



Hunt Institute for Botanical Documentation
5th Floor, Hunt Library
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4909 Frew Street
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Telephone: 412-268-2434
Email: huntinst@andrew.cmu.edu
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About the Institute

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

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



13th October, 1972.

Dear Askell,

You will probably have heard, via Doris, that I have suggested that a session in plant biosystematics be held at the Boulder Conference next year; and arrangements for this have now been confirmed with Dr. Rogers. I am suggesting as the subject for discussion 'The taxonomic treatment of infra-specific variation, with special reference to floristic studies' as this seems to me to be an important subject, and one likely to provoke discussion. I hope that you and/or Doris will be able to make a contribution; I am in touch with Moore and Heywood at Reading, who I hope will be coming, and I have also written about the session to Peter Raven and Harlan Lewis. I am at present considering the possibility of interesting other European botanists in the session, though I have no idea which of them is thinking of coming to the Conference.

I hope to bring Joan with me to Boulder on this occasion; she has never been to the western parts of the U.S.A. and this should provide a good opportunity to see something of the Rockies, and also probably California. I'm sorry we missed you in Yugoslavia; we went to the Scopoli celebration on September 11th and 12th, and then took a week's holiday on the island of Rab, which we enjoyed very much.

I hope that Loa and your little granddaughter are both well; we were very pleased to see them in Coimbra, after a rather long interval. We both look forward to seeing you all again next year. In the meantime, I hope to hear from you soon.

With kindest regards to Doris and yourself, in which Joan joins,

Yours,

(from David Valentine)

Professor A. Löve,
Department of Biology,
University of Colorado,
Boulder,
Colorado 80302,
U.S.A.

The taxonomic treatment of infraspecific variation, in relation to floristic studies

1. Primary floristic knowledge is being progressively brought together into a series of major floras, of which Flora Europaea is the latest example; and it should be possible, in the foreseeable future to identify without too much difficulty, plants from any part of the temperate world, without recourse to local or obscure publications. Whether this information is produced in the orthodox way, or stored in a computer-based system, is another matter with which we are not concerned here.

The question we are asking is, what is the next major step in floristic investigation? One such step is to devise means of systematising the wealth of taxonomic information about variation below the species level. There is an enormous amount of such information in the literature, particularly in Europe, but it is widely scattered. Also available in a scattered form is an increasing amount of biosystematic information. An effort is thus needed to bring all this together, and either to publish it in book form, or to store it mechanically. Such an effort would be worth while a) to eliminate literature-searches and duplication of effort b) to bring out new problems for research and to provide material for wide-ranging generalisations.

What is needed is a scheme for classifying, handling and where necessary naming taxa or other groupings below the species level, and getting this agreed internationally. The basis for this already exists in the International Code. Once this is agreed, the work of synthesis can begin.

2. To carry out such a project would mean a great deal of work. It could be approached in two ways. One is at the national level, e.g. to produce what might be called a Critical Flora of the British Isles. The other is at the continental level (eventually world level); and this, in order to be practicable, would at first involve selection. Now generally speaking, existing Floras deal adequately with endemics (which for various reasons are the easiest to handle), but less adequately with wides; and it is the wides which have the greatest store of variation. Also, by looking first at the wides, one would have the advantage of a smaller number of species to handle, probably not more than 10% of the whole. Thus in the European flora, only 1500

species would need to be investigated, instead of 15,000.

The kind of scheme we have in mind for the study of wides, in order to discover a) how much is known about them and b) what further needs to be done, is shown in Table 1. This kind of treatment has rarely if ever been applied to a wide over the whole of its range, though it may have been approached in a few cultivated plants. It is noteworthy that in biological and ecological work on individual species, there is a tendency to concentrate on local or endemic taxa, for example the species selected by authors in the Biological Flora of the British Isles. The larger floras rarely give a full account of variation, though this is done by Hegi for certain families in the Flora of Central Europe, and also in Ascherson and Graebner's (incomplete) Flora.

Table 1

<u>Approach</u>	<u>Technique</u>
1) <u>External factors associated with variation</u>	
a) Geographical (involving both spatial and climatic factors)	Meusel's chorological methods
b) Ecological (involving soil, minerals, water etc.)	Phytosociological methods
2) <u>Indicators of variation (overt or cryptic)</u>	
a) External morphology	Orthodox taxonomy
b) Anatomy	-
c) Micromorphology	Scanning EM
d) Physiology	Experimental garden; Growth cabinets; Dormancy studies.
e) Biochemistry	Flavones; isozymes etc.
f) Chromosomes	Population studies of chromosomal variation.
g) Breeding system	Experimental studies; pollination; apomixis.
h) Hybridization	-

The indicators show a pattern of variation which is usually associated with external factors. It may be only partially genotypic; and the mode of association will vary, e.g. ecotypic, clinal, polymorphic.

A few authors have made transcontinental studies, but rarely intensively. Thus Hara has discussed specific and subspecific variation from W. Europe across Asia to Japan; Löve and Böcher have made comparisons between Europe, through Iceland and Greenland to N. America; and more recently Moore has compared N. temperate and S. temperate floras. The work of Lewis and Callaghan, who have made physiological comparisons between populations of the same species from Arctic and Antarctic locations, is also important. But all too often, such work has not been attempted, or else relevant data lie fallow in the literature. Thus, in a relatively local species, Centaurea scabiosa, there has been little attempt to correlate knowledge about variation in western ~~western~~ *maritime* populations with what is known about montane plants in C. Europe, or to tie these together with studies of chromosomal variation. In many cases, available correlations have hardly been considered, e.g. the possibility of linking orthodox taxonomic and phytosociological data, as suggested by Guinocet; the method has recently been applied by Bidault in local studies on Festuca and other genera in S. France. On an intercontinental scale it has been applied by Kornaš to comparisons between Europe and N. America; but its potential value is hardly appreciated in the English-speaking world.

Doubtless it will be difficult to fit all the information called for in Table 1 (when we get it) into a single, usable system; but it is worth noting that the system which already exists in the International Code, with its categories of subspecies, variety, forma, notomorph etc., is not really fully used. It is

surprising that the variation of weedy species, which are among the best known and commonest wides, has rarely been surveyed in extenso. Particularly interesting are species such as Silene alba and Hypericum perforatum, which are weeds in one part of their range and not in another.

3. In the following pages, we shall give an indication of how the wides to be studied might be selected. We shall then list very briefly some of the general questions to which the preliminary selection may give rise, and point out the value of collecting and systematising detailed information about them. The source of the data which we have used is Volume 1 of *Flora Europaea*, families Salicaceae to Caryophyllaceae.

It would be possible to define a European wide as one which is present in all but a few of the countries or territories of Europe (as defined in *Flora Europaea*), and some examples are given in Table 2. But such species are not necessarily widespread outside Europe; and it is more satisfactory to define a wide as a species widespread in 2 or more continents. We can make a list of such species by using the Chorological Atlas of Meusel et al., and selecting those species which cover 2 or more continents; we include on the one hand species which cross Asia to the Pacific, or nearly, and on the other species (with disjunct distributions) found in Europe and North America.

In our selected families, only 11 species (shown in Table 2) qualify for both lists, i.e. widespread both in Europe and outside Europe.

