International Commission on Whaling

(Constituted under the International Whaling Convention signed at Washington on 2nd December, 1946)

THIRTEENTH REPORT OF THE COMMISSION

(covering the thirteenth fiscal year 1st June, 1961 to 31st May, 1962)

(As approved by the Commission at its Fourteenth Meeting in London, July 1962, and authorised to be printed)

L O N D O N
Issued from the Office of the Commission
1962

CONTENTS

LIST OF MEMBERS OF THE COMMISSION

Argentina	(Not yet appointed)
Australia	Mr. J. V. MORONEY
Brazil	(Not yet appointed)
Canada	Mr. G. R. CLARK (*Chairman*)
Denmark	Mr. J. NØRGAARD
France	Mr. P. GRIBELIN
Iceland	His Excellency Mr. H. SV. BJÖRNSSON
Japan	Mr. I. FUJITA
Mexico	(Not yet appointed)
The Netherlands	Dr. G. J. LIENESCH
New Zealand	Mr. G. L. O'HALLORAN
Norway	Mr. G. SJAASTAD
Panama	Mr. R. R. ALEMAN
South Africa	Mr. C. G. DU PLESSIS
Sweden	Mr. P. B. KOLLBERG
U.S.S.R.	Mr. M. SUKHORUCHENKO (*Vice-Chairman*)
United Kingdom	Mr. H. GARDNER
U.S.A.	Dr. REMINGTON KELLOGG

R. S. WIMPENNY,
Secretary.

Office of the Commission,
Whitehall Place,
London, S.W.1

International Whaling Commission

1. *Meetings* This Report covers the Thirteenth Meeting of the Commission, held in London from 19th–23rd June, 1961, under the Chairmanship of Mr. G. R. Clark, and also the meeting of the Commission's *Ad Hoc* Scientific Committee, held in London from 25th to 29th June, 1962 under the Chairmanship of Dr. N. A. Mackintosh, to assess the results of the 1961/62 (Antarctic) and 1961 (outside Antarctic) whaling seasons.

Reports of these meetings are attached as Appendices III and IV and are referred to here only where they need to be related to continuing developments during the year.

2. *Membership* Notification of the adherence of the Government of the Netherlands to the Convention was received by the Depository Government on 4th May, 1962 and the Convention entered into force with respect to the Netherlands on that date. The Netherlands Government stated that they confidently expected that their adherence to the Convention would be followed by the signing of a whale catch quota agreement between the five Antarctic pelagic whaling countries at a very early date.

A notice of withdrawal of the Norwegian Government from the Convention on 30th June, 1962 was received by the Depository Government on 29th December, 1961. The Norwegian Government stated, however, that their primary object remained the conclusion of a quota agreement between the five nations engaged in pelagic whaling in the Antarctic and that their notice of withdrawal would be cancelled in the event of a quota agreement being signed by Norway, the Netherlands, Japan, the United Kingdom and the Union of Soviet Socialist Republics before 1st July, 1962. On agreement being obtained in this matter on 6th June, 1962 (see Section 13 below) the Norwegian Government cancelled their notice of withdrawal on 7th June, 1962.

3. *Catch Limitation* The blue whale catch limit on baleen whales taken by factory ships in the Antarctic during the 1960/61 and 1961/62 season was suspended by the Commission at the Twelfth meeting by amendment of Paragraph 8(a) of the Schedule. The objections to the amendment subsequently lodged by the Governments of Japan and the Union of Soviet Socialist Republics were withdrawn, by the Japanese Government on 19th December, 1961 and by the Soviet Government on 9th April, 1962.

In accordance with the Commission's decision at the Thirteenth Meeting (Section II of the Chairman's Report at Appendix III) the Antarctic pelagic whaling countries were reminded of the Twelfth Meeting resolution requesting them, during the suspension of the Convention catch limit, to limit the size of their national quotas to a level no greater than each imposed for the 1959/60 season. In reply the Commission was informed that the Government of the Netherlands had imposed a limit of 1,200 blue whale units, the same as in the two previous seasons. The Soviet Government, whose expeditions have been increased from two to four since 1959/60, maintained a limit of 3,000 units i.e. 20 per cent of the total catch limit permitted by the Convention in 1959/60. The United Kingdom Government set a limit of 1,800 units for two expeditions, the same as in 1960/61 and compared with 2,500 units for three expeditions in 1959/60. The limit imposed by the Norwegian Government was 5,100 units, 700 units less than in the two previous seasons in consequence of the sale of an expedition to Japan, while the limit set by the Japanese Government was increased by 700 units to 6,680 units, compared with 5,980 units for seven expeditions in 1960/61 and 5,100 units for six expeditions in 1959/60.

Only the Soviet expeditions reached the limit set and the combined catch for the five countries (as recorded below) amounted to 15,253 blue whale units compared with 16,433 units in 1960/61 and 15,512 units in 1959/60.

4. *The 1961/62 Catch* In the 1961/62 season there were 21 pelagic expeditions in the Antarctic, the same number as in 1960/61. There were the same two British and one Dutch expeditions. The former Norwegian factory ship "Kosmos III" was sold to Japan and renamed "Nisshin Maru No. 3". The number of Norwegian expeditions was accordingly reduced to seven in 1961/62. There were also seven Japanese expeditions as the addition of "Nisshin Maru No. 3" was offset by the withdrawal of the smallest Japanese factory ship "Kinjyo Maru" from Antarctic operations. The new Soviet ship "Sovietskaya Rossia" of 33,154 tons with 16 catchers had her first season and increased the number of Soviet expeditions from three to four.

The total number of catchers operating with the 21 pelagic expeditions was 261 compared with 252 in 1960/61. The distribution of the catchers was as follows:

	No. of Catchers	
	1961/62	*1960/61*
Norway	71	81
United Kingdom ..	22	22
Netherlands	15	14
Japan	86	83
U.S.S.R.	67	52
	261	252

The following table shows the number of blue whale units taken by the pelagic expeditions and their distribution in natural numbers for the different species:

	Blue whales	*Fin whales*	*1961/62 Humpback whales*	*Sei whales*	*Blue whale units*
Norway	132	6,943	12	560	3,702
United Kingdom	50	1,678	11	1,058	1,070
Netherlands	45	1,111	14	52	615
Japan	489	11,855	2	941	6,574
U.S.S.R.	402	4,851	270	2,138	3,292
Total	1,118	26,438	309	4,749	15,253

	Blue whales	*Fin whales*	*1960/61 Humpback whales*	*Sei whales*	*Blue whale units*
Total	1,740	27,374	718	4,310	16,433

Additionally, the Antarctic pelagic expeditions caught a total of 4,864 sperm whales in 1961/62 compared with 4,666 in 1960/61.

The total Antarctic pelagic baleen catch was 1,180 blue whale units less than in 1960/61, a decrease of over 7 per cent. Taking the natural numbers, the blue whale catch was nearly 36 per cent less than in the previous season, that of fin whales 3.4 per cent less while the humpback catch was nearly 57 per cent less. The catch of sei whales, on the other hand, was over 10 per cent higher than in 1960/61 and was, in fact, the highest catch ever recorded for one season in Antarctic pelagic whaling.

The Antarctic baleen season under the Convention was 12th December to 7th April. All expeditions ceased whaling on 7th April except four Japanese

expeditions three of which ceased on 29th March and one on the 28th March. The period of operation for all expeditions taken together averaged 115 days compared with 96 days in the previous season.

The total output of oil for the pelagic season amounted to 2,005,087 barrels at 6 barrels to the ton, inclusive of sperm oil. This compared with 2,123,157 barrels in 1960/61.

