The Guiding Committee is scheduled to meet in Paris from 25 to 27 April 1974.

The setting up of a full time Geoscience Unit to undertake compilation and contouring work is dependent on the necessary funds being made available. This matter is in the hands of IOC and has not yet been resolved.

In the light of the above activity it is not planned to hold further meetings of SCOR WG 41 in the immediate future, but to await the outcome of the new organization. If this is effective it might be considered that the SCOR WG 41 has fulfilled its terms of reference.

ANNEX XII

SCOR WG 42 (with ICES)
STUDY OF THE POLLUTION OF THE BALTIC
REPORT OF MEETING 28/29 JUNE 1973
Kiel, FRG

Participants

Dr G. Kullenberg (Denmark) Acting Chairman

Dr Hans Ackefors (Sweden)
Prof. A. Aitsam (USSR)
Prof. B. Bolin (Sweden)
Dr H-J. Brosin (DDR)
Dr B.I. Dybern (Sweden)
Prof. K. Grasshoff (FRG)
Dr R.C. Griffiths (France)
Mr Aaro Haverinen (Finland)
Prof. Dr. G. Hempel (FRG)
Dr A. Lindquist (Sweden)
Prof. C.H. Mortimer (USA)
Mr H. Naeve (Italy)
Dr S. Nordström (Sweden)
Dr W. Slaczka (Poland)
Dr Erik Somer (Denmark)
Dr J-O. Strömberg (Sweden)
Mr Hans Tambs-Lyche (Denmark)
Mr O. Vagn Olsen (Denmark)
Dr A. Voipio (Finland)
Dr B. Weichart (FRG)
Dr L. Zmudzinski (Poland)

1. Opening of the Session

The Meeting was opened by Dr G. Kullenberg who on very short notice had been invited to act as Chairman by the President of ICES, due to the sickness of the Chairman, Professor I. Hela.

Mr H. Tambs-Lyche explained the procedure followed in this case and also noted the changes in members of the Working Group that had occurred.

A telegram was sent to Professor Hela regretting his sickness and wishing him a speedy recovery.

Professor G. Hempel welcomed the Working Group to Kiel on behalf of the "Institut für Meereskunde".

Dr J-O. Strömberg was elected Rapporteur of the Session.

2. Approval of the Agenda

Slight changes of the Draft Agenda were made. Thus changes of the terms of references for the Working Group (WG) were not discussed, since specific suggestions on redrafting were not yet available. Brief information on the continued cooperation between SCOR and ICES within the framework of the WG was added to Item 4.

With these minor amendments the Agenda was approved.

3. Presentation of Supplementary National Reports

Dr Slaczka gave a brief statement on the recent Polish achievements in Baltic research and on future plans. Two research expeditions are launched each year, one in May-June and the other by the end of August. During each of these, a large number of stations are visited in three areas 1) the Skagerak-Kattegat-Danish Sounds, 2) the central Baltic, and 3) the eastern Baltic. Plans are to include some stations also in the Bothnian Sea. At most stations samples of benthos, plankton, sea-water and sediments are taken. Analyses are made (partly on board the ship) on e. g. DDT, PCB, oils, oxygen content, heavy metals and standard hydrographical parameters. Sensitivity tests of pollutants on some organisms (e. g. Asellus, Mesidothea, Crangon, Neomysis) have also been performed showing Neomysis most and Mesidothea least sensitive to changes. A national report was received from USSR.

The Danish delegation reported that considerable means have now been made available for a major study in the Danish Sounds of the water and matter exchange between the North Sea and the Baltic. With the present progress the observational programme will start during 1974.

The Finnish delegation informed about ongoing cooperative work in the Gulf of Bothnia and the Aland Sea, where current measurements and other physical as well as chemical observations are made.

4. Information on the "Conference on the Protection of the Baltic" and ICES/SCOR Cooperation on the Baltic Pollution Problems

a) A meeting of Government experts for the preparation of the Baltic Conference on the Marine Environment was initiated by the Finnish Government and positively accepted by all countries bordering the Baltic. The first meeting was held at the end of May - beginning of June 1973 in Helsinki. A second meeting will be held in Helsinki at the end of November 1973, and the Conference itself will meet by the end of March 1974.