Table 2

<u>Flora Europaea</u>	<u>Meusel</u>
<u>Urtica dioica</u> (All except 3) 2n=32,48,52.	Circumpolar
<u>Viscum album</u> (All except 8) 2n=20.	Eurasia to the Pacific but disjunct.
<u>Rumex acetosella</u> (All) 2n=16,28,42.	Eurasia to the Pacific.
<u>Polygonum hydropiper</u> (All except 7) 2n=20,22.	Eurasia to the Pacific.
<u>Polygonum lepathifolium</u> (All except 3) 2n=22.	Circumpolar
<u>Polygonum amphibium</u> (All except 4) 2n=66,96.	Circumpolar
<u>Chenopodium hybridum</u> (All except 10) 2n=18,36.	Eurasia to the Pacific.
<u>Salsola kali</u> (All except 3) 2n=36.	Europe, deep into Asia.
<u>Montia fontana</u> (All except 7 or 8) 2n=18,20,40.	Cosmopolitan, disjunct.
<u>Agrostemma githago</u> (All except 4) 2n=24,48.	Eurasia almost to Pacific.
<u>Sagina procumbens</u> (All except 1) 2n=22.	E. Canada, Europe, scattered in Asia.

N.B. Chromosome numbers from Fedorov's List.

However, Meusel includes few or no weedy species in his Atlas. If we list further species, widespread in Europe, which are weeds, and add their world distribution from C.T.W. or Hultén, we obtain Table 3 :-

Table 3

<u>Weeds (all except 8 or less, Vol. 1 F.E.)</u>		<u>Distribution</u>
<u>Urtica urens</u>	2n=24,26,52	(CTW) N. temperate regions.
<u>Polygonum aviculare</u>	2n=40,60	(Hultén) Circumpolar
<u>P. persicaria</u>	2n=22,40,44	(Hultén) Circumpolar
<u>Bilderdykia convolvulus</u>	2n=20,40	(Hultén) Circumpolar
<u>Rumex crispus</u>	2n=60	(Hultén) Circumpolar
<u>Rumex obtusifolius</u>	2n=40,60	(CTW) W.C. Europe! Not a wide appar.
<u>Chenopodium polyspernum</u>	2n=18	(Meusel) Europe, narrow belt into Asia.
<u>Chenopodium album</u>	2n=18,36,54	(Hultén) Circumpolar
<u>Atriplex patula</u>	2n=18	(CTW) Europe, N.Africa, W.Asia; naturalised N.Amer.
<u>Atriplex hastata</u>	2n=18,36	(CTW) Europe, N.Afr. Asia, put intwd. N.Amer.
<u>Amaranthus retroflexus</u>	2n=18,32,34	(CTW) Native of N. America but see Meusel.
<u>Stellaria media</u>	2n=28,36-42,44	(Hultén) Circumpolar
<u>Cerastium fontanum</u>	2n=126,144	(CTW) Cosmopolitan
<u>Spergula arvensis</u>	2n=18	(Hultén) Circumpolar
<u>Silene alba</u>	2n=24,48	(CTW) Europe N.Af. W.Asia.
<u>Scleranthus annuus</u>	2n=22,44	(CTW) Europe, Asia, introduced N.America.

A third list of some interest is that of non-weedy species widespread in Europe, but not with very wide distributions outside, though many extend to some extent to the East, (Table 4). (Chromosome numbers from Fedorov).

Table 4

Non-weedy wides in Europe, with better than 'All except 8'.

<u>Alnus glutinosa</u>	2n=28,56.
<u>Corylus avellana</u>	2n=22,28.
<u>Quercus robur</u>	2n=24
<u>Rumex Cr. lomoseratus</u>	2n=18,20,40.
<u>Suaeda maritima</u>	2n=18,36.
<u>Arenaria serpyllifolia</u>	2n=20,40,44.
<u>Mochringia trivenia</u>	2n=24
<u>Stellaria graminea</u>	2n=26,39.
<u>Cerastium pumilum</u>	2n=72,90,95,100.
<u>Myosoton aquaticum</u>	2n=28.
<u>Spergularia marina</u>	2n=36.
<u>Spergularia rubra</u>	2n=36,54.
<u>Lychnis flos-cuculi</u>	2n=24.
<u>Silene vulgaris</u>	2n=24,48.
<u>Dianthus deltoides</u>	2n=30.

4. It is possible to analyse these lists from many points of view. The following questions can be asked:
- 1) From what kinds of habitat do the plants come?
 - 2) What percentage is weedy? What maritime?
 - 3) What are their migration methods?
 - 4) To what extent do they have chromosome races? And if split into species ~~by the Wilsons~~, would the fragments still qualify as wides?
 - 5) Do any of them have vicarious species in N. America or the Far East?
 - 6) To what extent have these species been intensively studied by the methods given in Table 1, and what sort of map of variation could be produced?
 - 7) What percentage do these species form of the families in F.E. from which they were selected?
 - 8) What is their life-form, and how many are annuals, how many trees?
 - 9) What is known about their breeding system, e.g. is there an abnormally high or low proportion of dioecious species?

There has not yet been time to carry out these analyses for the species listed. Clearly, some of the questions could be answered on the basis of information immediately available; but a thorough exploration of the existing data, on the lines suggested in Table 1, would doubtless make it possible to make much more significant comparisons and sounder generalisations. It is our contention that an investigation along these lines is likely to be a suggestive and productive activity; and that it would be wise to plan future floristic studies in this way.

D.H.V.

(By David Valentine)

September, 1972.



International Union of Pure and Applied Chemistry

President: Prof. J. Bérard (France)
Vice-President: Sir Harold Thompson (UK)
Secretary General: Dr. W. Gallay (Canada)
Treasurer: Prof. O. Horn (Germany)

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Telephone: Oxford 70125 & 72834 Telegrams: IUPAC OXFORD

56/MW/MG/72

12th January, 1972.

Prof. A. Löve,
Department of Biology,
University of Colorado,
Boulder, Colorado 80302,
U.S.A.

Dear Prof. Löve,

COMMISSION III. 2: CHEMICAL TAXONOMY

I have the pleasant duty of welcoming your participation in the work of IUPAC.

The Union is a voluntary non-profit association of Adhering Organizations representing the chemists of 44 countries. Its objects are:

to promote continuing cooperation among the chemists of the member countries,

to study topics of international importance to pure and applied chemistry which need regulation, standardization or codification,

to cooperate with other international organizations which deal with topics of a chemical nature, and

to contribute to the advancement of pure and applied chemistry in all its aspects.

You were recently nominated an Associate Member (1971-) of the IUPAC body mentioned at the head of this letter. The nomination has now been approved by the Bureau and your National Adhering Organization.

/Cont'd.

Presuming that you will wish to accept the nomination and contribute to the important programme of work currently being undertaken by this IUPAC body, I thought you would like to have a note of the addresses of its Officers:

Chairman:

Prof. A. Kjaer
Organisk-Kemisk Laboratorium
Danmarks Tekniske Højskole
Bygning 201
DK-2800 Lyngby
DENMARK

Secretary:

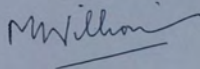
Dr. T. Swain
Biochemical Laboratory
Royal Botanic Gardens
Kew, Richmond
Surrey, U.K.

If they have not already been in contact with you to allocate a working project, I expect they will do so in the near future.

As an Associate Member it is intended that you will work mainly through the medium of correspondence. While you are quite free to attend meetings of this IUPAC body, I must point out that it is not possible for IUPAC to reimburse any expenses so incurred by you.

Under separate cover I am sending you a copy of the IUPAC Statutes and IUPAC Information Bulletin No.41 (November 1971). Early in 1972 you will receive Comptes Rendus XXVI IUPAC Conference. These documents provide useful background information on the Union. If I can be of any further help to you, please do not hesitate to write to me.