The average catch per catcher's day's work by pelagic expeditions in 1961/62 Antarctic season amounted to 0.51 blue whale units. This was 25 per cent less than in 1960/61 when the average was 0.68 and 30 per cent less than in 1959/60 when the average was 0.73. In the five previous seasons, 1954/55–1958/59, the average had been between 0.90 and 0.88 units.

The average sizes of whales taken in pelagic expeditions were: blue whales, 75.33 feet (74.01 feet in 1960/61), fin whales, 66.49 feet (66.79 feet in 1960/61), humpback whales, 41.37 feet (41·38 feet in 1960/61), sei whales, 50.30 feet (50.20 feet in 1960/61) and sperm whales, 46.26 feet (46.76 feet in 1960/61).

The geographical distribution of the catch varied from the previous season. The blue whale units caught in Areas I, II and IV increased, while those in Areas III, V and VI decreased:

	Area I	*Area II*	*Area IV*
1961/62	1,809	3,729	1,792
1960/61	241	2,929	1,211
Increase ..	1,568	800	581
	Area III	*Area V*	*Area VI*
1960/61	7,885	1,887	2,222
1961/62	6,488	693	718
Decrease ..	1,397	1,194	1,504

At South Georgia whaling was undertaken by one company operating from one land station. A total of 1,194 whales were caught and total oil production, baleen and sperm oil, amounted to 49,815 barrels. In 1960/61 when two companies operated from three land stations the total catch of whales amounted to 2,317 and total oil production to 109,727 barrels.

Outside the Antarctic 46 land stations and 3 floating factories were in operation in 1961. A total of 22,195 whales were caught compared with 24,724 whales in 1960. Total oil production, baleen and sperm oil amounted to 646,676 barrels compared with 733,192 barrels in 1960.

5. *Antarctic Whaling Season* In accordance with the Commission's decision at the Thirteenth Meeting (Section 9 of Chairman's Report at Appendix III) the opening date of the baleen season, for the taking of fin and sei whales, was advanced from 28th December to 12th December and Paragraph 7(a) of the Schedule was amended accordingly. No objections to the amendment were lodged. No change was made in the opening date for the taking of blue whales which the Commission had amended at the Twelfth Meeting from 1st February to 14th February. This amendment of Paragraph 7(a) of the Schedule relating to the opening of the blue whale season was, however, rendered ineffective both as regards the 1960/61 and 1961/62 seasons by the objections which were subsequently lodged and not withdrawn by the Governments of Japan, Norway, the United Kingdom and the Union of Soviet Socialist Republics. The closing date of the baleen season remained at 7th April.

The Commission's resolution at the Thirteenth Meeting (Section 17 of Chairman's Report at Appendix III), requesting the Governments of Japan, Norway, the United Kingdom and the Union of Soviet Socialist Republics to

reconsider and withdraw their objections to the amendments to Paragraphs 6(2) and 6(3) of the Schedule adopted at the Twelfth Meeting for additional protection for humpback whales, was brought to the attention of those Governments. The amendments banned the taking of humpbacks in Antarctic Area IV until the end of 1963 and reduced during the same period the catching season in Antarctic Area V from four to three days commencing 20th January. In reply the Soviet Government informed the Commission that it would withdraw its objections if the other three Governments did likewise. The United Kingdom Government stated that it was prepared to withdraw its objections if the other three Governments were also willing to do so and the Government of the Netherlands returned to the Convention. The Norwegian Government decided to postpone its decision about withdrawal of the objections pending the conclusion of a quota agreement and the establishment of an international inspection scheme to ensure the observance of the provisions of the Convention. The Japanese Government stated that it was unable to withdraw its objections but, in compliance with the request of the Australian Government, would voluntarily restrict the taking of humpbacks by Japanese expeditions in Antarctic Area IV in the 1961/62 season to two days during the period 20th–23rd January, 1962. The non-withdrawal of the objections meant that the Twelfth Meeting amendments to Paragraph 6(2) and 6(3) of the Schedule remained ineffective during the 1961/62 season.

6. *State of Antarctic Stocks —Blue Whales* Allowing for the catch of pigmy blue whales, it is clear that the catch from the main blue whale stocks has declined to a level a tenth or less of that immediately after the war. If the taking of blue whales continues the catches will become progressively smaller and the position of the already depleted stocks will become even more serious. The *Ad Hoc* Scientific Committee at their 1962 meeting considered that complete protection for blue whales would be necessary for a period of years to enable the stocks to recuperate enough to sustain even a moderate catch level in future. The Committee warned the Commission that every year this protection was postponed the time was delayed, possibly by several years, when it would be possible to take any appreciable quantity of blue whales.

7. *Fin Whales* The *Ad Hoc* Scientific Committee made no specific recommendation in the 1962 report with regard to fin whales, the catch of which was slightly lower than in the preceding season. The Committee, however, expressed grave concern about the present level of exploitation of the baleen stocks as a whole which was much higher in their view than the stocks could sustain. In this connection it will be noted that fin whales comprise by far the greatest proportion of the Antarctic baleen catch.

8. *Humpbacks* The *Ad Hoc* Scientific Committee considered the position of each of the six groups of humpbacks in the Southern Hemisphere. They made no recommendation about Group I (South East Pacific) from which 125 whales have been taken in 1961. There is at present complete protection for Group II (Atlantic region) in Antarctic Area II but the Committee had no reason to suppose that there had been any recovery of the stocks in this region. Group III (West Indian Ocean) are much depleted and although the Committee made no recommendation for new restrictions they pointed out that regeneration could not be expected if there were any substantial increase in the present very small level of catch from this Group. There is clear evidence from the catches off Western Australia in 1961 that the condition of Group IV (East Indian Ocean) has further deteriorated and will continue to do so if the present level of catching is maintained. In Antarctic

Area IV, 56 humpbacks from this group were taken in 1961/62. The deterioration in Group V (South West Pacific) which was first observed in 1960 was seen to be increased in 1961. The East Australian quotas were not attained and a very few whales were taken or seen off New Zealand. The scarcity of whales and trends in the composition of the catches combine to show that the Group has been severely depleted. No humpbacks were taken in Antarctic Area V in the 1961/62 season. As regards Group VI, the *Ad Hoc* Scientific Committee noted in their 1961 report that there was reason to doubt whether this was, in fact, a separate group and not part of the stocks of Group V. The Committee had no further evidence at their last meeting on this point.

9. *Sei Whales* The Antarctic catch of sei whales is still increasing though average lengths appear to be stable. The increase in catch is probably due to the diversion of effort towards sei whales in the absence of the larger more preferred species. The rate of increase in the sei catch is, however, slowing down and led the *Ad Hoc* Scientific Committee to suspect that the maximum sustainable sei catch from the Antarctic is being approached or already passed.

10. *Sperm Whales* There was a slight increase in the Antarctic catch but the *Ad Hoc* Scientific Committee noted that the average length of sperm whales taken has continued to decline.

11. *Whale Marking* In view of the expense of whale marking the *Ad Hoc* Scientific Committee confirmed the view expressed in their 1961 report that future marking programmes would best be confined in the first instance to obtaining information about migrations and movements and age and growth. For the purposes, however, of both making assessments on existing data and planning programmes for the longer term, the Committee made arrangements for the preparation, before their next meeting with the special Committee of Three Scientists, of (1) a comprehensive record of marking so far carried out covering whales marked and recovered by species, season and area and (2) a summary of the biological results obtained so far, of the problems which marking can help to solve and a comprehensive programme of future marking, showing the number of whales of each species and each stock to be marked at each interval of time and at each locality. Proposals would also be included for further research into marking methods and the analysis of results included estimation of the percentage of marks recovered from marked whales recaptured.

