Additional Activities

These should be done where circumstances permit.

1) X-ray of hand and wrist for skeletal age determination.

2) Radiographic measurement of bone, muscle and fat in calf, upper arm and thigh in children and adults.

3) Standardized photography of whole body and of face.

C. Specialist Activities

1) Determination of body density by [illegible] technique.

2) Measurement of body volume and density by underwater weighing.

3) Determination of body fluid spaces.

4) Determination of total body potassium by K.

Adaptation to High Altitude (Category II)

I. Scope and Aims

The study of the adaptation and fitness of settled communities at high altitudes is one of the [illegible] of the IBP. In many different regions one finds [illegible] contrasts

in atmospheric pressure, temperature, and terrain with restricting effects upon nutritional and disease ecology. The object of the programme is to make an integrated study of the detailed interrelationships between the various ways in which man adapts to the totality of the restrictions of this type of environment. The areas suggested for study are the Andes, Himalayas, Ethiopian Highlands and the Caucasus.

Till now [illegible] of Peru have been the scene of the most active work on several [illegible], while in the Himalayas the [illegible] (Sherpas) has been intensively pursued. Under IBP it is hoped that a better understanding of several communities in different parts of the Andes [illegible] as well as Peru, the Himalayas, and the less well-known areas such as Ethiopia and the Caucasus will be the object of multinational team work.

It is [illegible] clear that the complexity of the ecological situation makes it desirable that attempts should be made to use a research design based on 'transmigrants' and 'nontransmigrants' comparisons. It will be an adequate [illegible] of carefully defined subjects in order to distinguish between genetic and nongenetic components in adaptation. A discussion of these design problems will be found in papers by Harrison, Baker and Weiner in *The Biology of Human Adaptability*. A simplified scheme is given below.

A secondary objective of high altitude studies is the study of the responses of indigenous peoples at altitudes higher than those normally inhabited, i.e. over 15,000 ft, for comparison with results already obtained on lowlanders.

II. *Outline scheme for High Altitude study*

1) *Design of Study*: The design of the study is essentially one of a comparison between two populations, one of which (A) has resided at high altitude for a considerable number of generations (A.H.H.), but of which some members have migrated to lower levels (A.L.L.). The other population (B) has resided at low altitude for many generations (B.L.L.) but has elements at high altitude (B.H.H.).

	Population A	Population B
[illegible]	A.H.H.	B.H.H.
	A.L.L.	B.L.L.

Comparisons can be made as follows:

1) A.H.H. and B.H.H. / A.L.L. and B.L.L. — Unique similarities are [illegible] adaptations. Differences are due to different ancestral origins.

2) A.H.H. and A.L.L. / B.H.H. and B.L.L. — Similarities are genetic and due to common ancestry. Differences are phenotypic adaptations.

2) S(H) and M(L); S(H) and S(L): Similar comparisons due to [illegible] in the [illegible] populations. Differences may be [illegible] or genetic.

To identify the [illegible] groups may well be the object of pilot stage studies. The main objectives of such expeditions would be:

1) Demonstration of the population [illegible] for the survey, both [illegible] and [illegible] to [illegible].

2) Establishing good relations with the inhabitants so that subsequent larger parties would meet with a favourable reception [illegible]. To achieve this aim, pilot expeditions would have to [illegible] a good deal of clinical [illegible].

3) *The Samples.* As far as possible, [illegible] subjects should be studied. Two separate methods of sampling should be used:

a) [illegible] studies.

b) An age dependent sample (to detect any [illegible] selection as well as environmental [illegible]). It would be useful but not absolutely essential for the size of this sample to be based on the age structure of the population.

Numbers:	Adults	:	300 in each of the 4 groups (A(H), A(L), B(H), B(L))

Age dependent: 2–5, 6–10, 11–15 } = 100 per group

A group of 25 [illegible] also be included if possible.

Total [illegible] per group – 2000–4000 in [illegible].

4) Field Work – [illegible]

2. Primary Activities

1. *Background Information*

a) Medical examination of all individuals along the lines suggested in [illegible].

b) Demographic information: This would follow the lines laid down in [illegible]. Particular attention should be paid to [illegible] of the [illegible], [illegible] factors affecting fertility.

c) [illegible] survey.

2. Blood should be taken for serological [illegible] and for the following special [illegible]: a) bacterial and viral antibodies; b) blood [illegible]; c) [illegible] concentrations [illegible]; d) [illegible] levels, [illegible]; Vitamin A and carotene.

3. *Sample Studies*

a) Blood: 15 ml of blood to be collected and packed in [illegible] containers and despatched for testing. Tests would always be made for:

[illegible] groups and genetic [illegible] ABO, [illegible], MNSs, P, Rh, Kell, Lutheran, Lewis, Duffy, Kidd, Diego, [illegible]; [illegible] and serum [illegible] variants.

b) [illegible] to be collected for [illegible] studies.

c) Saliva to be collected [illegible] and [illegible] for [illegible] study.

d) Other genetic factors [illegible]: a) colour blindness; b) [illegible]; c) [illegible]; d) [illegible]; e) [illegible] observations; f) [illegible] including [illegible]; g) dental characteristics.