Yours sincerely,



M. WILLIAMS (DR.)
Executive Secretary IUPAC

c.c. Prof. A. Kjaer
Dr. T. Swain
Prof. G. Ourisson
Prof. H. Zollinger



ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD
NORTH ATLANTIC TREATY ORGANIZATION

BRUXELLES 39

DIVISION DES AFFAIRES SCIENTIFIQUES
SCIENTIFIC AFFAIRS DIVISION

41.00.40
TEL. : 41.44.00
41.44.90

SA.5-2-04.382/AJ

28th May, 1969

Dear Professor Løve,

Thank you for your application for support of an advanced study institute on "Biological evidence for and significance of continental drift, mainly in the North Atlantic". As far as I can see it contains all the information we need, and I shall be pleased to present it to the Advisory Panel at its meeting on the 18th July. I should mention, however, that we cannot promise a definite decision at that time. It often happens that the panel feels the need for further information and comparison with all applications for support in the area, and consequently postpones a decision to its last meeting.

As you know, it is the policy of our programme to support advanced study institutes as distinct from large international conferences. It is on this basis that I would ask you to reconsider the participation in the meeting. In my experience maximum benefit is gained by having about 50 to 100 participants. A much larger attendance hampers formal and informal discussions and the establishment of contacts between participants.

Yours sincerely,

H. Arnth-Jensen

(Dictated by Dr. Arnth-Jensen
and signed in his absence.)

Prof. A. Løve,
Department of Biology,
University of Colorado,
Boulder,
Colorado 80302,
USA

NATO ADVANCED STUDY INSTITUTES PROGRAMME

Please complete all four pages of this application form in ten copies and return them to the Scientific Affairs Division, NATO, Brussels 39, Belgium before the 15th October for support the following year.

- 1 - Name and address of Applicant: Askill Löve, Ph.D., D.Sc.,
Professor and Chairman,
Department of Biology,
University of Colorado,
Boulder, Colorado 80302, U.S.A.
- 2 - Title of proposed Advanced Study Institute:
Biological evidence for and significance of continental drift, mainly
in the North Atlantic.
- 3 - Location:
To be decided when support is forthcoming (W or NW Europe?)
- 4 - Date of course: Late June and/or early July 1970.
Total number of working days: Two full weeks as a minimum
- 5 - Type of course, e.g. lectures and discussions, laboratory, etc.
Lectures and discussions; possibly excursions.

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- 6 - Estimated attendance — Lecturers: 26 (-30)
(Please specify on page 3) Other participants: 60-100
Total: c. 85-125

- 7 - Grant requested from NATO (in US dollars): \$28,500
(Please itemise on page 4)

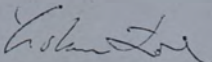
- 8 - Size of possible grants from other sources: none
(Please specify on page 4)

- 9 - Have you directed a NATO Advanced Study Institute in earlier years or been involved in its organization?

Yes

Please state year and institute title:

1962: North Atlantic Biota and Their History, Reykjavík, Iceland.

- 10 - Signature of applicant: 

Date: May 20, 1969

12: SCIENTIFIC CONTENT OF THE COURSE:

The Institute is to be organized around the theme of biological evidence for and significance of continental drift, mainly in the area of the North Atlantic. In other words, it will look into the biogeographical evidence of continental drift, which in this area seems to have been mainly during the Tertiary, when all genera and most species of animals and plants which now inhabit this region either were being formed or had become stabilized. Since it is obvious to common sense that biogeographical reasoning of any kind must be consistent with geological knowledge, it is important that such an Institute first gets information about the experience and ideas of geologists specializing in this field. Therefore, the plan is that the first two days of the Institute will be taken up by geological, geophysical, oceanographic, and meteorological lectures and discussions to form the necessary background for the biological lectures and discussions which will take up most of the remainder of the time of the Institute. The biological lectures and discussions will emphasize past and present biogeography including paleobiology and palynology, as well as detailed discussions on dispersal and migration mechanisms and other evolutionary phenomena of importance for the understanding of later modifications of what the drift may have started when it separated groups of biota in these regions.

Since detailed information about the exact content of each lecture will not be available until when the lecturers have agreed on their special themes, supposedly during the first part of next winter, only schematic information on what they will cover can be given at present. As to the geologists, the facts and causes of continental drift will certainly take up a good deal of their time, some will emphasize the paleomagnetic evidence, whereas others may discuss the controversial subjects of the possibly expanding earth or the effects of possible convection currents on the mid-oceanic ridges. It is hoped that at least some of them will try to furnish the biologists with maps of the North Atlantic at various times with not too long intervals. The meteorologists will explain the effects of the drift, northwards and westwards, on the climates, which ultimately decide about the constitution, evolution, and dispersal of the individual species and the ecosystems they form. The biologists, who form the majority of the lecturers, can be expected to discuss these same phenomena as evidenced by paleogeological evidence and the present distribution and relationships of floras and faunas on both sides of the North Atlantic, putting emphasis on the influence of the moving lands on humidity and temperature and other factors that force dispersal of biota into new areas and affect their course of evolution.

It is likely that the Institute and the book expected to result from its discussions will have a profound influence on historical biogeography, which at present is mainly based on faith in the hypothesis of fixity and permanence of the present lands and the belief in the instability of species, instead of taking into account the mounting paleogeological and geological evidence that actually shows that the biological species, once formed, is more conservative than the rocks on which it grows and likely has witnessed the drifting of continents to form wide oceans where deserts were before, and the lifting and erosion of mountain chains. If this will be the result, then the Institute will likely soon be regarded as a milestone in the modernization of evolutionary biogeography.

11 - Name and address of scientific directors and eventual organizing or advisory committee:

Scientific director: Dr. Askell Löve, Professor and Chairman,
Department of Biology,
University of Colorado,
Boulder, Colorado 80302, U.S.A.

A small advisory committee to be formed when a preliminary acceptance of the Institute has been given.

An organizing committee to be appointed when locality has been selected.

12 - Scientific content of the course: cf. attached sheet.

(Please provide this information in detail on separate sheets, if possible in ten copies.)

13 - Tentative list of lecturers and their subjects.

N.B. - Please mention the reaction of the proposed lecturers to your approach to them (positive interest, preliminary agreement etc.) and whether a lecturer is willing to stay for the total duration of the course.

The following have responded very enthusiastically and want to stay all the time, but two geologists, who are not listed here, have preliminarily agreed to take part:

Professor F. Aldrich, St. John's, Newfoundland (marine fishes)
Dr. P. L. Bender, ESSA, Boulder, Colo., U.S.A. (geophysics, paleomagnetism)
Professor L. Brundin, Stockholm, Sweden (insect distribution, past and present)
Professor R. A. Bryson, Madison, Wisc., U.S.A. (paleoclimatology)
Professor S.W. Carey, Hobart, Australia (geology of the expanding earth)
Professor Trausti Einarsson, Reykjavík, Iceland (midocean ridges)
Dr. Thorleifur Einarsson, Reykjavík, Iceland (changes in ocean life in Miocene)
Dr. D. K. Ferguson, Antwerp, Belgium (paleobotany and paleomagnetism)
Mr. F. Fitch, London, England (late Tertiary events in the North Atlantic region)
Professor E. Hadač, Praha, CSR (distribution of Tethys flora)
Professor J. G. Hawkes, Birmingham, England (drift and plant evolution)
Professor Bruce Heezen, Palisades, N.Y., U.S.A. (the Atlantic at diff. stages of drift)
Professor Eric Hultén, Stockholm, Sweden (Quaternary plant distributions)
Professor Curt Kosswig, Istanbul, Turkey (fresh-water fishes and drift)
Dr. Doris Löve, Boulder, Colo., U.S.A. (plant dispersals)
Professor Svein Manum, Oslo, Norway (arctic paleobotany and palynology)
Dr. R. Melville, Kew, England (modern angiosperm distribution and drift)
Professor J.A. Miller, Cambridge, England (geological evidence for drift)
Professor G. Rudebeck, Stockholm, Sweden (bird migration and drift)
Professor Hugo Sjörs, Uppsala, Sweden (drift and ecological zonation)
Dr. Zd. Urban, Praha, CSR (drift and distribution of fungi)
Professor J. W. Valentine, Davis, Calif., U.S.A. (drift and marine shelf invertebr.)
Professor A. Zilch, Frankfurt a.M., Germany (land mollusc distribution now and then)

- 14 - Approximate time schedule of the course:
(Number of lectures per day, laboratory sessions, seminars etc.)