In the 1961/62 Antarctic season 139 whales were marked by Japanese expeditions and about 200 by Soviet expeditions. During the season 70 marks were recovered in the Antarctic including one from a sperm whale which is only the fourth recorded recovery in this area from this species. Australia and New Zealand stations marked 92 humpback and 11 sperm whales in the winter of 1961.

12. *North Pacific Stocks* The Commission accepted the recommendation of the Scientific Committee at the Thirteenth Meeting that much more information was needed about whale stocks in the North Pacific and that a study of all species in this area should be made by a special group of scientists. Plans were made during the year for a study to be made by American, Canadian, Japanese and Soviet scientists and developments were discussed at the meeting of the *Ad Hoc* Scientific Committee (Appendix IV, Sections 11-12).

13. *Antarctic Pelagic Whaling--Extra Convention Quota Arrangements* Negotiations were successfully concluded during 1962 between the Govern-

ments of Japan, the Netherlands, Norway, the United Kingdom and the Union of Soviet Socialist Republics on the terms of arrangements for the regulation of Antarctic pelagic whaling within the total catch limit set by the Convention. The Commission was advised that the arrangements were signed in London on 6th June on behalf of the five Governments. The arrangements, the text of which is given at Appendix V, are based on the recommendations agreed at the London Conference in November, 1958 (Tenth Report: Appendix V) and will operate until the end of the 1965/66 season. The total permitted catch under the Convention is allocated among the five countries in the proportions: Japan 33 per cent, Norway 32 per cent, Union of Soviet Socialist Republics 20 per cent, United Kingdom 9 per cent, the Netherlands 6 per cent. With the addition of the fourth Soviet factory ship, the five Governments undertake not to permit any increase in the number of factory ships operating in the Antarctic under their jurisdiction except through the purchase one from another of an existing Antarctic factory ship. None of the five Governments will permit the transfer of a factory ship to another country which is party to the Convention unless a part of its quota, is also transferred or unless the purchaser's country agrees to accept the obligations of the agreement or guarantees that the factory ship would not be used in the Antarctic during the term of the agreement. If a factory ship under any other flag should commence Antarctic pelagic whaling, except as a result of the purchase of a fleet from a party to the agreement, the agreement will become null and void. The quotas specified for Norway and Japan relate, it is understood, to the position prior to the transfer of the expedition Kosmos III referred to in Sections 3 and 4 above.

In addition to the arrangements signed on behalf of the five Governments, supplementary arrangements were signed on behalf of the Governments of the Netherlands, Norway, Japan and the United Kingdom whereby the Netherlands expedition could benefit by a bonus system, contributed from the quotas of the other three countries, depending upon the catch of the Netherlands expedition by a certain date during the Antarctic whaling season. The text of these supplementary arrangements is given at Appendix VI.

14. *Scientific Appraisal of Antarctic Whale Stocks* The First Interim Report of the Committee of Three Scientists and the Report of the Special *Ad Hoc* Scientific Committee were accepted by the Commission at the Thirteenth Meeting (see Section 12 of the Chairman's Report at Appendix III). The two reports are here reproduced at Appendices VII and VIII. During the year the preparation of data by the national research units was completed. Plans for the card punching of data by the Bureau of International Whaling Statistics and the processing of the data by electronic computer and for a further meeting of the Committee of Three Scientists with the Special *Ad Hoc* Scientific Committee to assess the results were, however, delayed because the expenditure could not be authorised until the Antarctic pelagic whaling countries were in a position to assure the necessary funds (see Section 18 below). This position was not reached in time for the data to be processed and for a meeting of the scientists to be arranged before the Commission's Fourteenth Meeting in July 1962. It is now expected that a meeting of the Committee of Three with the Special *Ad Hoc* Scientific Committee will be held later in 1962 and that the final reports will be considered by the Commission at the Fifteenth Meeting in 1963.

15. *Amendments of the Schedule* In addition to the amendments of the opening date of the Antarctic pelagic baleen season in Paragraph 7(a) of the Schedule, the Commission at the Thirteenth Meeting amended Paragraphs

6(i), 7(e), and 12(b) to permit the taking of ten humpback whales a year in Greenland waters by catchers under 50 gross tons, to allow an eight month open season for minke whales in Greenland for catchers not attached to a factory ship and to permit whales caught in Greenland waters to be treated without the use of factory ship or land station provided that they were fully utilised. The Commission also amended Paragraphs 9(a) and (b) of the Schedule to permit in the North-east Pacific area during the period 1st April, 1962 to 31st March, 1965 baleen whales of the lower size limits to be taken for delivery to a land station without the condition that the whales be used for local consumption. No objections to these amendments were received.

16. *Humane Killing of Whales* In the light of a report on the technological advances in the conventional method of explosive harpooning, which were considerably shortening the time taken to kill the whale (Section 19 of the Chairman's Report at Appendix III), the Commission concluded at the Thirteenth Meeting that it would not be justified at this stage in recommending any specific programme of research or experiment in other methods. The matter was however, to be kept under review and the Commission recommended that Contracting Governments should encourage further experiments by their industries with a view to shortening the time factor still further. The Commissioners representing the Governments of Norway, Japan and the U.S.S.R. at the Thirteenth Meeting stated that further experiments were in fact to be carried out.

17. *International Observer Scheme* The Commission re-affirmed at the Thirteenth Meeting its approval in principle of an international inspection system for Antarctic pelagic whaling. The five countries concerned were requested to meet together at an early date to work out the details with a view to the submission of proposals for formal approval of the Commission at the next annual meeting and, if possible, to the implementation of the scheme on a voluntary basis during the 1961/62 season. A voluntary scheme was not, however, possible during 1961/62 as the five countries found themselves unable to hold discussions before the Government of the Netherlands had re-joined the Convention.

18. *Finance* The Commission approved two budgets for 1961/62, an ordinary budget and an extra-ordinary budget in respect of the scientific investigation of the Antarctic whale stocks.

The cost of the scientific investigation was estimated at £7,600, (£4,000 for the processing of the data and £3,600 for travelling and subsistence expenses), and the Commission proposed that £6,750 should be contributed by the five Antarctic pelagic whaling countries in the same proportion as their national catch quotas under the proposed quota arrangements. It was felt that these countries were the ones that would benefit most from the investigation. The five countries indicated that they were willing to contribute in the proportion of their quotas on various conditions which turned upon the return of the Netherlands to the Convention and the signing of the quota arrangements. Owing to the delay in the settlement of these events, plans for the scientific investigation were held up and the only expenditure incurred during the financial year was £4·4 in respect of travel and subsistence for the Chairman of the Committee of Three in attending the Commission's Thirteenth Meeting and the printing and air transport of revised data forms C and D to the national research centres. The only special contributions received from the Antarctic pelagic whaling countries before the end of the financial year on 31st May, 1962 was from the Government of Japan amounting to £2,227 10s.

In the ordinary budget the Commission provided the remaining £850 towards the estimated cost of the scientific investigation since it was considered that it was not unreasonable for all Contracting Governments to share the expenditure to that extent. It was also decided to renew a contribution of £500 towards the cost of the international whale marking programme which contribution had been suspended during 1960/61 by the decision at the Twelfth Meeting.

A copy of the audited accounts for 1961/62 is attached at Appendix IX. In the ordinary budget expenditure for the year under review was £3,851 compared with £4,039 in 1960/61. There were small increases in the cost of meetings and of printing, postage and stationery, but these together with the contribution to whale marking were offset by saving of expenditure on the special investigation, which in 1960/61 had amounted to £960.