4. *Physiological Studies, including Fitness and Working Capacity*

a) Respiratory Capacity and related observations. Observations should include: i) forced expiratory volume; ii) forced vital capacity; iii) breath holding time; iv) [illegible].

b) Working Capacity and related Observations: [illegible] should include: i) assessment of [illegible]; ii) [illegible] heart rate and blood pressure [illegible]; iii) a test of muscular strength.

5. *General Population Characteristics*

a) Anthropometry: Desirable measurements in relation to [illegible] function, working capacity, temperature tolerance, growth and [illegible].

b) Standard [illegible] Photography.

B. Additional Activities

These should be done according to resources, trained personnel and equipment.

1. *Nutritional Studies*

a) To determine calorie, protein and mineral intake.

b) Assessment of [illegible] activity.

2. *Physiological Studies*

a) Tests of cold tolerance [illegible].

b) Tests of cold tolerance [illegible].

c) Tests of heat tolerance.

d) Cardiac [illegible].

e) Tests of [illegible].

f) Tests of [illegible].

g) Samples collected for [illegible];

h) Tests of [illegible].

3. *Physique and Growth*

a) X-ray of hand and wrist for skeletal age determination.

b) Radiographic measurements of bone, muscle and fat in calf, upper arm and thigh in children and adults.

c) Standardized photographs of whole body, and of face.

4. Genetic Studies

Medical examination for congenital abnormalities using check list.

C. Specialized surveys

In addition to [illegible] the following special [illegible] would be made [illegible] on about 12 indigenous subjects, [illegible] as well as at very high altitudes.

a) [illegible]

b) [illegible]

c) Maximum pulmonary diffusing capacity.

d) [illegible]

e) Nutritional balance studies, [illegible]

Thermal Tolerance (Category T)

1. Scope and aims

[illegible]

[illegible]

II Field Work – List of Activities

A. Primary variables

1. Ecological Observations

a) Medical examination of all individuals.

b) Demographic information for [illegible] sampling;
c) [illegible] assessment;
d) Collection of blood for [illegible] genetic characteristics;
e) Assessment of habitual activity of subjects.
f) Anthropometry: detailed measurements [illegible] and [illegible] working capacity, physiques; these comprise [illegible] measurements:
i) skinfold thickness at [illegible] sites;
ii) height and weight;
iii) surface area measurements;
iv) [illegible];
v) chest, arm and leg [illegible];
vi) arm and leg circumferences;
g) Work capacity assessment [illegible].

1. Cold Tolerance

a) Whole body cooling either by 8 hour cold exposure [illegible] or by [illegible] should always include:
i) Skin temperatures at [illegible] to give [illegible] skin temperature;
ii) Toe and finger temperatures to give information of peripheral blood flow;
iii) [illegible] rectal temperature [illegible];
iv) Oxygen consumption for [illegible] sampling;
v) Shivering by EMG;
vi) [illegible] sleeping [illegible];
vii) Urine samples.

Environment. Cold tests should be carried out [illegible] so that [illegible] be eliminated.

The environmental conditions in cold and control rooms should be specified in terms of:
i) dry and wet bulb temperatures by ventilated psychrometer;
ii) black globe temperature [illegible];
iii) air movement [illegible].

The [illegible] should always be specified [illegible] and using [illegible].
c) [illegible].

2. Heat Tolerance

a) The basis of [illegible] heat tolerance test should [illegible] [illegible] with two levels of work [illegible] every hour during the test [illegible] for differing age groups and [illegible]. The environmental conditions [illegible]

[illegible] should be specified [illegible] wet bulb temperatures by ventilated psychrometer, [illegible] by black globe thermometer [illegible] by [illegible] air movement [illegible].
c) The basic observations should always include:
i) [illegible] temperature, the overall temperature changes, [illegible] recommended [illegible];
ii) Skin temperatures;
iii) Sweat loss to be determined; [illegible] to be [illegible];
iv) [illegible] rate [illegible] determined by ECG;
v) Oxygen cost of the work for every [illegible] of the test should be determined;
vi) Record of [illegible] to be kept.
d) The heat tolerance and auxiliary observations should include:
i) Skinfold thickness at 10 agreed sites;
ii) Height and weight;
iii) Surface area measurements;
iv) Outdoor conditions.

3. General Climatic Characteristics

a) [illegible].

B. Additional studies

1. Cold Tolerance

a) [illegible] of finger blood flow during [illegible] cold exposure;
b) Hand blood circulation by [illegible] during local cold exposure.

2. Heat Tolerance

a) [illegible] collection during [illegible] for sweat collection is [illegible], [illegible] concentration and [illegible] to be determined [illegible] intervals.
b) [illegible] where equipment is available.