Four to five lectures every morning, discussions all afternoons, recreation in the evenings and perhaps personal discussions.

It is expected that at least some of the lecturers will organize small discussion groups with students for some of the evenings and for the weekend - and for days with bad weather that may have been planned for excursions.

- 15 - Are there any particular reasons for the choice of location?
(Laboratory space, possibility of excursion, convenient for organizing committee, special lodging facilities, etc.)

Not directly applicable at this time, but special lodging facilities and a possibility of an excursion to places of direct interest for the subject and for observation of drift phenomena are the main reasons to be considered.

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- 16 - Indicate approximately the national distributions of lecturers and other participants:

Nationality	Number of lecturers	Other participants
Australia	one	
Belgium	one	To be decided
Canada	two	later, when space
England	five	and other important
FRANCE Germany	one	factors will be
Iceland	two	known.
Norway	one	It is hoped that
Sweden	four	60-100 students
Turkey	one	at various levels
U.S.A.	five	and from various
		countries can be
		allowed to take
		part.
Non-NATO countries	<u>Finland and Czechoslovakia</u>	<u>one and two</u>

Total: twenty-six

17 - Approximate budget for the meeting:	NATO grant \$	Other sources \$
1. Living expenses of lecturers	5000	
2. Travel expenses of lecturers	9500	
3. Honoraria for lecturers	-	
4. Living expenses for students)		
5. Travel expenses for students)	2000	
6. Rental for accommodation (conference rooms)	1000	
7. Director's honorarium	2000	
8. Clerical and technical assistance	2500	
9. Organizational expenses (advertising, paper, mailing, lecture notes, costs of meeting of organizing committee)	2000	
10. Expenses for publications	2000	
11. Other expenses (specify (excursion s x)	2500	
	<u>\$28,500</u>	<u>0</u>
TOTAL:	<u>\$28,500</u>	<u>0</u>

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The budget is based on the experience from the summer institute that was held in Reykjavik, Iceland, in 1962, and on the assumption that it would be held in western or northwestern Europe, perhaps in Iceland or Ireland or Scotland, depending upon factors not yet solved. I would prefer, however, that these possibilities be kept secret until at a later date, to avoid complications when getting a local organizing committee established.

It is important that the discussions be kept at a high level which requires that the number of participants be increased rather than reduced. If this is kept in mind, the estimated cost is to be regarded as very reasonable.

Unfortunately, I know of no other source for additional support for this institute except perhaps if it were held in North America.



ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD
NORTH ATLANTIC TREATY ORGANIZATION

BRUXELLES 39

DIVISION DES AFFAIRES SCIENTIFIQUES
SCIENTIFIC AFFAIRS DIVISION

41.00.40
TEL.: 41.44.00
41.44.90

SA.5-2-04.89/AJ

28th January, 1969

Dear Professor Löve,

I was pleased to learn from your letter of 19th January of your interest in organizing an advanced study institute on "Biological Evidence for and Consequences of Continental Drift". This specific subject has not to my knowledge been treated in a NATO advanced study institute before, even though we now support more than 50 institutes each year with widely ranging scientific topics, as you will see from the enclosed list of meetings in 1969.

The enclosed Notes for Applicants describes the present policy of the programme. The competition for the funds available has become somewhat greater in the last few years, and although the scientific quality of a proposal is still the main criterion for support, it has also become a necessary requirement that a proposed meeting be a true advanced study institute, as opposed to a symposium, conference or another type of international scientific meeting. Your first consideration must therefore be to decide whether the meeting you have in mind is within the concepts of the Advanced Study Institutes Programme. Judging from your letter this seems to be the case.

If you decide to submit a formal application it is extremely important to include a list of lecturers and, if possible, the topics they are likely to treat. The scientific evaluation of the proposals are based on this list of lecturers. For this reason we request you to enquire from the lecturers you list about their interest in the meeting and their availability, and we would ask you not to list any lecturers you have not contacted.

Concerning the location of the meeting, we have, of course, no preference for particular countries within the Alliance. We do, however, hope that participation in the meeting will be really international, and in this connection I would suggest that you consider the possibility of planning the institute in Europe instead of in the United States, depending on whether you can count on the assistance of local organizers here, and on the participation you have in mind.

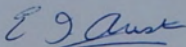
Prof. A. Löve,
Department of Biology,
University of Colorado,
Boulder,
Colorado 80302,
USA.

28th January, 1969

Experience has shown that a successful advanced study institute can be organized with NATO support of \$15,000 to \$20,000. This amount does not cover all the costs of a two-week institute of 60 to 70 persons, but it should cover travel and living expenses for lecturers and a sufficient contribution to the expenses of students to ensure an attendance of well-qualified younger scientists.

If you are able to submit the application before the end of May our Advisory Panel will review it at its summer meeting, and even though no definite decision can be promised before the last panel meeting in 1969, at the end of the year, I should be able to send you at the end of July a good indication of the prospects for support.

Yours sincerely,



H. Arnth-Jensen
Head, Pure Science Bureau

(Dictated by Dr. Arnth-Jensen and signed in his absence.)

UNIVERSITY OF COLORADO

BOULDER, COLORADO 80302

DEPARTMENT OF BIOLOGY
OFFICE OF THE CHAIRMAN

Boulder, June 29, 1969.

Dr. H. Arnth-Jensen,
Scientific Affairs Division,
North Atlantic Treaty Organization,
Bruxelles 39, Belgium.

Your ref.: SA.5-2-04.382/AJ

Dear Dr. Arnth-Jensen:

Many thanks for your good letter of May 28 regarding my application for support of an advanced study institute next year. I quite agree with your concern that I mentioned more participants than you usually expect for a successful institute, though you may be sure of that the number of students will hardly be much higher than 1 or 1.5 per lecturer... though this may depend somewhat upon the place where the institute will be held. My project was based on my experience from the 1962 institute in Iceland, and I dare to say that it was very successful despite the fact that we got more student participation than expected at the beginning. But, as in that case, we can certainly expect that the greatest influence of the institute comes later on, through seminars which will use the publication, which is true even seven years after that institute was held.

As far as I understand your letter, there may be some difficulties in getting a decision on this institute at the summer meeting of your panel. I have been in contact with my proposed participants and also with some others who have heard of the institute proposal and are filled with interest, and they all seem to be of the opinion that it is very important that we can say to them with certainty during this summer that the institute is going to be held next summer, because otherwise they would hesitate to spend as much time for preparation of their papers and, especially, new maps and other pictorial material which cannot be completed in as short a time as would be available from the last meeting of the panel in December. Therefore, I sincerely hope that you will be able to give me a firm though preliminary approval after the July meeting, though with the understanding that the final meeting may make some changes, in either direction. Since I will have to be able to make some travel to get support from local people for the arrangements already this summer or fall, it would be beneficial if your July meeting could make some small funds available for this, if it at all finds the proposal agreeable.

One of those two specialists who had not been able to commit themselves definitely when I wrote the proposal, is Professor J. Tuzo Wilson, the famous Canadian geophysicist. He was travelling when I contacted him, but as soon as he returned he wrote me a very enthusiastic letter accepting the preliminary invitation and added a good deal of remarks that are characteristic for those who had accepted to participate. So I am in no doubt that this is just the correct time for such an institute and that it will be filled with interest and give your summer institutes some glory in addition to all that it is getting from the many other institutes it has supported in the past.