19. *Infractions* Details of the infractions reported in respect of the 1961/62 season (Antarctic) and 1961 season (outside Antarctic) have been summarized in Appendix X of this report.

20. *Permits to take Whales for Scientific Purposes* The Commission was informed during the year that the Soviet Government had granted permission, under Article VIII of the Convention, for the taking of up to three right whales by each of the four Soviet Antarctic pelagic expeditions before the opening and after the closing of the 1961/62 season.

21. *Meetings of Committees* As indicated in Section 14, no meetings of the Committee of Three Scientists or of the Special *Ad Hoc* Scientific Committee were held between the 1961 and 1962 annual meetings of the Commission. The normal annual meeting of the *Ad Hoc* Scientific Committee on the assessment of the previous season's whaling was held on 25th–29th June, 1962 in the week immediately preceding the Commission's Fourteenth Meeting.

22. *Officers* Mr. G. R. Clark (Canada) and Mr. B. C. Engholm (United Kingdom) who were elected Chairman and Vice-Chairman at the Twelfth Meeting completed their second year in office.

The constitution of the Commission at the Thirteenth Meeting is shown in Appendix I, that of the Technical, Scientific and Finance and Administration Committees in the Chairman's Report (Appendix III) and the *Ad Hoc* Scientific Committee in that Committee's report at Appendix IV.

R. S. WIMPENNY
Secretary to the Commission

APPENDIX I

List of Commissioners and Advisers attending the Thirteenth Meeting of the Commission, June, 1961

Chairman: Mr. G. R. Clark (Canada)

	Commissioners or Deputies	*Advisers*
ARGENTINA	Senor S. N. Martinez	
AUSTRALIA	Mr. J. V. Moroney	Dr. G. L. Kesteven Mr. R. Crichton-Brown Mr. G. M. Bunning Mr. N. G. Bell
BRAZIL	Not Represented	
CANADA	Mr. G. R. Clark (in Chair)	Mr. W. M. Sprules Mr. W. A. Stewart

DENMARK	Mr. J. Hertoft	Mr. O. Skardhamar Mr. P. Rosendahl
FRANCE	Mon. P. Gribelin	Dr. P. Budker
ICELAND	Mr. E. Benedikz	
JAPAN	Mr. I. Fujita	Dr. H. Omura Mr. T. Kamenaga Mr. K. Ando Mr. K. Mikanagi Mr. Y. Arino Mr. T. Miyata Mr. K. Nakao Mr. K. Futamura
MEXICO	Senor R. Valenzuela *	
NEW ZEALAND ..	Mr. J. V. Scott	
PANAMA	Not Represented	
NORWAY	Mr. G. Sjaastad	Mr. I. R. Rindal Mr. E. Moe Mr. E. Vangstein Mr. E. Haugen Mr. Kapstø Mr. E. Ribu Dr. Å. Jonsgård
SOUTH AFRICA ..	Mr. C. G. du Plessis	Dr. G. C. Scully
SWEDEN	Mr. S. Brattstrom	
UNITED KINGDOM	Mr. B. C. Engholm (*Vice-Chairman*)	Mr. A. J. Aglen Mr. J. Graham Mr. H. F. Greenfield Mr. T. S. Leach Mr. H. T. Blaney Dr. N. A. Mackintosh Dr. R. M. Laws Mr. S. G. Brown Capt. H. K. Salvesen Mr. G. H. Elliott Mr. D. Carmichael
U.S.A.	Dr. A. Remington Kellogg	Mr. W. Dawson Mr. Wm. C. Herrington Lieut. Cmdr. A. F. Fugaro Mr. D. W. Rice
U.S.S.R.	Mr. M. Sukhoruchenko	Capt. A. N. Solyanik Dr. V. A. Arseniev Dr. V. A. Tverianovitch Mr. B. Morgun Mr. B. P. Pisanev Mr. S. Baranov (*Interpreter*)

Observers

Committee of Three Scientists	Dr. D. G. Chapman (Chairman)
CHILE	Mr. M. Valenzuela

**in observer and not representative capacity*

THE NETHERLANDS	Dr. W. L. van Utrecht Mr. P. G. Lardinois
ITALY	Signor U. Padovan
PORTUGAL	Commander J. Lopes
F.A.O.	Mr. S. J. Holt (Member of Committee of Three Scientists)
I.C.E.S...	Mr. A. J. Aglen (United Kingdom)
Secretariat	Mr. R. S. Wimpenny (Secretary), assisted by Miss J. M. Kirby Mr. R. Forsdike Mr. W. Robson The Palantype Organisation

APPENDIX II

AP XIII 19th April, 1961

Sir,

Circular letter to all Commissioners
Agenda: Thirteenth Meeting, 1961

I enclose herewith, in duplicate a copy of the Agenda for the Thirteenth Meeting of the Commission to be held on Monday, 19th June, 1961 and the necessary following days at No. 10 Carlton House Terrace, London, S.W.1. The opening session will begin at 10 a.m.

The Agenda has been drawn up in the light of comments which have been received on the draft provisional agenda circulated with my letter of 13th January, 1961.

Copies of the financial statements, referred to under Item 4(a), cannot be completed until the end of the current financial year, 31st May, 1961. They will be circulated as soon after as possible and will include a statement (subject to audit) of income and expenditure for the financial year 1960/61 and an estimate of income and expenditure for 1961/62. With regard to Item 4(b) Commissioners will recall that at the Twelfth Meeting, the Commission decided that it should review at its next meeting its financial position and the present system of levying contributions. The Commission had in mind the comparatively small balance in hand at the time, the financial commitments in connection with the appointment of the Special Committee of Three Scientists and the decision to withdraw the contribution towards the cost of whale marking in the current financial year. Commissioners should note that in undertaking this review at the Thirteenth Meeting the Commission may wish to consider a further increase in the annual contribution.

Under Item 5 the Commission may wish to consider the position resulting from the extra-Convention discussions between the five Antarctic pelagic whaling countries which will have taken place before the Thirteenth Meeting. The Commissioner for the United States has pointed out that the Commission would be precluded under Rule XII of the Rules of Procedure from taking any appropriate consequential action unless such consideration was provided for on the Agenda. In the same context, Item 17 has been included to permit the Commission to consider further action in connection with observer scheme proposals should it wish to do so.

Item 6 refers to the annual report of the *Ad Hoc* Scientific Committee in connection with its normal assessment of the results of the whaling season just ended. Commissioners will know that this year the annual meeting of the

Committee has been arranged for the week preceding the Thirteenth Meeting i.e. from 13th-16th June. The Committee's report will not therefore be available before the beginning of the Commission's meeting.

Item 7 has been included at the request of the Commissioner for Japan who will no doubt address the Commission on the subject.

Commissioners have been informed of the appointment of the Special Committee of Three Scientists, following the Resolution adopted at the Twelfth Meeting, and arising from the Committee's mandate in the same Resolution of the special meeting of the *Ad Hoc* Scientific Committee, which is to be held in Rome from 24th April to 6th May and at which the "Committee of Three" will also be present. Under the terms of the Resolution the "Committee of Three" have one year from their appointment to report to the Commission; and it is possible that one or more further special meetings of the *Ad Hoc* Scientific Committee may be required. Item 8 has been included on the Agenda for the Thirteenth Meeting, however, in case either the "Committee of Three" or the *Ad Hoc* Scientific Committee should wish to render any progress or interim report, or the Commission wish to consider any problems with these special mandates.

The report on infractions, Item 10, will be circulated at a later date when the information relating to the last season has been received from Contracting Governments.