As to the need for scientific advice, 2 lines of ideas had been forwarded:

1) that ICES together with other interested organizations give all required advice within their competence and possibilities

2) a new body is set up.

Mr Tambs-Lyche informed that the Bureau of ICES had decided to offer the services of ICES to the Conference, if it should wish to make use of them.

Dr Mortimer noted the parallel with the pollution studies in the Great Lakes, where a separate scientific body had been set up. The experience therefrom is available.

b) Mr Tambs-Lyche and Professor Hempel informed that SCOR has so far no intention to withdraw from the cooperation within the framework of the present WG. The pollution studies of the Baltic will be a most valuable pilot project in this field and of great scientific interest. The fact that the German Democratic Republic might become a member of ICES in the near future does not change the basis for this cooperation.

5. Report on the Sampling and Analytical Capacities around the Baltic

A report on the responses to his questionnaire was presented by Professor Grasshof. He also reported that answers from two laboratories in the USSR had now arrived, giving a total of 27 answering institutes. The WG noted with great satisfaction the willingness of the different laboratories to participate in future pollution studies of the Baltic. Together they can cover the needs for analyses of all the different compounds which can be considered important during the initial study. One primary difficulty is the many methods used for analyses of single compounds, which call for intercalibration. A detailed knowledge of methodology and standards used by the various laboratories is essential for a successful base-line survey. This can be obtained in the following way:

a. analytical experts (preferably 2, one for heavy metals and one for organic constituents) should visit the various laboratories which have answered the questionnaire, in order to obtain direct information about the procedures for analysis used in the laboratories, thereby gaining much more information than is possible through correspondence only;

b. a meeting of analytical specialists should be convened before February 1974.

A recommendation to this effect was adopted by the WG (Recommendation 1). It was also stressed by the WG that it is desirable to increase analytical capacities in each of the Baltic countries, especially increasing the number of compounds that can be analysed in each country.

6. Report on the Sources of Input to the Baltic Sea

A progress report on the answers to the Questionnaire on inputs to the Baltic was presented by Dr Brosin. Answers had been received from 4 countries, Denmark, FRG, DDR and USSR, and an answer was presented at the meeting by Sweden.

The difficulties in obtaining satisfactory information concerning the input of certain materials such as nutrients and industrial input were noted. The great importance in obtaining input data was stressed and the necessity of continuation of this work was realised. Dr Brosin was asked to compile the incoming information. The Baltic countries are urged to provide as complete information as possible. The lacking answers will possibly be available by October 1973, and a full report early in 1974.

The WG noted the important plans presented by the Group of Experts on the Water Balance of the Baltic Sea under the National Committees for the International Hydrological Decade (IHD) at their second meeting. A close collaboration between that Group and the present WG on related subjects is necessary. Especially river discharge prob-

lems and the transfer of pollutants from the air into the water were discussed. A recommendation (No. 2) to this effect was adopted.

7. Discussion on the Monitoring of the Horizontal Extension of Anaerobic Conditions in the Baltic

The WG noted that the national efforts to monitor the horizontal extension of oxygenfree water in the Baltic were quite sufficient.

The exchange of data is, however, not fully satisfactory and the WG expressed the desirability that annual reports from these studies be submitted to "Annales Biologiques". These could be similar to the Swedish annual reports, which have been given national publicity during the last couple of years.

8. Report on the Research Programme for Investigation of the Baltic as a Natural Resource in view of Marine Pollution Problems

The outlining of a research programme for understanding the natural processes going on in the Baltic, and the formulation of specific tasks of limited endurance but which need the concerted efforts of all or most of the Baltic nations has been a major task of the WG. The Report of the drafting group was presented. [It has been agreed subsequently that this report will be published in ICES Cooperative Research Report series.]