With the very best regards,

Yours sincerely,

Askell Löve

UNIVERSITY OF COLORADO

BOULDER, COLORADO 80302

DEPARTMENT OF BIOLOGY
OFFICE OF THE CHAIRMAN

Boulder, May 20, 1969.

Dr. H. Arnth-Jensen,
Head, Pure Science Bureau,
Scientific Affairs Division,
North Atlantic Treaty Organization,
Bruxelles 39, Belgium.

Your ref.: SA.5-2-04.89/AJ

Dear Dr. Arnth-Jensen:

I am sorry that I did not thank you immediately for your good letter of January 28 and for the informations it contained, but since I am probably one of these incurable optimists who do not realize how slow our colleagues are sometimes in answering letters, I thought I would wait until I could send you all the material. This has taken months, but I hope you forgive me when you see that my application is complete except for the locality of the proposed Institute. As to the locality, I would like to be allowed to discuss it with the participants when we know that the support for the Institute will be forthcoming. Naturally, we will not make any decision on the place of the Institute without consulting you before contacting formally the prospective organizing committee members wherever they will be, but I hope this can be possible either late in the summer or early in the fall.

I used my experience from the last Institute I directed, in 1962, as a basis of my estimate. I am sorry that this apparently is higher than the sum you mentioned in your letter, but what can we do with the inflation if we nevertheless want to have an Institute that will at least be as good as the one I am comparing with? I hope, however, that the sum will not be a stumbling block, because I am convinced that if this Institute is held, it will have a profound influence on all thinking in biogeography not only within the area to be discussed, and, thus, be of a very special importance and honor to the institution that makes it possible. You would be pleased to see the optimistic response I got from everybody contacted, also those few who were unable to promise any participation, since this indicates that the idea of a discussion of just the biology of continental drift is very ripe.

If you need more information that is included in the application papers, I would be more than happy to add them at any time. And I and the prospective participants would appreciate to get your indication of support as soon as possible, so that we can put full power behind all the planning and organization of a certainly excellent Institute.

Yours sincerely,

Åskell Löve,
Professor and Chairman.

CONSEIL DE L'ATLANTIQUE NORD
NORTH ATLANTIC COUNCIL

ORIGINAL: ENGLISH/FRENCH
January 1969

NATO UNCLASSIFIED
SA.5-2-04.22/AJ

NATO ADVANCED STUDY INSTITUTES

1969 PROGRAMME

(PROVISIONAL)

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NATO UNCLASSIFIED

The NATO Advanced Study Institutes Programme sponsors each year a number of international meetings and courses at which various scientific topics are presented and discussed at an advanced level. These meetings have in the past proved very successful in strengthening international contacts among scientists and in reviewing recent developments in many different sciences. It is hoped that the 56 Advanced Study Institutes to be held in 1969 and listed overleaf will continue this tradition.

While these activities are sponsored by NATO, the individual directors are entirely responsible for planning the scientific programme, selection of participants, etc. Each director arranges for the publication of a detailed programme, admission forms, etc., and for publicity of the course.

Persons interested in a particular NATO Advanced Study Institute should therefore write direct to the appropriate director for further details and to verify the dates and location of the meeting. Applicants are encouraged to submit applications for participation as soon as possible since the selection of participants is often made many months in advance of the course.

The Advanced Study Institutes Programme will continue in 1970. We shall be pleased to forward details of the criteria for NATO sponsorship to any scientist who is contemplating the organization of an international meeting which may conform with the Advanced Study Institute concept. Please address such enquiries to the Scientific Affairs Division, NATO, Brussels 39, Belgium well in advance of 15th October, by which date all formal applications for support in 1970 must be received.

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Le Programme de Cours d'Eté de l'OTAN subventionne chaque année plusieurs réunions et cours de caractère international durant lesquels des sujets scientifiques de haut niveau sont présentés et discutés. Ces réunions se sont révélées très utiles dans le passé pour renforcer des contacts internationaux parmi les scientifiques et pour examiner les derniers développements dans différents domaines scientifiques. On espère que les 56 cours d'été qui auront lieu en 1969, et dont la liste est jointe, poursuivront cette tradition.

Bien que ces activités soient subventionnées par l'OTAN, chaque directeur est entièrement responsable de l'organisation du programme scientifique, du choix des participants etc. Chaque directeur se charge également de la publication d'un programme détaillé, des formulaires d'inscription, etc., et de la publicité à donner au cours.

Toute personne intéressée à un cours d'été OTAN en particulier devra donc s'adresser directement au directeur en question pour plus amples détails, et pour vérifier les dates et lieu de la réunion. Il est recommandé aux candidats de soumettre leur demande d'admission aussitôt que possible, étant donné que le choix des participants est souvent fait plusieurs mois avant le cours.

Le Programme de Cours d'Eté se poursuivra en 1970. Nous sommes prêts à envoyer tous les renseignements sur les critères de soutien financier et sur la procédure à adopter pour présenter une demande à tous les scientifiques qui souhaitent organiser une réunion internationale du type des cours d'été de l'OTAN. Prière de s'adresser à cet effet à la Division des Affaires Scientifiques, OTAN, Bruxelles 39, Belgique avant le 15 octobre, date à laquelle toutes les demandes officielles pour 1970 doivent être reçues.

Ref.	Director Directeur	Title Titre	Location	Date
17/67	Dr. A.E. Evangelopoulos, State and University Hospital, "Alexandra", K. Lourou Str., Athens, Greece	Fourth advanced study institute on molecular biology	Spetsai, Greece	6th to 9th July
19/68	Prof. Max. K. Hecht, Department of Biology, Queens College of the City University of New York, Flushing, New York, 11367, USA.	Vertebrate Evolution: Mechanism and Process	Istanbul, Turkey	last two weeks August
28/68	Prof. Dr. N.L. Mavridis, Department of Geodetic Astronomy, University of Thessaloniki, Thessaloniki, Greece.	Structure and Evolution of the Galaxy	Athens, Greece	10th to 23rd September
36/68	Dr. J.R. Royce, Director, The Center for Advanced Study in Theoretical Psychology, The University of Alberta, Edmonton, Alberta, Canada.	The psychology of knowing	Banff, Alberta, Canada	5th to 9th May
39/68	Dr. S. Bratos, Centre de Mécanique Ondulatoire Appliquée, 23, rue du Maroc, Paris 14e, France.	Le Mouvement Moléculaire dans les Liquides	Menton, France	30th June to 13th July

Ref.	Director Directeur	Title Titre	Location	Date
40/68	Prof. P.L. Broadhurst, Department of Psychology, University of Birmingham, Birmingham, England. <u>and</u> Prof. J.L. Jinks, Department of Genetics, University of Birmingham, Birmingham, England.	Psychogenetics	Birmingham 15, England	14th to 26th July
42/68	Prof. M. Anastassiades, Director of the Ionospheric Institute, National Observatory of Athens, Theseum-Athens (306), Greece	Solar Eclipses and the Ionosphere	Athens, Greece	-
1/69	Prof. P. De Somer, Rega Institute, University of Louvain, Minderbroedersstraat 10, Louvain, Belgium	The germ-free animal as a tool in research	Bruges, Belgium	14th to 20th September
2/69	Prof. Cécile M. DeWitt, Department of Physics, University of North Carolina, Chapel Hill, N.C. 27514, USA.	Physical aspects of some biological problems	Les Houches, France	1st July to 27th August