Under Item 11 the Commission will wish to consider the analysis of the replies of Contracting Governments to the questionnaire on whaling legislation, which I was instructed at the Twelfth Meeting to prepare, together with any additional replies received since the last meeting. The relative documents will be circulated later. At present there are still one or two replies outstanding.

A draft of the Twelfth Annual Report, Item 15, will also follow later. This cannot be completed until figures relating to the last year's catch are available.

With reference to Item 16, I expect to receive in due course, for circulation to the Commission before the Meeting, a report on the initial Anglo/Norwegian technical discussions on the electric harpoon which have just taken place and at which were present two members of the Commission's Working Party on Humane and Expeditious Methods of Killing Whales.

The amendments to Paragraphs 6(1), 7(e) and 12(b) of the Schedule under Item 18(c), have been included at the request of the Commissioner for Denmark who points out that they are intended only to concern Greenland and may be looked upon as a consequence of the clarifications made in Paragraph 11 of the Technical Committee's Report at the Twelfth Meeting, which were accepted by the Commission. The Danish Commissioner states that he or his representative at the Thirteenth Meeting will be prepared to furnish the Commission with any further explanation for the adoption of the proposed amendments.

As explained in my letter of 13th January, the amendments to Paragraphs 9(a) and 9(b) of the Schedule, under Item 18(d), have been proposed by the Canadian Commissioner who also states that he or his representative at the Thirteenth Meeting will be prepared to explain his Government's reasons for these proposals.

No other proposals for amendment of the Schedule have been received from Contracting Governments. Item 18(a) and (b) have been included, however, to allow the Commission to consider any changes in Paragraphs 7(a), 8(a)—(d) of the Schedule which might arise from the review of the previous season's catch statistics or from the extra-Concention discussions on the regulation of Antarctic pelagic whaling.

A copy of the Agenda and of this covering letter, which should be read with and as part of the Agenda, are being sent to each Contracting Government. Further copies may be obtained on application.

I should be glad to be informed by the 12th June, or earlier if possible, of the names of all those who will be present at the Thirteenth Meeting on behalf of your Government.

I am, Sir,

Your obedient Servant,

R. S. WIMPENNY

Secretary to the Commission

AGENDA FOR THE THIRTEENTH MEETING TO BEGIN AT 10 A.M. ON MONDAY, 19TH JUNE, 1961, AT 10 CARLTON HOUSE TERRACE, LONDON, S.W.1.

1. Address of Welcome.
2. Arrangements for the Meeting and Adoption of Agenda.
3. Appointments to Committees.
4. Finance and Administration
   (a) Review of the Commission's financial position (account for 1960/61 and estimate for 1961/62 to be circulated with Paper IWC/13/2)
   (b) Review of the present level of, and methods of levying, annual contributions from Contracting Governments (see para: 19 of the Chairman's Report of the Twelfth Meeting) and consideration of a possible increase.
5. Review of Extra-Convention Discussions on Regulation of Antarctic Pelagic Whaling and Possible Consequential Action.
6. Report of the *Ad Hoc* Scientific Committee (Report to be circulated as Paper IWC/13/3).
7. Examination of the Problem of Size Limit for Sperm Whales.
8. Special Scientific Appraisal of the Whale Stocks (see para: 9 of the Chairman's Report of the Twelfth Meeting).
9. Review of the Previous Season's Catches
10. Infractions
    (Infractions Report to be circulated as Paper IWC/13/4).
11. Implementing Legislation.
    (See para: 17 of the Chairman's Report of Twelfth Meeting—additional information and analysis to be circulated as Paper IWC/13/5).
12. Report by the Technical Committee.
13. Report by the Scientific Committee.
14. Report by the Finance and Administration Committee.
15. Twelfth Annual Report.
    (A draft will be circulated as Paper IWC/13/6).
16. Humane Killing of Whales
    (See Paragraph 16 of the Chairman's Report of Twelfth Meeting—a note on the position of the technical discussion between the Norwegian and British industries will be circulated as Paper IWC/13/7).
17. The Observer Scheme.
18. Amendments of the Schedule.
    (a) Opening dates and length of Antarctic pelagic baleen whaling season (Paragraphs 7(a), 8(d)).
    (b) Blue whale unit limit in Antarctic (Paragraphs 8(a), 8(c)).
    (c) Proposed amendment of Paragraph 6(1), 7(e) and 12(b):

Paragraph 6(1): add to the existing paragraph the sentence "Notwithstanding this close season the taking of 10 humpback whales per year is permitted in Greenland waters provided that whale catchers of less than 50 gross register tonnage are used for this purpose."

Paragraph 7(e): add to the existing paragraph the sentence "Notwithstanding this paragraph one continuous open season not to exceed eight months may be implemented so far as Greenland is concerned."

Paragraph 12(b): add to the existing paragraph the sentence "A Contracting Government may in less developed regions exceptionally permit treating of whales without use of land stations, provided that such whales are fully utilized in accordance with this paragraph."

(d) Proposed amendment of Paragraphs 9 (a) and 9 (b):

Paragraph 9(a): add in the 8th line after the words "provided that" the words "in the Southern Hemisphere."

Paragraph 9(b): delete from the 4th line the words "or land stations"; delete from the 7th and 8th lines the words "in each case that" and substitute therefore the words "that in the Southern Hemisphere."

19. Date and Place of the Next Meeting
(Rule XVII of the Rules of Procedure of the Commission refer to meetings outside London).
20. Arrangements for Press Release.
21. Any Other Business.

APPENDIX III

CHAIRMAN'S REPORT OF THE THIRTEENTH MEETING

1. *Date and Place* The Commission's Thirteenth Meeting took place from 19th June to 23rd June, 1961 at 10 Carlton House Terrace, London, under the Chairmanship of Mr. G. R. Clark (Canada).

2. *Delegates and Observers* Representatives of Contracting Governments were present from Argentina, Australia, Canada, Denmark, France, Iceland, Japan, Mexico, New Zealand, Norway, South Africa, Sweden, the Union of Soviet Socialist Republics, the United States of America, and the United Kingdom. There were no representatives from Brazil and Panama. Observers attended from the Food and Agriculture Organization of the United Nations, the International Council for the Exploration of the Sea, Chile, Italy, the Netherlands, Portugal and the Special Committee of Three Scientists (Dr. D. G. Chapman, Chairman).

3. *Return to the Convention of Norway* Norway had rejoined the Convention on 25th September, 1960 and a special welcome was extended by the Commission to her representative, Mr. G. Sjaastad.

4. *Adoption of Agenda* The Commission adopted the agenda in the form previously circulated by the Secretary.

5. *Address of Welcome* Mr. W. M. F. Vane, M.P., Parliamentary Secretary to the Ministry of Agriculture, Fisheries and Food in the United Kingdom, addressed the opening session. He pointed out, in spite of the Commission's efforts to date, conservation of the stocks of the commercially important whale species had become an

increasingly pressing problem. It was therefore with great pleasure that he noted the return of Norway to the Convention and the appointment as special advisers of the three eminent scientists, Dr. Chapman of the United States, Mr. Allen of New Zealand and Mr. Holt of the Food and Agriculture Organisation of the United Nations. This support and advice would, he felt, assist substantially in achieving the Commission's aims.

6. *Condition of the Stocks* The general condition of the whale stocks as estimated from the information available was reported on by the Scientific Committee.

With regard to the Antarctic stock, the Committee continued to feel considerable anxiety about the most important species. Their estimate of the position in this field may be summarized as follows:

(i) *Blue Whales* There is evidence of a further decline in this species and the view that total protection was required in the Antarctic for several years in the first instance was put forward more strongly than ever.