3. General Climatic Characteristics

a) [illegible] of daily food and water [illegible] with [illegible] of 24 hr [illegible]. Auxiliary information [illegible] specification of environmental conditions and [illegible] of subjects;
b) When 24 hr urine samples can be collected [illegible] and [illegible] to a suitable laboratory, consideration should be given to determination of:
i) [illegible] in the sample;

(i) Endurance in the sample;
(j) [illegible]
(k) [illegible]

C. Field studies

1. [illegible] in the world [illegible] requiring a high degree of [illegible]. [illegible] are desirable [illegible]

a. Tests of [illegible] during cold and heat exposure.

b. [illegible]

c. Tests of [illegible]

Working Capacity of Selected Populations [illegible]

1. *Scope and aims*

[illegible] and physiology underlying work capacity [illegible] [illegible] functional capacities [illegible] The level of functional fitness, however, [illegible] can be evaluated through [illegible] of the shape and the composition of the body. [illegible] The measurement of work capacity [illegible] [illegible] of the circulatory apparatus [illegible] the respiratory and [illegible] system [illegible] The [illegible] [illegible] under standardized [illegible] conditions.

Work capacity varies in relation to many factors: age, sex, [illegible] state of nutrition etc. [illegible] [illegible] working on the physiological aspects of this problem. [illegible] of the work [illegible] understanding of many basic problems of the physiology and [illegible] of work capacity, they are in general based upon [illegible] [illegible] populations.

Thus we do not know the range and variability of physical fitness of people in the [illegible] of the world. We do not know the [illegible] [illegible] [illegible] characteristics of the populations of [illegible]

If a high degree of [illegible] skill, endurance and strength [illegible] [illegible] it would be interesting to [illegible] [illegible] [illegible] a [illegible] higher level and a [illegible] [illegible] in different [illegible] [illegible]

We can extend the range of [illegible] by looking at that part of the population which is [illegible] [illegible] and compare them with the [illegible] [illegible] [illegible] It would serve as a [illegible] for the study of a wide diversity of occupations. With this background of knowledge it would be possible [illegible] [illegible] [illegible] functional aspects of the cardio-respiratory system.

It may be that the shape and the composition of the human body [illegible] [illegible] [illegible] the [illegible] of the genetic element in producing differences in fitness may perhaps be [illegible] [illegible] blood [illegible]

In making comparisons between populations in terms of [illegible] [illegible] whether it be a tropical heat, desert conditions, cold or altitude, the [illegible] of physical fitness [illegible] [illegible] fitness has [illegible] tolerance to cold, because high fitness is associated with increased capacity to produce heat by muscular activity. [illegible] [illegible] plays an important part in [illegible] tolerance to cold. [illegible] [illegible] physically fit people [illegible] [illegible]

The pollutant [illegible] which [illegible] working capacity, can be [illegible] by the atmospheric pollution to which the [illegible] is exposed, [illegible] [illegible] as a result of industrial pollution of the atmosphere. [illegible] [illegible] pathological conditions. There are some cases [illegible] linked to the relation between fitness and pathology. For example [illegible] suggests that [illegible] [illegible] of degenerative diseases [illegible] [illegible] fitness. [illegible] When the fitness of a population is assessed, the [illegible] should be taken to relate this [illegible] and nutritional status of the subjects.

[illegible] different kinds of habitat, occupation, patterns of culture and social living may be regarded as

falling into the category of multipurpose surveys planned for the Human Adaptability Project. The study of fitness as defined for the purpose of this project [illegible] except by well equipped and well trained personnel. Fitness studies will become of greater significance when related to particular biological and [illegible] as well as careful sampling. It will be necessary, for any population, to have data on [illegible], the daily pattern of occupational and leisure time activity, the cultural and social life and [illegible] of the subjects.

II. Field Work – List of Activities

A. Primary activities

1) Measurement of aerobic work capacity estimated from simple [illegible] tests.
2) Measurement of selected aspects of lung function (forced expiratory volume).
3) Muscle strength including measurement of isometric strength in the muscles of
   a) the forearm (handgrip),
   b) the upper extremities and shoulder girdle,
   c) the trunk,
   d) the legs.
4) Anthropometry – height, weight, skin fold measurements.
5) Medical examination of subjects prior to tests.

Four classes of subjects are of major interest:
   a) School children of all societies;
   b) Adults in industrial and non-industrial communities, representing all occupations;
   c) People of simple communities where physical activity is essential for survival;
   d) The athletic population of the world.

B. Advanced activities

1) Measurement of maximal oxygen uptake by the direct method and evaluation of related respiratory and circulatory measurements [illegible] and heart rate in relation to oxygen uptake.
2) Pulmonary diffusion capacity and airway resistance.
3) Assessment of habitual physical activity [illegible], continuous heart rate recordings [illegible].
4) [illegible] techniques.

C. Specialised activities

1) Measurement of the capacity of the [illegible] muscle metabolism [illegible].

2) Determination of oxygen usage [illegible].
3) Measurement of body fluids, blood volume and total amount of haemoglobin.
4) Measurement of the size of the heart by X-ray technique.
5) Measurement of cardiac output and arterial blood pressure during graded exercise loads.
6) Measurement plus [illegible] measurements of [illegible] and [illegible].

The additional and specialised activities require well equipped and highly trained research teams. They can not therefore be carried out on a widespread scale and are [illegible] for [illegible] studies.

Disease as a Selective Agent (Category VIII)

I. Scope and aims

It has been postulated (Haldane) that infectious disease might well have been the main effective agent of natural selection of man in former days, the survival and reproduction of those individuals possessing genes making for resistance [illegible] would not be expected to act as selective agents at [illegible] unless they are in some way also associated with [illegible]. That genetic resistance to infections and some other diseases exists is not in doubt, though in only a few cases, so far, has the responsible gene [illegible] its metabolic role in disease [illegible] been identified.