Ref.	Director Directeur	Title Titre	Location	Date
3/69	Prof. J. Lewis, University College London, Gower Street, London, W.C.1., England. <u>and</u> Prof. R. Mason, Dept. of Chemistry, The University, Sheffield, S3 7HF, England.	Theoretical and structural inorganic chemistry	Italy	July
4/69	Prof. L. Martini, Dept. of Pharmacology, University of Milan, Via Vanvitelli 32, I 20129, Milan, Italy.	Integration of endocrine and non-endocrine mechanisms in the hypothalamus	Stresa, Italy	19th to 30th May
5/69	Dr. Francis O. Schmitt, Institute Professor, Massachusetts Institute of Technology, 280 Newton Street, Brookline, Mass. 02146, USA.	Intensive study program in neurosciences	Boulder, Colorado, USA	21st July to 8th August
6/69	Prof. Liana Bolis, Istituto di Fisiologia Generale, Università di Roma, 00185 - Rome, Italy.	Permeability and function of biological membranes	Italy	June

Ref.	Director Directeur	Title Titre	Location	Date
7/69	Prof. E.C. Milner, Dept. of Mathematics, University of Calgary, Calgary, Alberta, Canada	Combinatorial structures and their applications	Calgary, Alberta, Canada	2nd to 14th June
8/69	Prof. R.O. Gandy, Dept. of Mathematics, Manchester University, Manchester, England.	Colloquium and summer school in mathematical logic	Manchester, England	4th to 20th August
9/69	Mr. Floyd B. Fischer, Director, Continuing Education, The Pennsylvania State University, University Park, Penn. 16802, USA. <u>Scientific Director</u> Dr. Russel J. Hutnik, College of Agriculture, The Pennsylvania State University.	Symposium on ecology and revegetation of drastically disturbed areas.	Pennsylvania, USA	3rd to 16th August
10/69	Prof. G.R. Tristram, Dept. of Biochemistry, University of St. Andrews, Bute Medical Buildings, St. Andrews, Fife, Scotland.	The chemistry and biology of the intercellular matrix	Ligure, (Portofino) Italy	16th to 28th May
11/69	Prof. A.E. Beck, Dept. of Geophysics, University of Western Ontario, London, Ontario, Canada.	Earthquake displacement fields and the rotation of the earth	London, Ontario, Canada	22nd to 30th June

Ref.	Director Directeur	Title Titre	Location	Date
12/69	Prof. D.R. Hay, Dept. of Physics, University of Western Ontario, London, Ontario, Canada.	Effects of atmospheric water electro-magnetic wave propagation	London, Ontario, Canada	29th August to 6th September
13/69	Dr. Guy G. Boulaye, Institut de Mathematiques Appliquées de l'Université de Grenoble, Boite Postale 7, 38 Saint Martin d'Heres, Grenoble, France.	Design of digital computers (computer architecture)	France	August/ September
14/69	Prof. L. Eyring and Prof. M. O'Keefe, Chemistry Dept. Arizona State University, Tempe, Arizona 85281, USA.	The chemistry of extended defects in non-metallic solids	Scottsdale, Arizona, USA	16th to 26th April
15/69	Dr. Jean Abadie, 29 Bd. Edgar Quintet, Paris 14e, France.	Integer and nonlinear programming	Ile de Bandor, Bandol, France	8th to 21st June
16/69	Mr. L.J. Carter, Secretary, The British Interplanetary Society, 12 Bessborough Gardens, London, S.W.1., England.	Earth resources survey satellites (including meteorological applications)	Cambridge, England	14th to 25th June

Ref.	Director Directeur	Title Titre	Location	Date
17/69	Prof. Dr. S. Amelinckx, Fakulteit der Wetenschappen Rijksuniversitair Centrum Antwerpen, Middelheimlaan 1, Antwerp, Belgium	Recent developments in diffraction techniques applied to materials science	Antwerp, Belgium	
18/69	Prof. Sir Harrie Massey, F.R.S., Dept. of Physics, University College London, Gower Street, London, W.C.1., England.	Summer school in space experiment design	Dorking, Surrey, England	25th August to 12th September
19/69	Prof. L. Santamaria, Director of the Institute of Biological Chemistry and General Pathology, University of Sassari, Viale Mancini 5, 07100 Sassari, Italy.	Biological effects of visible light - photochemistry and photobiology of "photo-dynamic action"	Sassari, Sardinia, Italy	31st August to 14th September
20/69	Prof. E. Bompiani, Director of the International Mathematical Summer Center, Istituto Matematico dell' Università, 00185 Rome, Italy. <u>Scientific Director</u> Prof. D.H. Rivlin, Center of Applied Mathematics, Lehigh University, Bethlehem, Penn. 18015, USA.	Non-linear continuum theories in mechanics and physics and their applications	Padua, Italy	1st to 10th September

Ref.	Director Directeur	Title Titre	Location	Date
21/69	Prof. E. Bompiani, Director of the International Mathematical Summer Center, Istituto Matematico dell' Università, 00185 Rome, Italy.	Linear and algebraic systems on an algebraic manifold	Varenna, Italy	8th to 17th September
22/69	<u>Scientific Director</u> Prof. Dr. E. Marchionna, Politecnico di Milano, Piazza Leonardo da Vinci 32, Milan, Italy Prof. Dr. Marcel Brelot, Department of Mathematics, Université de Paris, 47, rue des Ecoles, Paris 5e, France.	Potential Theory.	Strésa, Italy	1st to 10th July
23/69	Prof. A. Zichichi, International School of Physics "Ettore Majorana", CERN, Geneva, Switzerland.	Present problems in particle physics	Erci, Sicily	June - July (2 weeks)

Ref.	Director Directeur	Title Titre	Location	Date
24/69	Prof. O. Sinanoglu, Dept. of Theoretical Chemistry, M.E.T.U., Ankara, Turkey. and Prof. E.U. Condon, Dept. of Physics and Astrophysics, University of Colorado, Boulder, Colorado, USA.	New directions in atomic physics	Ankara, Turkey	8th to 20th September
25/69	Dr. J.J. Connell, Ministry of Technology, Humber Laboratory, Wassand Street, Hull, England.	Changes in proteins in frozen and dried foods	Aberdeen, Scotland	8th to 12th September
26/69	Dr. R.I. Reed, Dept. of Chemistry, University of Glasgow, Glasgow W.2., Scotland	Mass Spectrometry	Lisbon, Portugal	25th August to 6th September
27/69	Mr. Finn Lied, Norwegian Defence Research Establishment, P.O. Box 25, 2007 Kjeller, Norway.	Production and maintenance of the Polar Ionosphere	Norway	April
28/69	Prof. G. Toraldo di Francia, Società Italiana di Fisica, Via Irnerio 46, 40126, Bologna, Italy.	Physics with Intersecting storage rings	Varenna, Italy.	16th to 28th June

Ref.	Director Directeur	Title Titre	Location	Date
29/69	<u>Scientific Director</u> Prof. B. Touschek, Laboratori Nazionali di Frascati, Casella Postale No. 70, 00044 Frascati (Roma), Italy. Prof. G. Toraldo di Francia, Società Italiana di Fisica, Via Irnerio 46, 40126, Bologna, Italy.	Relativity and Cosmology	Varenna, Italy	30th June to 12th July
30/69	<u>Scientific Director</u> Prof. R.K. Sachs, c/o Dept. of Mathematics, University of California, Berkeley, California 94720, USA. Prof. G. Toraldo di Francia (address as above) <u>Scientific Director</u> Prof. P. Caldirola, Istituto di Scienze Fisiche, Via Celoria 16, 20133 Milano, Italy.	Physics of High Energy Density	Varenna, Italy	14th July to 2nd August
31/69	Prof. Julius Wess Institut für Theoretische Physik Universität Karlsruhe, 75 Karlsruhe, Kaiserstrasse 12, Germany.	Weak Interactions	Karlsruhe, Germany	14th July to 1st August