The WG supports the general philosophy of the Report. It was stressed that the tasks listed in the Report are those considered to have a high priority in order to obtain an understanding of basic processes in the open Baltic. Thus projects involving long-time series of specific coastal problems are not dealt with. The projects are not meant to interfere with other projects in national programmes. The aim of the present suggested investigations is to provide the necessary scientific basis for an effective monitoring programme, which is envisaged to be established in the future in order to facilitate control and prediction of the current pollution situation in the Baltic. For predictions verified models are needed. The great advantage was realised of having working models which can give guidance to the observational programmes and be tested by observations. Considering the urgency of this matter the WG recommended that scientists engaged in modelling efforts of the Baltic and similar areas should have an opportunity to meet in connection either with the next Conference of the Baltic Oceanographers or the next Statutory Meeting of ICES in Copenhagen (Recommendation 3).

The WG noted that the semi-empirical approach, as for instance the Odum approach, is one way of modelling the environment which can be used at the present stage together with the purely theoretical approach. The ultimate goal is, however, to obtain dynamical models verified by observations.

Thereafter the tasks were discussed one by one, and recommendations to the Action Planning Group of the WG, which should meet on 30 June, were made. (See p.68 for report of The Action Planning Group.)

Task 1: Exchange of matters and waters with the North Sea.
Means for starting this task are already available in Denmark and Sweden. Cooperation is necessary (Denmark, FRG, Sweden) and also with the North Sea Group (Norway, Denmark, Sweden).

Task 2: Open sea experiment.
The WG suggested that one area is chosen for concentrated efforts. Detailed measurements of density and current structure in the water column, together with sections of temperature profiles obtained by towing thermistor chains, may be one way of approach.

This task is important but detailed planning is required. The Action Planning Group was asked to make rough estimates of needed ship times, manpower etc.

The experience from the Lake Ontario study (International Field Year for the Great Lakes) can be a great help in the planning and conducting of this task.

Task 3: The Baltic circulation: development of an exploratory model followed by field observations.

The WG was of the opinion that an exploratory model could greatly help in achieving an optimum planning of the field observations. The model should be tested, if necessary further developed, and in the end possibly verified by the observations. The need for a meeting of people engaged in modelling has already been mentioned (cf. Recommendation 3).

Task 4: The lateral boundary layer dynamics experiment.
Major national efforts could be combined with international cooperation in the open sea. Available resources are, however, inadequate and additional funding is necessary. The Action Planning Group was asked to make an effort to estimate costs for shiptime etc., to choose suitable experiment sites and, if possible, to take the Great Lakes' study in consideration in the planning.

Task 5: Open sea multi-disciplinary continuous stations.
The Action Planning Group was asked to make estimates of needs in terms of ship time, manpower etc. Further designing of experiments will have to be made by a special scientific task group that will have to convene later.

This is an interdisciplinary task which definitely needs large ships and international cooperation. The character of this task as a process study (short time) was stressed.

Task 6: Biological productivity studies at fixed stations.
The WG decided that Professor Hempel and Dr Lindquist elaborate on the fish production problems to be included in this task. Until this is ready the Action Planning Group can do only little on this task.

Task 7: Determination of toxic substances throughout the food chain.
This task should follow the base-line study. The Action Planning Group, therefore, need not concern itself immediately with this task. The progress of the North Sea Group is of great interest in this connection.

The WG has, through this research programme, made an effort to pinpoint some of the processes that need investigation, and the understanding of which is crucial for a successful study of the pollution situation in the Baltic. It is obvious that some tasks need more preparatory work and all the tasks cannot be carried out in one specific year. However, the projects that can be dealt with immediately should not wait for the other ones, but be started as soon as possible. It is believed that a period of 1-2 years is sufficient for the greater part of this study, which could then be called the "International

Baltic Pollution Study Year" (IBPSY). It is suggested that this study should be carried out in the period 1975-76.

The WG decided to recommend to ICES and SCOR to publish the research programme (Recommendation 4).

9. Base-line Studies of Pollution in the Baltic

This point was delegated to the Action Planning Group which had been set up for formulating a detailed programme for the implementation of the most urgently needed investigations outlined in the Report discussed under Point 8. It was stressed that a primary task for it was now to organize a base-line survey of the Baltic pollution (toxic substances in fish and the marine environment). In doing this the Action Planning Group should make all possible use of the experience gained by the North Sea Group.