(ii) *Fin Whales* There are indications of a decrease in this stock extending over some years past.

(iii) *Humpback Whales* The stock in Group IV (Antarctic Area IV and west coast of Australia) is thought to be in a serious condition. Subject to revision when population estimates become available, the Scientific Committee consider the stocks to be now at a level at which only one to two hundred whales should be taken annually. There is also evidence of a decline in the stock of Group V (Antarctic area V and east coast of Australia and New Zealand) which, it has been suggested, with the reservation already mentioned, might not be capable of giving a sustained yield of more than 1,000 whales each year. The stocks in Group II (Atlantic region) and Group III (West Indian Ocean) have been substantially depleted and would not be expected to support any extra exploitation.

(iv) *Sei Whales* Increased catches of this species are being made but there are no data on the state of the stock. Such information is needed and more general research and marking is required for this species.

(v) *Sperm Whales* There has been a fall in the average length of sperm whales caught in the Antarctic but there is need for further general research on this species before the state of the stock can be defined.

(vi) *Blue Whale Unit Limit* The available biological evidence indicates that the overall catch limit in recent seasons has permitted excessive catches. The overall limit itself, however, is thought to be undesirable as it could permit the excessive exploitation of one stock while others might be under exploited. As soon as population studies allow stocks to be properly assessed, each stock should be made subject to special conservation measures.

With regard to the state of the stocks outside the Antarctic, the Scientific Committee had no substantial report to make. The Committee was opposed, however, in the absence of further scientific information, to any measures likely to reduce the present minimum size of whales on the grounds that the minimum sizes had been fixed in order to give protection to immature animals that had not yet reproduced themselves and, in the present state of knowledge, this seemed a safe conservation policy.

7. *The Convention's Conservation Aims and Extra-Convention Discussions* The blue whale unit catch limit was suspended for two seasons following a decision reached by the Commission at its Twelfth Meeting. The Governments of Japan and the U.S.S.R. had registered objec-

tions to this amendment to the Schedule to the Convention and consequently continued to observe the previous total Antarctic quota of 15,000 blue whale units. The action by the Commission to suspend the blue whale unit catch limit for two seasons was taken in order to provide some degree of accommodation for the Governments of Norway and the Netherlands to rejoin the Convention while discussions could be held looking towards the development of a formula for an allocation or division of the total quota between the Antarctic whaling countries. During this period of suspension of the Antarctic quota, the Commission held to the view that all countries would adhere to all other conservation measures designated in the Schedule. As indicated earlier in this Report, the Government of Norway rejoined the Convention but that of the Netherlands remained a non-adherent.

In a statement presented by the Commissioner for the United Kingdom and in documents submitted by him to the Commission, an account was given of three meetings held in 1961, between representatives of the Antarctic whaling countries for the purpose of reaching agreement regarding a formula for division of the total permitted Antarctic quota. In November, 1958, the U.S.S.R. had agreed to accept an allocation of 20 per cent of the total Antarctic quota. At the 1961 meetings, discussions centred on devising a formula for division of the remaining 80 per cent between Japan, the Netherlands, Norway and the United Kingdom. At the first meeting held in 1961 representatives of these four countries participated with the U.S.S.R. represented by an observer.

In his review of the situation the Commissioner for the United Kingdom reported that at the last meeting held in May, between representatives of the four countries, agreement was very near on a formula for an allocation scheme which would give 33 per cent of the total permitted quota to Japan, 32 per cent to Norway, 9 per cent to the United Kingdom and 6 per cent to the Netherlands, with 20 per cent being allocated to the U.S.S.R. In addition to these basic percentages, under a special arrangement, the Netherlands would also benefit by a bonus system depending on the catch of her expedition by a certain date during the Antarctic whaling season.

In her consideration of the proposals developed during these meetings held outside the Convention and in order to assist in reaching a final decision, the Netherlands Government had asked for the views of the Commission on the following points:

(i) the principle of carrying over from one season to the next the balance of any unused quota allocation;

(ii) the lengthening of the Antarctic whaling season;

(iii) the introduction and implementation of an International Observer Scheme for Antarctic whaling.

The Commission noted all of these developments and its attitude to these last three matters is recorded in the succeeding paragraphs.

8. *The "Carry-over" of Antarctic Pelagic Whaling Quotas* The proposal, put forward by the Government of the Netherlands in quota discussions outside the Convention, that any uncaught balances of country allocations should be carried forward from one season to the next, was carefully considered by the Technical Committee. It was realized that there might be economic advantages to a country or company operating only one expedition if the short-fall of an allocation in one year could be carried over into the next. If the quotas were lower than or equal to the optimum catch level for the purpose of conserving whale stocks, the principle of carry-over might not be objectionable. On the other hand, if the quotas were higher than the optimum catch

level, as is thought to be the case at present, the effect of carrying over any residue would be undesirable. In considering the proposal from all aspects, the Technical Committee concluded that there was a preponderance of arguments against it and unanimously recommended that, in the present circumstances, the Commission should oppose any carry-over of uncaught balances from one year to the next. The Commission endorsed this recommendation.

9. *Opening Date of Antarctic Baleen Whaling Season* One of the difficulties met with in the talks held outside the Convention regarding a formula for division of the total quota had been the length of the baleen whaling season. It was thought by some that it should be longer so as to make it easier for expeditions to obtain their catch allocation. Although there was some reluctance to make this extension on the grounds that possibly more pregnant females would be caught in the earlier part of the season, the scientific basis for this view was admitted to require further review as there was some recent evidence pointing in the opposite direction.

The Commission, under these circumstances, agreed to advance the commencement of the Antarctic baleen whaling season from 28th December to 12th December. Effect was given to this agreement by a proposal from the Commissioner for the United Kingdom, seconded by the Commissioner for Canada, that item 7(a) of the Schedule should be amended in the third line, deleting "28th December" and substituting "12th December". On being put to the vote, the amendment was carried, there being eight votes in favour, one against and three abstentions.

10. *Observer Scheme* The Commission considered the question of an International Observer Scheme and agreed unanimously on the following points:

(i) The Commission's views are reaffirmed regarding the need for an International Observer System and it is also agreed that its implementation should be made as quickly as possible.

(ii) The Commission requests the five Antarctic whaling countries to meet together as quickly as possible to work out the details of such a scheme.

(iii) The Commission requests the Netherlands to participate in such a meeting to work out the details which should be arranged as quickly as possible.

(iv) It might be possible if a scheme can be developed by the five countries directly concerned for there to be a provisional implementation in the 1961/62 season if the practical problems can be overcome.

(v) If a scheme can be worked out by the five countries it would be submitted for formal incorporation in the Schedule of the Convention if it is approved by the Commission at the 1962 Annual Meeting.

11. *Antarctic Catch Limitation* Of the four countries concerned under the Convention with the Antarctic blue whale unit catch limit suspension mentioned in Paragraph 7 above (Japan, Norway, the U.S.S.R. and the United Kingdom). Japan and the U.S.S.R. had objected to the suspension and were therefore working under the 15,000 blue whale unit limit, while Norway and the United Kingdom in the Convention and the Netherlands outside it were not operating under these restrictions. Nevertheless all these countries had responded to a resolution adopted at the Twelfth Meeting requesting them to impose, during the period of suspension of the Convention catch limit, national quotas on their

expeditions at a level not greater than each adopted for the 1959/60 season. The Commission therefore resolved without dissent on the proposal of the Commissioner for New Zealand and seconded by the Commissioner for the United States of America that the Governments of Japan, the Netherlands, Norway, the U.S.S.R. and the United Kingdom should be reminded of the Twelfth Meeting resolution.