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Ref.	Director Directeur	Title Titre	Location	Date
32/69	Prof. Georges Papy, Centre Belge de Pédagogie de la Mathématique, 183 Avenue Brugmann, Bruxelles 6, Belgium.	The structure and logic of mathematics	Eupen, Belgium	30th June to 13th July
33/69	Prof. R. Couteaux, Laboratoire de Cytologie, Faculté des Sciences, 7 quai Saint-Bernard, Paris 5e, France.	Morphological, biochemical and physiological studies of acetylcholine release at synapse	Varenna, Italy	1st to 13th September
35/69	Dr. D.E. Cohen, Secretary, London Mathematical Society, Queen Mary College, Mile End Road, London, E.1., England.	Instructional conference on finite simple groups	Oxford, England	2nd to 20th September
36/69	Prof. Dr. Horst Sund, Fachbereich Biologie, Universität Konstanz, 775 Konstanz, Germany.	Pyridine Nucleotide- dependent Dehydrogenases	Konstanz, Germany	14th to 20th September
37/69	Dr. G.E.R. Deacon, F.R.S., National Institute of Oceanography, Wormley, Godalming, Surrey, England.	Geophysical Fluid Dynamics	Bangor, N. Wales, UK	1st to 19th September

Ref.	Director Directeur	Title Titre	Location	Date
38/69	Prof. H. Kay, Dept. of Psychology, The University, Sheffield 10, England. <u>and</u> Dr. N. Moray, (same address)	On-line computing techniques in behavioural science	Sheffield, England	11th to 25th July
39/69	Dr. R.T. Bingham, Forestry Sciences Laboratory, P.O. Box 469, Moscow, Idaho 83843, USA.	Biology and international aspects of rust resistance in forest trees. (With emphasis on blister rust resistance of white pines).	Moscow, Idaho, USA	16th to 24th August
40/69	Prof. P.S. Farago, Dept. of Physics, University of Edinburgh, Edinburgh, Scotland.	10th Scottish Summer School in Physics (Quantum Optics)	Musselburgh, Midlothian, Scotland, UK	7th to 25th July
41/69	Prof. Franz Bingen, Institute of Mathematics, University of Brussels, 50 Avenue Roosevelt, Brussels 5, Belgium.	Summer school on represen- tations of lie groups	Namur, Belgium	1st to 12th September
42/69	Prof. R. Boite, Faculté Polytechnique de Mons, Rue de Houdain, Mons, Belgium.	Network Theory	Knokke, Belgium	1st to 12th September

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Ref.	Director Directeur	Title Titre	Location	Date
43/69	Dr. Hans Jørgen Helms, Northern Europe University Computing Center, Technical University of Denmark, 2800 Lyngby, Denmark. <u>Scientific Director</u> Mr. Jean-Jacques Duby, Scientific Center IBM France, 94-96 rue Reaumur, 75 Paris 2, France.	Fundamental aspects and current developments in computer programming	Lyngby, Nr. Copenhagen, Denmark	11th to 22nd August
44/69	Prof. M. Lévy, Laboratoire de Physique Théorique et Hautes Energies, Faculté des Sciences de Paris, 9 quai Saint-Bernard, 75 - Paris 5, France.	Weak interactions and quantum statistical mechanics	Gargèse, Corsica	30th June to 27th July
45/69	Dr. James W. Miller, Office of Naval Research, Code 455, Washington, D.C., 20360, USA.	Human Factors/Ergonomics - Recent advances and their application to modern technology	Palermo, Sicily	26th September to 10th October
46/69	Prof. J. Van Kranendonk, Dept. of Physics, University of Toronto, Toronto 5, Ontario, Canada.	Fundamental problems in simple metals	Alberta, Canada	11th to 23rd August

Ref.	Director Directeur	Title Titre	Location	Date
47/69	Prof. P-O Löwdin, Quantum Theory Project, Nuclear Sciences Building, University of Florida, Gainesville, Flo. 32603, USA.	Summer Institute on quantum chemistry, solid state physics and quantum biology	Beitostølen, Norway(1)	27th July to 31st August
48/69	Prof.Dr. E. Camatini, Scuola Internazionale Enrico, Mattei di Studi Superiori sugli Idrocarburi, Matanopoli in San Donato Milanese, Milan, Italy.	Hydrocarbon reservoir simulation by computers	Metanopoli in San Donato Milanese, (Milan), Italy	May
49/69	Prof.Dr. E. Camatini, (address as above)	Geological prospecting for radioactive minerals	"	24th to 29th March
50/69	Prof.Dr. W. Dekeyser, Krijgsiaan 105, Gent, Belgium.	Amorphous semiconductors	Gent, Belgium	25th August to 5th September

- (1) The first part of the meeting, from 27th July, will be held in Uppsala, Sweden, but will not be financed by NATO.

CONSEIL DE L'ATLANTIQUE NORD NORTH ATLANTIC COUNCIL

NATO ADVANCED STUDY INSTITUTES PROGRAMME

An activity of the Science Committee of the North Atlantic Treaty Organization

Notes for Applicants

General policy behind the Programme

The aim of the NATO Science Committee since its establishment in 1958 has been to further international collaboration between scientists from the member countries of the Alliance. Almost all fields of basic science have received substantial support through the three main programmes of the Committee: NATO Science Fellowships allow individual students or younger scientists to study in another country; the Research Grants Programme supports international collaborative research projects; and the Advanced Study Institutes Programme finances certain types of international meetings.

The purpose of the Advanced Study Institutes Programme is to contribute to the dissemination of advanced knowledge and the formation of contacts among scientists from different countries. There are, of course, many ways of achieving this goal; for example the large international conferences which are a common feature of nearly all fields of science, and small symposia where more specialised topics are treated in a limited forum. The NATO programme does not, however, sponsor this sort of meeting, for which support is available from many national and international bodies, but concentrates instead on a useful supplement to these scientific activities.

An Advanced Study Institutes should be primarily a high level teaching activity at which a carefully defined subject is presented in a systematic and coherently structured programme. The subject should be treated in considerable depth by lecturers eminent in their field and very likely of international standing; the subject is presented to other scientists who will already have specialised in the field or possess an advanced general background.

The best results are achieved if the time is allotted so that each lecturer develops a coherent section of the programme. For this a lecturer:student ratio of between 1:3 and 1:10 is generally found to be satisfactory. Furthermore it is evident that only if the meeting is of sufficient length can this programme be adequately developed. Experience

has shown that a duration of about two to three weeks is preferable. It is particularly desirable that lecturers should be prepared to stay for the duration of the institute, or a substantial part of it, to ensure good and stimulating interaction in the group. This should be made clear to lecturers when they are being invited.

An advanced study institute is aimed at an audience of approximately postdoctoral level; this does not necessarily exclude postgraduate students, and it may well include senior scientists of high qualifications and notable achievement in the subject of the institute or in related fields.

The principal or survey lectures should also provide the basis for eventual seminar discussions or the presentation and examination of recent research findings; the meeting may include experimental classes as well as the more usual arrangement of lectures and discussions. The presentation of the latest researches of the participants should not dominate an advanced study institute.

A further decisive characteristic of an advanced study institute is the relatively small number of participants: this facilitates formal and informal discussion on the various aspects of the presentation. It follows from this also that the students (for want of a better term) will be of a sufficiently high calibre for them to benefit from and contribute to free exchanges at a high level. From past experience it has been found that maximum benefit is obtained from meetings of 50 to 70 persons.