10. Collaboration with other Bodies

This has already been touched upon, and it is obvious that close collaboration with the Baltic Marine Biologists, the Conference of Baltic Oceanographers, the Group of Experts on the Water Balance of the Baltic under the IHD, and a number of Committees within the ICES is highly desirable.

Further connections can easily be arranged through ICES and SCOR, should such be deemed to be of benefit to the Baltic pollution studies.

Dr Griffiths hoped that IOC could contribute to a successful conduct of the studies.

The WG would be pleased to offer within its competence whatever collaboration the Baltic Marine Biologists would need. (Recommentation 5).

11. Further Actions by the WG

The report of the meeting of the Action Planning Group should be annexed to this Report.

The next meeting of the WG should be held after the next ICES Statutory Meeting and SCOR Executive Committee Meeting but before the final Meeting of the Conference on the Protection of the Baltic, i.e. preferably by the end of March 1974.

Mr Tambs-Lyche said that ICES would be prepared to host the next meeting of the WG.

12. Revised Terms of Reference for the WG

No discussions were held under this heading.

13. Adoption of Recommendations

Adopted Recommendations are given below:

Recommendation 1

The Working Group

noting with satisfaction the positive answers of a large number of institutes from all the Baltic countries to the Questionnaire regarding sampling and analytical capacities, distributed through ICES in May 1972;

having considered the severe problems of analytical methodology for pollutants, especially for heavy metals and organic compounds, in water, food organisms, and sediment;

being aware that an international programme for a base-line survey in the Baltic is ultimately dependent on the reliability and comparability of the analytical data;

being also aware that a large variety of sophisticated methods and modifications is used at present by the different institutes wishing to participate in an international programme;

recommends that all institutes involved should be visited by experts before December 1973 in order to get complete and detailed information about the analytical methods, the sampling techniques, sample preparation and preservation, and the standards used at present;

recommends further that a meeting of the working analysts from institutes concerned with Baltic pollution studies be convened before February 1974 to discuss the analytical problems and to agree on comparable and practicable methods for an international exercise.

Recommendation 2

The Working Group

noting with satisfaction the Recommendation II-7 of the 2nd Meeting of Experts on the Water Balance of the Baltic Sea, convened by the National Committees for the International Hydrological Decade (IHD) in the Baltic countries;

desiring to avoid double work and overlapping of tasks;

noting further that the National Committees of IHD in the Baltic countries give high priority to the work described in the recommendation mentioned;

decides to offer collaboration with the National Committees of the IHD and to support their efforts by the means available to the WG.

Recommendation 3

The Working Group recommends that a special meeting on circulation modelling of the Baltic be held either in connection with the next Conference of the Baltic Oceanographers or in connection with the Statutory Meeting of ICES in Copenhagen in the last week of September 1974, and that opportunity should be given for scientists engaged in modelling efforts in similar situations to participate.

Recommendation 4

The Working Group

recognizing that the report on the "Research Programme for investigation of the Baltic Sea as a natural resource in view of marine pollution problems", after agreed revision by the drafting group, will serve as a basis and guideline for further scientific studies in the area;

recommends that the report be published by ICES and SCOR.

Recommendation 5

The Working Group

being aware of the severe methodological problems connected with routine biological investigations in the Baltic;

stressing the urgency of finding generally agreed solutions to these problems;

being informed that 6 working groups of the Baltic Marine Biologists are at present considering them;

hoping that the work of these groups will lead to acceptance of agreed, standard methods before 1975;

decides to keep close contact with the Baltic Marine Biologists in order to make maximum use of their experience and expertise in the detailed planning of its future work.

14. Presentation of the Report of the WG

This Report should be circulated to the members of the WG, and comments, suggested additions or deletions should be sent to the ICES Secretariat within 8 days from its reception.

Additional comments to the Research Programme should be submitted to Dr Bolin or Professor Hempel without delay.

As already mentioned, it is recommended that the Research Programme be published by ICES and SCOR.