This complex subject of genetic differences in susceptibility to [illegible] and [illegible] disease, and the part they play in determining the [illegible] and severity of disease can only be briefly mentioned here; the reader is referred to "Genetics and the Epidemiology of Chronic Diseases", U.S. Public Health Serv. Public. No. [illegible], and to the report of the [illegible] meeting [illegible]. It is important, however, to emphasize the many [illegible] that such work, although [illegible], falls appropriately within the scope of the Human Adaptability Programme, since [illegible] cooperation for [illegible] aspects of human biology would be needed. The following comments extracted from the report [illegible] give some idea of the opportunities and limitations.

Twin comparisons have been widely used but there is some difference of opinion as to their value. Satisfactory twin material is difficult to obtain and it is [illegible]. Although twin studies indicate that genetic factors are involved in response to some diseases, it is difficult to [illegible] their findings.

Some study has been done on the inheritance of [illegible] diseases in families. In the [illegible] the disease [illegible] by [illegible] methods of [illegible] analysis.

1. Comparison of [illegible] blood group [illegible]

2. Twin comparisons in non-European regions.

3. Genetic studies on the populations of [illegible] for example, [illegible]

4. [illegible]

5. The study of blood groups in relation to [illegible]

6. [illegible]

It is clear from the [illegible]

[illegible]

[illegible]

Socio-demographic factors affecting genetic structure, population dynamics (Chapters [illegible])

1. Scope and aims

Social and demographic factors [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

II. Field Work

[illegible] and demographic data are required to evaluate the role of fertility and survival in population growth, economic effects.

The level of precision (M.S.E.) must be considered in relation to reliability and economic use data. The information cannot be obtained with any degree of accuracy from a population sample by any exact statistical analysis of correlations. What is required is the 'responding to different members of the local and demographic inputs' should take at the end of some different recordkeeping and in the examples of characteristic ecological and productive. Another task is potential would provide the biological investigation more and probably largely complete the demographic or situations before their arrival. Further they permit for on the world 'normal' organized with the usual problem of the population and with the short (duration) notion. Nevertheless individuals in a given type of [illegible] by conditions and social problem, such the relevant individual in the investigation, and should be directed to evidence of these cultural variations would also lead to association or inhibition of information upon [illegible] required in the programme. During the period in the studied [illegible] which affect have to be handled with extreme care, the accuracy of the questions regarding economic and income levels is used to potentially explosive situations where no response to the help of individuals in the [illegible] population studies or of research the nature of the investigation [illegible] where it may prove for the success of the questionnaire to be answered by any one answer or to a given period, sometimes. Accuracy of reliability and [illegible] are prohibitive to develop the information. But in most of these investigations employment does to little success why the required [illegible] should and be evaluated on a properly balanced, controlled investigation. Previous will depend on the methods to assess. If the same person's answers are used, the consequence will probably [illegible] [illegible] or not a more [illegible] when dealing with more subjects, and a [illegible] which [illegible] to [illegible] subjects. The whole data should be [illegible] by [illegible] with any subject, as a [illegible] with a person and the [illegible] has been designed with the object to obtain checking [illegible] with comparisons with the personal observations of the [illegible] group, and from comparisons with the information given by other individuals, where [illegible] are obvious. This [illegible] could [illegible] on the [illegible] suggest that additional information has arisen from some other source. The important [illegible] in part of the problems in this [illegible] designed to obtain [illegible] [illegible] as the part of the investigation, [illegible] should [illegible] more than the [illegible] to [illegible] [illegible] and be [illegible] [illegible] to obtain.

(i) Classification [illegible] [illegible] [illegible]

Part one of the problem is [illegible] to the [illegible] of the subject and [illegible] should be completed for every individual in a [illegible] and [illegible] for all those for whom [illegible] [illegible] will be responsible for [illegible] [illegible] to obtain for [illegible] [illegible] and the [illegible] [illegible], [illegible] it will be [illegible] [illegible]

[illegible]

b) Developmental data

Developmental history of each living offspring, including growth [illegible]

c) Marriage data

[illegible]

d) Sexual activity and pregnancy

[illegible]

e) [illegible]

[illegible]

2. Sampling of populations as required by design of the study.
3. Health Variables (adults and offspring)
   a) Medical history (see HA 2b/2);
   b) Physical examination (see HA 2b/2);
   c) Congenital defects identified (see HA 2b/1);
   d) Basic nutritional variables;
   e) Blood and urine collection for medical purposes;
   f) Dental examination.
4. Genetic and Physical data
   a) Collection of blood, urine and saliva for genetic purposes [illegible];
   b) Anthropometric examination [illegible];
   c) Dermatoglyphic examination;
   d) Psychometry and other observations of genetic importance [illegible].

C. Additional and Special Analyses

1. Medical examination — X-ray examination; E.C.G. examination; [illegible]

3. Physique and Growth
   a) [illegible];
   b) Radiographic observations of muscle, bone and fat;
   c) Standardized photography.
4. Performance and Physiological Tests
   a) Tests for [illegible];
   b) Tests of respiratory function;
   c) Tests of skilled performance.