12. *Scientific Appraisal of Antarctic Whale Stocks*

In accepting the reports of the Scientific Committee, the Special *Ad Hoc* Scientific Committee and the First Interim Report of the Special Committee of Three Scientists, the Commission understood that the programme of work of the latter two bodies was nearly the same and that they would work together in close co-operation. In the First Interim Report of the Committee of Three Scientists, Dr. Chapman, who had been elected Chairman, stated that his Committee would co-operate with the *Ad Hoc* Scientific Committee by guiding the preparation of existing data in an appropriate form, recommending what additional data were required, devising appropriate methods of analysis to determine optimum yield, assisting in the preparation of an estimate by these methods and in supplying to the Commission an independent opinion as to the nature and reliability of the results.

The Commission also understood that to obtain a preliminary report on its task from the Special Committee of Three Scientists by the 1962 meeting, a very considerable assembly of tabulation would have to be ready for processing at a Special Meeting of the *Ad Hoc* Scientific Committee which it was agreed should be convened by Dr. Chapman and held, if possible, at Seattle before the end of 1961.

The tabulation required consists of four forms, E1 and E2 sent to the Bureau of International Whaling Statistics and forms C and D sent to the research institutes supplying the biological information. The work starts from the data on some 800,000 whales for which the Bureau of International Whaling Statistics has information on sex, length, time and place of capture. In order to convert this into age-composition and eventually to produce yield estimates, use must be made of the biological data collected by the individual research groups. It is expected that grouping by species, sex, geographical area, year, month and expedition may result in 4,000 length-frequency and age-length tables.

In order to deal with this mass of material, the information on the tables will have to be put on cards so that it may be handled and processed for yield equations or other calculations in an electronic computer. This part of the work it is intended to have done in Seattle, to which place the forms should be sent off two months before the joint meeting of the *Ad Hoc* Scientific Committee and the Special Committee of Three Scientists planned tentatively to begin on the 4th December 1961. The forms should therefore be posted to Dr. Chapman by 1st October so as to give him a month to prepare the data for use by the joint meeting. The cost of these operations, including the carding of data by the Bureau of International Whaling Statistics was estimated roughly at £4,000.

The Commission expressed their thanks and appreciation to the Special Committee of Three Scientists.

13. *Review of Previous Season's Catch*

In his report to the Commission on the statistics of the last season's catches, Mr. Vangstein said that the Bureau of International Whaling Statistics had not received information from

all the expeditions concerned in sufficient time to provide an analysis for use at the Commission's meeting. As a consequence the Scientific Committee had been unable to draw certain conclusions it required from the available statistics of the previous season's catches. The Bureau required at least a month to prepare its analysis, but this season some information had not been available until the middle of June. With a number of expeditions whaling until the closing date of the season on 7th April, it was understood that it would be difficult for all expeditions to provide reports to the Bureau at least a month before the normal time of the Commission's meeting in the third week of June, but that it should be possible for all expedition reports to be sent to the Bureau not later than the end of May.

In these circumstances and in order to give the Bureau time to produce its analysis, it seemed to the Commission that its Annual Meeting might be put back a little but not far enough to encroach on the 90 days notice necessary for the operation of a Schedule amendment. As mentioned in Paragraph 25 below, the commencing date for next year's meeting was in fact fixed for the 4th July, 1962. The Commission decided in addition that all member countries should be asked to urge their expeditions to provide reports to the Bureau as early as possible and in any case not later than the 31st May.

14. *Study of North Pacific Stocks* Much more information is needed concerning the whale stocks in the North Pacific and the Scientific Committee recommended that a special group of scientists should make a study of the stocks of all species in the North Pacific. The preliminary plans for the study were to be made by correspondence through the Secretary who will make the necessary approaches. In accepting the Scientific Committee's report the recommendation was approved by the Commission.

15. *Size Limits for Sperm Whales* The views expressed by the Japanese delegation in their explanatory memorandum (IWC/13/18) were noted by the Commission. This doubted the advisability of the continued application of the present regulation on size-limits for sperm whales, both for the practical reason that there are a number of countries outside the Convention catching sperm whales without such a limitation on size and for the scientific reason that the present size-limit might be higher than was necessary for protection purposes. In the view of the Scientific Committee, the minimum size-limit was virtually the only safeguard for the conservation of the stock and it would be undesirable to make any alteration in the present size-limit without further knowledge of the general biology of the species. The Committee observed, however, that Japan was undertaking an extensive biological investigation of the sperm whale and did not consider that a decision by the Commission was necessary at this meeting. They therefore recommended that the *Ad Hoc* Scientific Committee should be asked to undertake further scientific studies on sperm whales so that the Commission could consider the problem at the Fourteenth Meeting. The Commission agreed to this recommendation.

16. *Minimum Size of Whales to be taken at Land Stations in North-east Pacific Area* The taking of blue, fin and sei whales at 5 feet below the general minimum lengths of respectively 70, 55 and 40 feet in the northern hemisphere is limited to where whales are delivered to land stations on the understanding that the meat is to be used as human or animal food. On the grounds that conservation would not be affected and that the economics of a land station would be preserved, the

Commissioner for Canada proposed and the Commissioner for Denmark seconded a resolution which relaxed the restrictive provision as to the use of the whale in respect of the North-east Pacific area for a period of three years starting on the 1st April, 1962. The period of three years it was thought might enable a check to be made on any adverse effect on conservation. To give effect to this resolution it was proposed that the Schedule should be amended as follows:

Paragraph 9(a): after the words "provided that" in the eighth line, insert a comma and the words "except in the North-east Pacific area for a period of three years starting 1st April, 1962".

Paragraph 9(b): delete the words "provided in each case that" in the seventh and eighth lines and insert the words "provided that, except in the North-east Pacific area for a period of three years starting 1st April, 1962, in each case".

The amendment was carried, there being nine in favour, none against and three abstentions.

17. *Protection of Humpbacks* At the Twelfth Meeting the Commission amended Paragraphs 6(2)(b) and 6(3)(a) of the Schedule to the Convention so as to afford total protection for humpbacks in Antarctic Area IV until the end of 1963 and to reduce during the same period the catching season in Antarctic Area V from four to three days. These measures were, however, nullified as a consequence of the objections lodged by the Governments of the four Antarctic pelagic whaling countries party to the Convention, Japan, Norway, the U.S.S.R. and the United Kingdom. At the present meeting grave concern was expressed by the Scientific Committee at the state of the stocks in these areas. On the motion of the Commissioner for the United States of America and seconded by the Commissioner for Australia it was, therefore, resolved without dissent that the four Governments concerned should be requested to reconsider their position and withdraw the objections.

18. *Greenland Whaling* The Commission agreed to a proposal of the Commissioner for Denmark, seconded by the Commissioner for the United Kingdom that ten humpback whales may be taken annually off the Greenland coast, provided the catching vessels are less than 50 tons. An open season of eight months instead of six is also to be allowed for the taking of minke whales in the waters off the same country. Included in the same proposal and relevant to the same area, it was also decided that a Contracting Government in less well developed regions may permit the treatment of whales without resorting to a land station to carry out the processing laid down in the Schedule.

The consequential amendment of the Schedule was as follows:

Paragraph 6(1): add to the existing paragraph the sentence "Notwithstanding this close season the taking of 10 humpback whales per year is permitted in Greenland waters provided that whale catchers of less than 50 tons gross register tonnage are used for this purpose".

Paragraph 7(c): add to the existing paragraph the sentence "Notwithstanding this paragraph one continuous open season not to exceed eight months may be implemented so far as Greenland is concerned".