15. Other Business

Mr Tambs-Lyche and the Chairman expressed the gratitude of the WG to the hosts of this Session, the "Institut für Meereskunde an der Universität Kiel", for their hospitality and help in various matters. Thereafter the Meeting was closed by the Chairman.

Action Planning Group
(SCOR/ICES WG 42)

Report of Meeting on 30 June 1973

1. The Action Planning Group met on 30 June, with the following participants:

Denmark:	Mr Vagn Olsen
Federal Republic of Germany:	Professor K. Grasshoff Professor G. Hempel (part of the time)
Finland:	Dr A. Voipio
German Democratic Republic:	Dr H-J. Brosin
Poland:	Dr W. Slaczka Dr L. Zmudzinski
Sweden:	Dr H. Ackefors Dr A. Lindquist
USSR:	Professor A. Aitsam
ICES:	Mr H. Tambs-Lyche

Professor Grasshoff chaired the meeting, and Mr Lambs-Lyche acted as Rapporteur.

2. There was no specific Agenda, but the Group agreed to consider the following two main items:

   a) preparation for a base-line study of the level of toxic substances in fish and shellfish from the Baltic and in their environment;

   b) the tasks proposed by the "Askö Group" as referred to the Group from the Working Group meeting the two previous days.

3. Concerning the base-line study the Group noted that, as it had been outlined by the Working Group at the Lund meeting, it was very similar to the corresponding study in the North Sea, and that to a large extent one could draw upon the experience gathered during that study. This has been taken into consideration in the following paragraphs.

4. The Group first discussed the compounds which should be determined in the organisms to be sampled, and in view of the differences in capacity and capability of the participating laboratories, it was agreed, that only a limited number of obligatory substances should be analysed by all participating laboratories, and that a supplementary list be made of those substances which it is very desirable that laboratories analyse, when they have facilities for doing so. In setting up the list, the Group kept in mind the desirability that it should include as many as possible of the compounds analysed during the North Sea study, since the comparison between the two areas may be of considerable interest.

   It was also stressed that the data gathered would not only be of use for the specific purpose of the base-line study itself, but they may also be of broader significance (example Pb in air/sea interaction).

5. The following metals should be obligatory: Hg; Pb; Cd. Second priority should be given to: Zn and Cu, and it is desirable that also Cr and Co are analysed. It was considered necessary to distinguish between "total Hg" and organo-Hg compounds, with information on "total Hg" as obligatory.

6. The following organic compounds should be analysed: γBHC; Dieldrin; DDT (total and derivatives); PCB's. Each participating laboratory should analyse as many of these compounds as they have facilities for.

   Concerning hydrocarbons it was hoped that these could be split in aromatic, aliphatic and olifenic ones. Aromatic hydrocarbons are the best indicators of petrohydrocarbonic pollution, since the other groups include substances that may have been generated from natural products.

   Chlorinated aliphatic hydrocarbons should also be included.

7. When considering the organisms to be included in the base-line study, it was kept in mind that it should be so designed that it may form a basis for later monitoring, and also that it is desirable that, to the extent possible the same organisms as were used in the North Sea study should be included. Finally, it was also found desirable that benthic organisms, bottom fish and pelagic fish were included.

   Some participants thought it desirable that plankton organisms be included as well.

However, in view of the difficulties with comparable sampling, differences in composition of the samples, and in age determination of larger planktonic animals like Mesidothea, it was agreed that inclusion of plankton organisms should not at this stage be made obligatory.

The following organisms will be obligatory and should be sampled and analysed by all participating laboratories:

cod, herring, flounder and mussels.

The list of desirable organisms include:

sprat, plaice, Macoma baltica, Mesidothea entomon and Crangon crangon.

Of these, plaice and Crangon will be of interest for comparison with the North Sea study, and it was hoped that the laboratories in whose areas they occur would include them.

8. For mussels one should analyse a representative sample of a population, the size distribution must be determined. For the fishes it is desirable to include both O-group and older specimens (cp. paragraph 11). Fat content, sex, year class and size distribution must be determined. For herring, both fillets (obligatory) and whole fish (desirable) should be analysed.