The choice of participants will be the responsibility of the organizers of the institute: on the basis of their own contacts, or the suggestion of their key lecturers, they will probably invite a proportion of the students direct. It is, however, important that a sufficient number of places are left open for participants who learn about the institute from general advertising, and who, although highly qualified in the subject, might not be known to the director of the institute.

One of the essential aims of the NATO scientific programmes is to foster scientific achievement by direct contacts between scientists of the member countries. Therefore, the participants should be drawn from as many countries within the Alliance as possible, with, however, the quality of the participants and the potential benefit of the institute to them being the primary criteria. This is not to imply that persons from non-NATO countries may not participate in a NATO Advanced Study Institute; in fact active participation by scientists from all countries is encouraged. Although NATO funds cannot be applied directly to meet the expenses of non-NATO participants, in practice organizers find that an advanced study institute awarded a NATO grant usually has additional support from other sources, which can be used for these participants.

As a general guide, participation of scientists from any one country is not expected to exceed about 20%. Furthermore, preference will be given to meetings which are not dominated by participants from only two or three countries.

Fields of Science

In principle advanced study institutes in nearly all scientific fields may be supported. Meetings have been arranged on topics in mathematics, astronomy, physics, chemistry, biology, engineering, technology and behavioural sciences. However, some subjects such as space sciences, nuclear energy and clinical medicine do not generally qualify for support, since these areas receive considerable support from other sources.

An advanced study institute may be organized as an interdisciplinary meeting. In that case the didactic aspect of the institute will consist of scientists specialised in one field teaching scientists highly qualified in a different area. The roles of lecturer and student will be interchanged during the meeting as the theme of common interest is developed from the viewpoint of different sciences.

The size and duration of an advanced study institute will allow for such treatment of a subject from the viewpoint of several sciences and discussions between specialists from different fields.

Location of the meeting

It has been found that the most successful activities are those which have been conducted in comparative isolation, with all participants being accommodated in one hotel or in lodgings on a university campus. This kind of arrangement provides for discussions and informal exchanges of information during leisure periods.

When choosing a location the importance of appropriate practical facilities and the help of an efficient local organizing group must be realised. It is impossible to arrange a successful institute without considerable preparation on the spot, well in advance of the meeting.

Publicity and advertising

It is extremely important to ensure adequate publicity for a particular advanced study institute well in advance, so that its existence is brought to the attention of all scientists who might be interested in participating. This publicity may be in the form of letters, circulars, posters, advertisements in appropriate journals, approaches to learned societies etc.

Financial support

Financial support may be requested from NATO to cover the major part of travel and living expenses for lecturers, and to contribute to these expenses for students from NATO countries who cannot find sufficient support from other sources.

In addition a NATO grant may be used to cover in full or in part general expenses in connection with the organization of the meeting, such as administration, hire of equipment and publication of the proceedings. The NATO grant often represents only part sponsorship of the meeting. Additional funds may be obtained from other sources including, for example, fees for participation from those who attend.

Method of application

The Scientific Affairs Division will be pleased to assist organizers of advanced study institutes in planning the meeting and in setting up the application. It is often an advantage at an early stage of the proceedings to establish a small international group of organizers to plan an institute; in such cases support for a meeting of the organizers may be considered.

Applications for financial support of an advanced study institute should reach:

Scientific Affairs Division,
NATO,
Brussels 39,
Belgium

before the 15th October at the very latest in the year preceding the proposed meeting. This final deadline must be respected.

The application should consist of ten completed copies of the attached form. Detailed information about the scientific content of the course and a list of lecturers, which includes their reactions to your approach to them, are of particular importance. Do not list speakers you have not approached.

The applications are considered by a small advisory panel of eminent scientists, nominated by the NATO Science Committee. This advisory panel holds a preparatory meeting during the summer for preliminary discussion of requests for support the following year; final decisions cannot be guaranteed at this first meeting. However, it is advantageous to present the request in time for the summer meeting (i.e., by 30th June) so that, for example, the advice or conditions suggested by the Panel may be considered by the organizers in time for the application to be re-submitted before 15th October for further consideration later the same year. The final meeting of the Advisory Panel is held in November, and the definitive list of successful applications for advanced study institutes in the following year is then decided. Applications which are not submitted sufficiently in advance of this meeting, i.e. by the 15th October, as mentioned above, cannot be considered.

Scientific Affairs Division
October 1968

Continued list of some school.

Cont. list of names of the school
1969

Zoology:⁽⁶⁾
Fred Aldrich, fishes ✓
Byron Kuttig, mammals
Lars Brundin, insects,
James W. Valentine, marine molluscs.
R. E. H. Reid, sponges,
Curt Koenig, freshwater fishes,
~~Harriet Walker, land molluscs.~~
Ernst Mayr, birds

Rudbeck,

Botanist:⁽⁶⁾
R. Melville, higher plants,
P. A. Colman? (Bany tree bridge).
D. K. Ferguson, angiosperms.
Hadai? (Gethi) ✓
~~Paul Martin? Estelle?~~
Urban, fungi.
Harey Nichols?.

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Geology:
Cary,
King,
J. Tingo Wilson, → ~~Geology in Engineering~~
T. S. Westell,
Johannes Einarsen?
E. Brown? (minutes, Science 1964, y. Melville).
M. Enig or Haagen?
Cree? (paleontology, y. Melville).

Maths/Physics:
Bryson?
× Peter Bender, film (fractals) Math. physics ✓
Makani? Makani? NCAR. Esra: Jim Owens, wave propagation group.
Gert Liljeqvist.
Emilia, logarithms,
Broecker?
John I. King (area books)

Continental drift:

Geology: (5): Casey, King, Heezen, (paleogeography)

Meteorology (2): NCAR + seek other work? Bryson?

Botanists 6
(ind. poles) (Estelle?)
(over)

Zoology
(ind. poles) 6: Björn Ustjén, Aldrich, Walden?,

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(30 students.)

Aspe signavit: cf. Bryson.

Centrosema asyri

C. Emiliani → *teguatum*.

Erly Dwy? *Centrosema* (1959).

Drecher, J. *Quart. U.S.* 1965: 737-753.

Lecturers:

Iceland: 11 *relig*
 Norway: 1
 Australia: 1
 England: 14 - 1
 USA: 11 + 11
 Canada: 11 - 1
 Sweden: 11
~~Holland: 1~~
 Turkey: 1
 Germany: 1
 Finland: 1
 CSR: 11

- ✓ Mann (botany) Norway
- ✓ Carey (geology) Australia
- ✓ Miller (geophysics) England
- ✓ Einarsson, Th. (geology) Iceland
- ✓ Heezen (oceanography-geology) USA
- ← [Westoll (geology) ^{palaeontologist} England
- ← [Wilson (geophysics) Canada
- ✓ Sjors (ecology) Sweden
- ✓ Fergusson (paleobotany) *coriopsis* & *palaeomagnetism*. Holland
- ✓ Neville (botany) - higher plants England
- ✓ Kosmoy (freshwater fishes) Turkey
- ✓ Valentine (geology *marine molluscs*) *marine invertebrates, shelf fauna* USA
- ✓ Zilch (entomology) Germany
- ✓ Brantén (entomology) Sweden
- ✓ Kuntze (paleogeology) mammals Finland
- ✓ Rudebeck (birds) Sweden
- ✓ Aldrich (ocean fishes) Canada
- ✓ Hadai (Tethyan plants) CSR
- ✓ Urban (fungi) CSR
- ✓ Dyson (meteorology) USA
- ✓ Bender (meteorology) USA

- ✓ Hawkes, J. G. ^(Dinorthis) (plants) England
- ← [Fitch (herpetology) ^{late Tertiary Atlantic} (geology) England.
- ✓ Trantsk Einarsson Iceland
Subsidence ridges & strons.