SPECIAL NUTRITIONAL STUDIES (Category II and IIIA)

a. Scope and Aims

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

H.A.5. [illegible] hereditary and related [illegible] factors.
H.A.7. Adaptation to regions of High Altitude.
H.A.10. Outline Sampling Problems in Human Physiological Growth [illegible] prepared by M. [illegible]. Reformulated.
H.A.11. Growth patterns on a world scale – outline guide to research [illegible]. Unspecified.
H.A.12. Growth and Physique surveys on a world scale – outline guide to research [illegible]. Unspecified.
H.A.13. Working Capacity of Selected Populations – outline guide to research [illegible].
H.A.14. Regional H.A. Meeting – [illegible], [illegible] April, 1968.
H.A.15. Report on IBP Meeting on Fitness and Genetic Structure [illegible] June 1968 [illegible].
[illegible] News Letter Vol. 1 No. 1 pp. [illegible], 1968. The Human adaptability [illegible] of IBP.

The Biology of Human Adaptability (Proceedings of Burg Wartenstein H.A. symposium) ed. by Paul T. Baker and J. S. Weiner. Oxford University Press (1966), physiological, genetic and anthropological papers on Africa, South America, India, Australia and New Guinea, S. [illegible] and Circumpolar regions and High Altitude Populations. P. T. Baker, D. C. [illegible], G. A. Harrison, J. Hiernaux, T. A. Mitchell, E. J. Clegg, R. Lange Andersen, R. S. [illegible], R. K. [illegible], N. S. [illegible], J. V. Neel, L. S. [illegible], D. F. Roberts, J. H. [illegible], W. J. Schull, J. M. Tanner, P. V. Tobias, C. H. [illegible], J. S. Weiner.

Research on population genetics of primitive groups. 1965. WHO Tech. Rep. Ser. No. 279.

The use of vital and health statistics for genetic and radiation studies. United Nations and World Health Organization. 1962.

U.N. Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas. Agenda Item F.1.1. 1962.

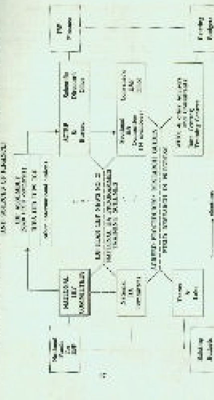
Biology of human populations. 1964. WHO Tech. Rep. Ser. No. 279. Immunological and haematological surveys: report of a study group. 1968. WHO Tech. Rep. Ser. No. [illegible].

Multidisciplinary studies on isolated populations in Latin America (Prepared for the Third Meeting of the Pan-American Health Organization Advisory Committee on Medical Research. 1964).

Research needs in human and animal tropical bioclimatology. 1966. In Tropical Health, NAS-NRC Publ. 996 Washington: National Academy of Sciences – National Research Council.

Research needs in tropical climatology. 1966. UNESCO [illegible] on Arid Zone Problems.

[illegible], F. H., 1968. The Genetics of Human and Animal Populations. Williams and Wilkins, Baltimore.



IV. ORGANIZATION AND IMPLEMENTATION

The fulfilment of the Human Adaptability Programme [illegible] depends on (1) the active and [illegible] participation of [illegible] working through their National Committees and (2) the [illegible] help and coordination provided by the SCIBP and the HA Sectional Committee [illegible] WHO and other agencies.

1. Organization

The functional organization of the Human Adaptability Project [illegible] (HA 201) on p. 41.

II. National level

The [illegible] national IBP Committees [illegible] already [illegible] HA [illegible] National Human Adaptability [illegible] Convenors [illegible] The following list gives the HA convenors and HA correspondents as known at present:

CONVENORS OF HA COMMITTEES AND CORRESPONDENTS FOR HA

Country	*Name and Address*
Australia	Professor R. J. Walsh, [illegible] Director, [illegible] Blood Transfusion Centre, [illegible] York Street, Sydney, New South Wales.
Austria	Dr. [illegible] Anthropologisches Institut, [illegible] Vienna IX.
Belgium	Dr. J. Hiernaux, [illegible]
Brazil	Dr. F. M. Salzano, Universidade do Rio Grande do Sul, [illegible] Porto Alegre, Brazil.
Canada	Dr. J. S. Hart, Head, Animal Physiology Section, Division of Biosciences, National Research Council, Ottawa, Ontario.
Chile	Dr. R. Cruz-Coke, [illegible] of Medicine, Department of Genetics, Universidad de Chile, Hospital Clínico San Borja [illegible] Santiago de Chile.
Czechoslovakia	Academic Dr. [illegible] Department of Physiology and Pathophysiology of Nutrition of the [illegible] Prague 2.
Ethiopia	Professor [illegible] Medical [illegible] P.O. Box 1176, Addis Ababa.
France	[illegible]
German Democratic Rep.	Professor [illegible] Institut für Anthropologie, Humboldt-Universität zu Berlin [illegible]
Fed. Rep.	Professor [illegible] Anthropologisches Institut der Universität [illegible]
India	Dr. M. R. Malhotra, Defence Inst. of Physiology and Allied Sciences, [illegible] Madras.
Italy	Professor [illegible] Istituto di Genetica dell'Università di Roma.
Japan	Professor H. Yoshimura, Department of Physiology, Kyoto Prefectural University of Medicine, [illegible] Kyoto.
Mexico	Dr. [illegible] Instituto de [illegible] Universidad [illegible] Mexico 20, D.F.
The Netherlands	Professor Dr. J. W. [illegible]
Nigeria	Dr. A. F. [illegible] University of Lagos Medical School, Lagos.
Norway	Professor [illegible]
Poland	Professor [illegible] Polish Academy of Sciences, Institute of Anthropology, [illegible]
Philippines	Dr. [illegible] National Science Development Board, [illegible] Manila.