It was recommended that laboratories which have facilities for it should analyse the contents of petroleum hydrocarbons in mussels, and that the laboratories concerned should exchange reference standards between them.

It was agreed that the coordinator of the base-line study would, as soon as possible, distribute to all participating laboratories detailed instructions for sampling and analytical procedures, based on the instructions used for the North Sea study.

9. Complete comparability between the results of analysis from all participating laboratories is essential for the success of the base-line study. Comparability includes sampling procedures, sample preparation and storage, calibration of the methods used and intercalibration between the laboratories. A review of the methods used in the different laboratories revealed a wide variety of procedures, and the Group found that the best way to ensure complete comparability would be that one, or preferably two, experts visit the participating laboratories. This would result in a collection of methods, which would be made available to everyone, and in an exchange of views as to the best procedure to select for the present study. In this connection it was, however, stressed that the aim is comparability and not standardization.

The Chairman informed the Group that he expected that the travel cost for two experts would be met by the assistance of the "Institut für Meereskunde" and SCOR.

When the report of the two experts is available, a meeting of the analysts concerned with the base-line study should be held as soon as possible in order to agree on the methods to be used.

A third step could be a workshop of 20-25 analysts for demonstration and comparison of methods. This could result in the compilation of a manual, which would be of very great importance for the monitoring which one expects will follow the base-line study.

10. The Group then discussed the timing of the base-line study and the preparations for it, and agreed that:-

- the visits to laboratories by the analytical experts should take place in the autumn of 1973, and preparations for them should start immediately;
- the meeting of analysts should be held early in 1974, in any case not later than February, and it could be held at the ICES headquarters;
- the workshop may be held in March 1974. Professor Grasshoff informed the Group that his laboratory would be prepared to host it.

11. In view of the urgency of the study, the necessary sampling should be done as early as possible.

Cod and herring should preferably be sampled in October-December. Sampling of 0-group cod and herring is desirable, but not essential. For older herring, each sample must be of uniform age, and sex and size determined. For cod one should aim at sampling the 3 and 4 year olds, and sex, age and size distribution must be reported. Flounder should also be sampled in the last quarter of the year, each sample to be of uniform age, and age, sex and size distribution to be reported.

Plaice (when collected), as for flounder.

Sprat (when collected), as for herring.

Mussels should also preferably be collected at the end of the year, or a little earlier.

Based on these observations, the Group recommended that sampling for the base-line study should be undertaken in the last quarter of 1973. The samples should be stored (frozen), and the analytical work should preferably start immediately after the meeting of the analysts. If it is done earlier, part of the sample should be kept for later parallels, if needed.

12. The Group recommended that, in addition to each country sampling in its own coastal waters, the areas should be divided as follows:

Finland:	the Bay of Bothnia and the Åland Sea; some samples also from the Finnish Bay.
Sweden:	the Bothnian Sea and from Åland to Gotland/Øland; west of Gotland; in the Arkona Basin, and between Bornholm and Sweden.
Denmark:	the Danish Belts, the Sound and around Bornholm.
Federal Republic of Germany:	the Kiel Bight, west of Bornholm, and the Arkona Basin.
German Democratic Republic:	along its coasts.
Poland:	east of Bornholm, south of Gotland.
USSR:	the eastern part of the Gotland Basin, the Bay of Riga and the Finnish Bay.

Each participating country will as soon as possible report to the coordinator on the samples collected. It was stressed that while sampling must be made both in coastal areas and in the open Baltic, the sampling network in the coastal areas should be denser.

13. It was strongly recommended that the laboratories which will participate in the base-line study should join the international intercalibration organized under the auspices of the ICES Working Group on the Study of the Pollution of the North Sea, where provisions have already been made for participation by Baltic laboratories. The coordinator will contact Dr Portmann and Dr Topping about this and make the necessary arrangements.

14. The Group thereafter considered the possibility of including analysis of toxic substances in sea-water in the base-line study. It was agreed that while it is premature to include DDT's and PCB's, petroleum hydrocarbons should, if possible, be included. If so, however, the sampling should be made after the meeting of analysts and after the planned workshop. It is necessary that this sampling is done by research ships with trained personnel.