Country	Name and Address
South Africa:	Professor P. V. Tobias, University of Witwatersrand Medical School, Johannesburg.
Sweden:	Dr. [illegible] Wilson, [illegible], Institute [illegible], [illegible] University, [illegible].
U.K.:	Sir [illegible], The Royal Society, Burlington House, Piccadilly, London, W.1.
U.S.A.:	Professor [illegible], Dept. of Physiology, [illegible] University, [illegible].
U.S.S.R.:	Professor E. M. Kreps, Sechenov Institute of Evolutionary Physiology, Maurice Thorez av. 44, Leningrad [illegible].
Yugoslavia:	Dr. [illegible], Head, Department for Physiology of Mineral Metabolism, Institute for Medical Research, [illegible].

D. International Level

IBP launched by ICSU is directed and supervised by SCIBP, which is elected by the General Assembly consisting of representatives of all participating countries. The constitution of SCIBP is described in detail in IBP News No. 1. IBP has a permanent Scientific Director Dr. E. B. Worthington, at the Central office at 7 Marylebone Rd., London, N.W.1. Of the present membership of SCIBP elected in July 1964, those especially concerned with human biology are:

Prof. [illegible] (Vice President)

Prof. Weiner — Convener, Human Adaptability Project

A Representative of the International Union of Physiological Sciences

A Representative of the International Union of Nutritional Sciences.

The Sectional Committee of Human Adaptability is elected on as wide a geographical basis as possible with a balance between [illegible] and [illegible]. The committee meets once a year and there are 10 full and 8 corresponding members. The first meeting was at Warsaw in April, 1965 [illegible], and the next meeting is planned for Paris in April, 1966. The present members are as follows:

H. A. Sectional Committee

* Corresponding members

Europe:	Professor J. S. Weiner Royal Anthropological Institute, 21 Bedford Square, London, W.C.1.	Convener
	Professor [illegible], [illegible], [illegible], Bulgaria.	Deputy Convener

France:	*Professor R. Metz, Laboratoire de Physiologie Appliquée, Faculté de Médecine, Univ. de Strasbourg, 11 place de l'Hôpital, Strasbourg, France.
	Professor E. M. Kreps, Director, Inst. of Comparative Physiology, Academy of Sciences of the U.S.S.R., Leningrad, U.S.S.R.
	*Dr. [illegible], Inst. Physiology, University of Belgrade, [illegible], Belgrade, Yugoslavia.
	*Prof. A. Wanke, Polish Academy of Sciences, Dept. of Anthropology, Wroclaw, ul. [illegible], Poland.
Africa:	Professor P. V. Tobias, University of Witwatersrand, Medical School, Johannesburg, South Africa.
	*Professor [illegible], Dept. of Pathology, University of Lagos Medical School, Private Mail Bag 12003, Lagos, Nigeria.
Asia:	Dr. M. S. Malhotra, Defence Inst. of Physiology & Allied Sciences, C/o Madras Medical College, Madras 3, India.
	Professor H. Yoshimura, M.D., Dept. of Physiology, Kyoto Prefectural University of Medicine, Kyoto, Japan.
Australia:	Professor R. J. Walsh, N.S.W. Red Cross Blood Transfusion Service, [illegible] York Street, Sydney.
N. America:	Professor J. V. Neel, University of Michigan Medical School, Dept. of Human Genetics, 1133 E. Catherine Street, Ann Arbor, Michigan, U.S.A.

N. America	Professor [illegible], Dept. of Anatomy and Physiology, Indiana University, Bloomington, Indiana [illegible], U.S.A.
S. America	Dr. F. M. Salzano, Universidade do Rio Grande do Sul, [illegible], Porto Alegre, Brazil

The Convener has the Assistant [illegible] Prof. J. S. Weiner, has an office at the Royal Anthropological Institute, 21 Bedford Square, London, W.C.1, with part time secretarial help. It is planned to appoint a full-time [illegible] in the near future.

At the Warsaw meeting the Sectional Committee decided that the [illegible] already the Convener [illegible] by [illegible] from a number of [illegible] biological [illegible] to [illegible] on a more formal basis and a number of [illegible] are being appointed to [illegible] methods of [illegible] through correspondence and by [illegible]. The [illegible] who [illegible] with [illegible] are as follows:

Growth and Physique	Dr. J. M. Tanner, Department of Growth and Development, Institute of Child Health, Great Ormond Street, London, W.C.1, England.
Working Capacity	Dr. K. Lange Andersen, [illegible] Physiological [illegible], Bergen, Norway.
Heat Tolerance	Dr. C. H. Wyndham, Human Sciences Laboratory, Transvaal and Orange Free State Chamber of Mines, P.O. Box 809, Johannesburg, S. Africa.
Cold Tolerance	Professor L. D. Carlson, University of Kentucky, Lexington, Kentucky, U.S.A.

* [illegible]
* Sampling
* Nutrition
* Genetic studies
* [illegible] to be appointed [illegible] the Convener will be glad to [illegible]

Acting also as a consultant body to the Convener is the Committee on Physiological Anthropometry set up by IUPS in [illegible] to help specifically on questions of methodology in Phase I of IBP. The members of this Committee were [illegible] with the compilation of the handbook on Methods. The Chairman is Prof. J. S. Weiner and its members are Dr. Tanner, Dr. Andersen, and Dr. Wyndham, who act as liaison

[illegible] other members of the Commission are Prof. [illegible] (UK) Prof. [illegible] (France) and Dr. [illegible] (USSR).

4. Implementation

1. National Level

a) National Programmes: It is the responsibility of national committees to formulate their programmes in the light of the scientific fields and personnel available to them and of course, the prevailing interests and international research [illegible] in human biology. Specific national contributions may be proposed for both phases I and II and the detailed tasks to be considered are specified in the [illegible] questionnaire [illegible] as well as in this guide. It is of paramount importance that national [illegible] and [illegible] through the information requested in the questionnaire [illegible] be filled [illegible] as possible. To summarize briefly, national contributions can consist of the following:

For phase I – a) Helping to formulate agreed methods,
b) Helping with research on methodology,
c) Taking part in training schemes,
d) Undertaking pilot investigations.

For phase II – Carrying the research topics [illegible] against described and explained above. Indicating areas and [illegible] of interest.

Following receipt of the information, comments on national contributions and suggestions for cooperation with other countries, etc. will be passed to the different nations by the Sectional Convener.

b) Research Studies and Surveys: The detailed formulation of research and its execution will be the responsibility of the national research committee and the team concerned. They will also undertake or [illegible] planning discussions with those countries with whom they [illegible] a particular region or topic is desirable. National teams will be free to call on the consultant services of members of the IBP and any of the UN agencies involved [illegible] in particular WHO.

Nearly every research topic listed in the programme in sections II and III is envisaged as requiring three stages of study.

1) A preliminary stage in which the extent of the problem will be defined by reference to existing knowledge and in which arrangements ([illegible] personnel, technical, etc.) will be made for carrying out the next stage, the field study.

2) Field study. This will be concerned mainly with obtaining preliminary information in the field and making possible the organisation [illegible] 3.

3) Full scale study. This would last for two years or more and would be phased according to the emphasis given. For example, the genetic study might be followed or preceded by physiological, medical or other studies.

The cost of analysis of multinational projects will be borne by the countries concerned, as was the case in the International Geophysical Year. Regional arrangements should certainly make possible the participation of many less well endowed countries by pooling of resources.

The plan for field research is, in the final resort, the responsibility of the host countries. In deciding the specific areas, design, sampling methods, hypotheses to be tested, etc. it will be [illegible] to [illegible] a minimum number of research methods in common so that IBP [illegible] would be [illegible] methods as well.

c) Interchange of data. A standardised proforma for use in the field by research teams will be agreed upon and will be obligatory in order that the minimum data can be tabulated and processed, using a punch card or tape recording system. For the IBP project it will be incumbent on participating countries to send basic information on the agreed proforma to central data collecting and tabulating centres. Teams will be free to publish the results in their own way, but the basic data will be [illegible] to be available for [illegible] investigation.

d) Ethical considerations. It is to be noted that in dealing with populations in the field, research teams will be under special obligations to maintain a high ethical approach in their investigations.

3. International Level

1) Collation of National Programmes. It will be the duty of the HA Sectional Committee to collate and comment constructively on all the various national programmes and to offer such help or guidance as can be made available through the Convener, the [illegible] agencies, WHO and the office of SCIBP.

2) For phase 2, it is the responsibility of the Sectional Committee, the Convener and the consultants to arrange meetings of working parties as is necessary for the completion of the handbook on methodology. Another important task is the promotion of training schemes by [illegible] to field training and by helping to arrange interchange of students.

3) For phase 3: The major concern of the Sectional Committee, the Convener and SCIBP will be:

1) To facilitate the launching of particular field projects, and
2) To establish a number of data centres.

IV. Documents Relating to Organisation and Implementation

HA 1/1 «Proposals for International Research», October 1963
HA 1/2 Minutes of 1st Meeting HA Sect. [illegible], Warsaw, [illegible] Apr. 1964
HA 1/3 National Programmes for the HA Section. Memoranda. IBP News Nos. 1, 2 and 3.

APPENDIX I

Progress Reports to Convener [illegible] 1965

Reports of Scientific and Special Committees of IBP.