    Information available indicates that the values for the content of toxic metals in sea-water in the open Baltic are very low (with some exceptions). Methods are available for analysis of Cu, Pb, Zn and Cd, but sampling without the risk of contamination, and storage of samples cause difficulties. At present it seems that the only really safe method is to use bottles of quartz, which are very expensive, and to deep-freeze the samples.

    It was therefore agreed that this should not be included in the base-line study now. However, the question should be taken up again at a later date, after the planned workshop has been held. Reference was also made to Task 7 of the "Askö" Report (see para. 24 below).

15. The information available on the content of toxic substances in bottom sediments are very difficult or impossible to interpret at present, and some basic studies must be made before a meaningful base-line study of this can be designed. When more information is available, it may possibly be included in Task 7 of the "Askö" Report.

16. Finally, the Group unanimously requested Professor K. Grasshoff to take upon him the task of coordinator of the base-line study, and Professor Grasshoff agreed to this.

17. The Group then considered the tasks proposed by the "Askö Group", as modified during the Working Group's discussions the previous days.

18. Task 1: Exchange of matters and waters with the North Sea

    The Group was informed about the Danish programme for a considerable intensification of the studies of these problems during the next five years, and also that some tri-lateral cooperation between Denmark, Sweden and DDR is planned, in order that the area between Sweden and Bornholm and the entrance to the Arkona Basin will be included, in addition to the Sound and the Danish Belts.

    The Action Planning Group took note of this very satisfactory development and hoped that progress of these investigations will be reported to the ICES/SCOR Working Group, with a view to exchanging information and to a coordination with other studies under the auspices of that Group; and that the group of national coordinators, which it understood would be established, will keep as close contact as convenient with the ICES/SCOR Working Group.

The Action Planning Group stressed the importance of these investigations, which are essential for any deeper understanding of the pollution situation of the Baltic as a whole.

It finally drew attention to the desirability of using the Sagami standards for nutrients (cf. Council Resolution 1970/3:6(c)), since this would increase the comparability of the results of different related studies.

19. Task 2: The open sea experiment

It was noted that the Working Group had recommended that this experiment should be made at one station, and that the study of the breaking of internal waves should be transferred to Task 4. It was considered that an area northeast of Gotland would be most suitable for the experiment.

One medium-sized research vessel is needed for observation periods of 2 weeks each in April, August and November. This would mean a $3\frac{1}{2}$ week's cruise (total time) at each occasion.

It was understood that instrumentation for the vertical measurements needed would be available in 1975, and that the other instrumentation is available. If the experiment periods are covered by more than one vessel, it will be necessary to run at least one set of measurements simultaneously for proper intercalibration.

The Group was informed that Finland may be interested in participating with one vessel for one period; that Sweden is interested in the work but could make no commitment yet; that USSR is highly interested and expect to provide one ship, and that DDR and FRG are both interested and may have ships available. The chances that this experiment will be made by international cooperation are therefore very good, and the Group recommended that a task group should be established for detailed planning as soon as this report has been approved by ICES and SCOR.

The Group agreed, however, that somewhat more specific information about the substances to be measured is needed before detailed plans can be drawn up. These substances should include both dissolved and particulate matters (for instance silicate and total phosphate, and particulate organic carbon). In addition, optical measurements should be included.

The number of measurements will probably be limited by the size of the participating ships and the possibility for accommodating at least 12 scientists and technicians, since for the duration of the experiments measuring will continue around the clock, with very close time spacing.

20. Task 3: The Baltic circulation, development of an exploratory model, followed by field observations

Detailed planning of this task cannot be made before more concrete information is available from the oceanographers working on modelling of the Baltic. The Group was informed by Professor Aitsam that such information about a three-layer model may be available in the autumn of 1973.

The field observations must be quasi-synoptic, which probably means that there will be a need for 5-8 vessels during a period of about 10 days; in addition, one could make use of the Finnish coastal stations and the Swedish coast-guard stations. The autumn would probably be the most convenient time for a field test, but it would have to be before the thermocline breaks down in September.

An expert task group for planning should be established, when the task has been approved in principle by ICES and SCOR. The participants indicated that all the countries represented were interested in this task and hoped to be in a position to participate.

21. Task 4: The lateral boundary layer experiment

The Group was informed that this would be a Swedish-Polish programme, with some cooperation from USSR and DDR, and depending upon the availability of national finances. It was understood that some preliminary planning is already being undertaken, and it was hoped that the countries concerned would form a task group, which will keep contact with the ICES/SCOR Working Group, so that the experiment can be coordinated with other elements of the Baltic programme.

22. Task 5: Open sea multi-disciplinary continuous stations

The Group agreed that the possibility should be investigated of a combination with Task 2, so that one Task 5 station is combined with the Task 2 experiment, possibly in the spring of 1975, and the two other Task 5 stations are made in 1976. It was also the view of the Group that core samples would probably need to be taken at only one of the three stations.

FRG is very interested in this task, and a suitable vessel will almost certainly be available in 1975.

Poland will also investigate the possibility of using a ship for this purpose.

In this connection the Polish participants informed the Group about plans in their country for equipping an old and large cargo-ship as a semi-permanent marine station, which could be stationed for longer periods at one place, with possibilities for changing the scientific teams.

The Action Planning Group welcomed this news, and look forward to receiving more details about this very interesting plan.

None of the other participants could make commitments at this stage, but they would consider the possibilities and report at a later stage.

The Group recommended that detailed planning for this task should be undertaken by a task group of experts, when approval of it in principle had been made by ICES and SCOR. This planning should be done in close collaboration with an ongoing Swedish programme of periodical measurements of primary and secondary production, so overlapping is avoided and the two studies will be complementary.

The task group to be established would probably also need to make use of the results of the base-line study.

23. Task 6: Biological productivity studies at fixed stations

The Action Planning Group considered that this task is at present mainly one of coordination of ongoing studies. A detailed list of these studies is the first requirement. It is also strongly recommended that the countries concerned coordinate their efforts by establishing a joint task group for this purpose, and that progress of the studies be reported annually through the ICES/SCOR Working Group in order that experience and results may be exchanged and the results of studies be made available as soon as possible for the benefit of the other studies of the Baltic and possibly also for any later monitoring that may be agreed.

It may also be necessary for the ICES/SCOR Working Group to take an initiative in order that the network of observations will give satisfactory coverage of the Baltic as a whole.

The necessary standardization would probably best be achieved through the work of the Baltic Marine Biologists. The participants from the Lysekil Laboratory undertook to provide information on the studies going on at present.

24. Task 7: Determination of toxic substances throughout the food-chain

This task will be a follow-up of the base-line study. Detailed planning is therefore only possible when the preliminary results of that study are available.

From a feasibility viewpoint, however, the Action Planning Group agreed that it will be necessary to limit the number of substances to be followed through the food-chain to a few selected ones. Also for this reason is it necessary to await the first results of the base-line study before any action is taken.

ANNEX XIII

RECOMMENDATIONS BY SCOR WG 43
(based on GATE C-scale meeting, October 1973)

1. Emergency buoy operations

It is noted that there may be a need for emergency ship operations in the event of mooring failures. The fixed position C-scale ships are most likely to be involved. Such emergencies may entail interruption of the routine programme for short periods.

2. Buoy identification

The group recommends that all buoys, both moored and drifting, should be properly marked and identified. It further recommends that a list of buoy types and markings, with drawings, be circulated to all participating ships.

3. Positions of C-scale ships

It is recommended that the C-scale ship triangle remain close to the centre of the B-area. It is not desirable to move it to the northeast because of the anticipated decrease of the mixed layer thickness in this direction.

4. B-area measurements

The group reemphasized the need to have high resolution (10 km) measurements on four sets of tracks between Dakar and station positions as stated in the SCOR Proposal for a GATE Oceanographic Programme. Should there be the requirement for STD stations on selected positions along these tracks, these measurements could be carried out when allowing for additional ship time.