1st report [illegible]
2nd report [illegible]
3rd report [illegible]
4th report [illegible]
5th report [illegible]
6th report [illegible]

Reports to Convener of International Union of Physiological Sciences

1st report [illegible]
2nd report [illegible]

APPENDIX II

IBP HUMAN ADAPTABILITY PROGRAMME

REPORT OF NATIONAL PROGRAMME*

A. Organisation

1. Country
2. Has a Human Adaptability Sub-Committee or Group been set up? YES / NO
3. If YES, give:

   Chairman's Name and Address

   Secretary's Name and Address

4. If NO, to whom should communications be sent?
   Name and Address

Signature
Date

---

* It is requested that this form be filled in as completely as possible and returned to: Professor J. S. Weiner, Convener, Human Adaptability Committee, IBP, c/o Royal Anthropological Society, 21 Bedford Square, London, W.C.1., England.

B. Information on Phase I ("Methods") of the Human Adaptability Project

1. Methodology

Indicate below names and addresses of research units which would be prepared to contribute by correspondence or discussion of methods. Later, requests will be made to some of these to [illegible] in 1965 and 1966 in order to finalise methods for the Handbook of Agreed Methods.

Growth Surveys (Give names and addresses)

Growth and Physique (Anthropometry): (Give names and addresses)

Working Capacity: (Give names and addresses)

Heat Tolerance Studies (Give names and addresses)

Cold Tolerance Studies (Give names and addresses)

High Altitude Studies (Give names and addresses)

Nutritional Studies (Give names and addresses)

Sociodemographic and Genetic Studies: (Give names and addresses)

MEDICAL Assessment: (Give names and addresses)

4. Training programme

a. Please indicate the names and addresses of Institutes willing to give training in:

Genetic Studies

Growth Studies

Environmental Physiology

Work Capacity Physiology

High Altitude Physiology

Nutritional Studies

b. Estimate of requirement for Training Fellowships:

i) Total number of Fellowships required 1965-1970 (5 years)

ii) Subdivide in accordance with the following lines of research:

- Growth Studies —
- Genetic Studies —
- Environmental Physiology —
- Work Capacity Physiology —
- High Altitude Physiology
- Nutritional Studies —

iii) Number of Fellowships available from local sources

iv) Number of Fellowships required from outside sources ......

5. Pilot Studies

Please give information on pilot studies to be carried out prior to the main programme, or those already planned or underway in 1965-1970 under the 3 Categories of Research laid down by the Paris Assembly. (Give names and addresses of directors or leaders of teams of investigators.)

Category 1

a) Genetic Surveys

b) Growth and Physique Surveys

Category 2

Multidisciplinary Studies

Category 3

Studies of Special Populations

Category 4.

Surveys related to WHO projects.

C. *Provisional Information on Phase 2 (1967) research of the Human Adaptability Section*

The information will of course be regarded as provisional, and clearly subject to eventual review by National Committees.

This information is required in terms of the Categories laid down by the Third Assembly. Please give:

(i) A short title or description of the project including the area and communities where the work will be carried out; and

(ii) The name and address of the responsible scientific officer.

Category 1.

a) Growth Surveys.

b) Growth and Physique Surveys.

Category 2.

Multidisciplinary Studies

a) Studies with emphasis on Environmental Physiology.

b) Studies with emphasis on High Altitude Physiology.

c) Studies with emphasis on Genetic Constitution.

d) Studies with emphasis on Nutrition.

e) Studies with emphasis on Growth and Physique.

f) Studies with emphasis on Health (including morbidity and [illegible] disease).

Category 3.

a) Studies of physiological fitness (working capacity and pulmonary function) on particular population samples, as far as possible on a standardized basis. Three groups in particular are of interest:

i) Samples from urban (industrialized) populations.

ii) Samples from non-industrialized populations.

iii) Athletes.

c) Disease as a selective agent of genetic constitution

d) Particular socio-demographic features affecting genetic constitution

e) History (including population dynamics)

f) Special nutritional problems ([illegible])

Category 8.

Surveys related to WHO projects

a) Cardio-vascular Studies

b) Haematological studies

c) Antibody levels in blood

d) [illegible] (See for example [illegible])

e) Surveys of congenital defects.

MULTIDISCIPLINARY STUDIES OF HUMAN ADAPTABILITY: THEORETICAL JUSTIFICATION AND METHOD

Paul T. Baker

Department of Sociology and Anthropology
The Pennsylvania State University

Man, in his process of evolution, has become the most widespread terrestrial animal [illegible]

[illegible]

[illegible]

[illegible]

5. *Determining the Degree of Adaptation in Human Populations*

[illegible]

6. *Determining the Success of Adaptation*

[illegible]

[illegible]

[illegible]

Methodological Solutions which can be Applied to [illegible] Problems

Having [illegible] some of the broad methodological problems [illegible]

[illegible]

[illegible]

[illegible]

1. [illegible]

(a) [illegible]

(b) [illegible]

2. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] of a Multidisciplinary Study

It is probably not an exaggeration to say that the majority of multi-disciplinary studies have failed [illegible]

[illegible]

1. A [illegible]

2. The project [illegible]

[illegible]

[illegible]

[illegible]

1) [illegible]

2) [illegible]

3) The data from the [illegible]

a) [illegible]

b) The nature of [illegible]

c) The number of people available [illegible]

d) The best time of the year [illegible]

4) [illegible]

5) [illegible]

[illegible]