Paragraph 12(b): add to the existing paragraph the sentence "A Contracting Government may, in less developed regions exceptionally permit treating of whales without use of land stations, provided that such whales are fully utilized in accordance with this paragraph".

This amendment to the Schedule was carried, eleven voting in favour, none against and one abstaining.

19. *The Humane Killing of Whales* One of the members of the Working Party on the Humane Killing of Whales reported to the Commission on the technical discussions held this spring between representatives of British and Norwegian industries on experiments made by both countries on the electrical killing of whales (IWC/13/7). Recent advances in the design and technique of explosive harpooning had, it appears, reduced the time taken to kill and very often ensured instant death. This meant that explosive harpooning killed as quickly as the electrical method. In view of the importance of the time factor, already emphasized in the report of the Working Party to the Twelfth Meeting of the Commission, and in the light of these technological developments, it seemed that the present methods were not necessarily inhumane.

The Commission therefore decided that, while no specific experiments were under recommendation at present, the subject should nevertheless be kept under review. In this connection it was understood that the Japanese, Norwegian and U.S.S.R. Governments were still carrying out experiments. Finally it was agreed that the Working Party on the Humane Killing of Whales should now be dispersed and the members thanked for the useful work they had done.

20. *Infractions* The Technical Committee in accepting their Infraction Sub-Committee's report noted that the position was generally satisfactory and that there was a continuance of the trend to a lower percentage of infractions. The Committee recommended to the Commission that member countries should:

(i) be reminded of their obligations to maintain regular and adequate inspection of land stations

(ii) be asked to ensure that infraction returns are in the hands of the Secretary in ample time for the necessary summary to be made before the Annual Meeting of the Commission.

The Commission noted the Technical Committee's report on this subject and approved the two recommendations.

21. *Legislation on Implementation* Replies had been received to the questionnaire on whaling legislation from all Contracting Governments except one. The Technical Committee considered the analysis of replies showed that appropriate measures for the implementation of the provisions of the Convention had been taken by all countries undertaking whaling operations. The Committee considered that, as the information was already available to the Contracting Governments in document form, the answers to the questionnaire should not be published in the Twelfth Annual Report and they further recommended that the Commission should remind all Contracting Governments to keep the Secretary informed of any changes in their whaling legislation or administrative arrangements so that the Commission's records might be kept up to date.

After considering and accepting the Technical Committee's report on these matters, the Commission approved the two recommendations which appear in the preceding paragraph.

22. *Finance* In considering the report of the Finance Committee the Commission had before it the following:

(i) The provisional statement of income and expenditure for the year ended 31st May, 1961. This showed an income made up from the

contributions of £250 from seventeen Contracting Governments and giving a sum of £4,250 or £228 more than the expenditure. Three contributions were, however, still outstanding and were included in the £4,250 just mentioned. Expenditure on the other hand stood at £4,022 or £360 more than for the previous year.

(ii) The estimated expenditure for the financial year ending 31st May, 1962. Here the anticipated expenditure of the special scientific investigation on stock assessments envisaged by the Committee of Three Scientists and mentioned in paragraph 12 above involved, subject to agreement, the extra expenditure of £7,600. Added to the other items of the estimate this would have been equivalent to an annual contribution of about £700 from each Contracting Government.

(iii) As the expenditure on the special scientific investigation was primarily in aid of the Antarctic whaling countries, it was proposed that £6,750 of this should be paid by these countries in the proportion of their proposed quota shares and that this should be placed in an extra-ordinary budget. This latter would come into force if all the countries concerned were prepared to pay and if the Netherlands returned to the Convention.

(iv) The balance of £850 would appear in the ordinary budget as a contribution to expenses of *Ad Hoc* Committee meetings, Secretary's fares, allowances, etc. and would represent the contribution made by all Contracting Governments for benefits they might expect to receive from the special scientific investigation. The ordinary budget would then have an expenditure of £4,600 which includes the reinstatement of £500 for whale marking, small increases in printing, stationery and postage and also in the cost of the annual meeting and an increase of £50 in the Secretary's fees. Estimated income of the ordinary budget would be £4,250, being the contribution of seventeen Contracting Governments at £250, plus a balance as at 31st May, 1961 of £1,054 making a total of £5,304.

(v) The Committee thought that, in future, the Commission might need to include in its budget some provision for scientific work, particularly since further work may arise from the special scientific investigations and therefore recommended that the Commission should invite all Contracting Governments to consider before the next meeting the possibility of an increase of, say, £50 in the annual contribution.

The Commission gave careful consideration to these matters, approving the income and expenditure accounts for the year ended 31st May, 1961 subject to final audit. The ordinary budget expenditure and income for the year ending 31st May, 1962 was also agreed and approval was given to the extra-ordinary budget expenditure and income for the same year, subject to the agreement of the appropriate countries to pay their shares of the special scientific investigations and to the return of the Netherlands to the Convention.

23. *Representation at Meetings of Other Organisations* The International Council for the Exploration of the Sea had invited the Commission to send an observer to the 49th Statutory Meeting to be held in Copenhagen from 2nd to 11th October, 1961. Mr. A. J. Aglen of the United Kingdom was accordingly appointed to act as observer at this meeting. An invitation had also been received from the Food and Agriculture Organization

of the United Nations to send an observer to the International Conference on Fish in Nutrition to be held in Washington, D.C., in September, 1961. As it was found impossible to find anyone to attend this meeting, the Commission decided that the invitation should be declined.

24. *Constitution of Committees* The composition of the Committees is given below.

Technical Committee Australia, Canada, Denmark, Japan, New Zealand, Norway, South Africa, the Union of Soviet Socialist Republics, the United States of America and the United Kingdom. Mr. B. C. Engholm (United Kingdom) was elected Chairman. An Infractions Sub-Committee was set up consisting of representatives of Australia, Japan, Norway, the Union of Soviet Socialist Republics, the United States of America and the United Kingdom.

Scientific Committee Australia, Canada, France, Japan, Norway, South Africa, the Union of Soviet Socialist Republics, the United States of America and the United Kingdom. Dr. N. A. Mackintosh (United Kingdom) was elected chairman.

Finance Committee The Chairman of the Commission nominated Mr. J. Hertoft (Denmark), Mr. J. V. Scott (New Zealand), Mr. G. Sjaastad (Norway), Mr. B. C. Engholm (United Kingdom) and Mr. I. Fujita (Japan). Mr. J. V. Scott (New Zealand) was elected Chairman.

25. *Place and Date of Next Meeting* The Commission accepted the recommendation of the Finance and Administration Committee that the Fourteenth Meeting should be held in London starting on Monday, 2nd July, 1962.

26. *Press Release* It was agreed by the Commission that the Chairman, working with the Secretary, should prepare a Press Release.

G. R. CLARK,
Chairman

APPENDIX IV

REPORT OF *AD HOC* SCIENTIFIC COMMITTEE OF JUNE 25–29, 1962

I. INTRODUCTION

1. The *Ad Hoc* Scientific Committee was convened by the Chairman of the Commission and met at the West Block, Ministry of Agriculture, Fisheries and Food, Whitehall Place, London, S.W.1 on Monday, 25th June, 1962, at 11 a.m. and continued for the following four days.

2. The following were present:

AUSTRALIA	Mr. C. G. Setter Dr. G. L. Kesteven
CANADA	Dr. W. M. Sprules
FRANCE	Dr. P. Budker
JAPAN	Dr. H. Omura Dr. M. Nishiwaki
THE NETHERLANDS	Professor E. J. Slijper
NORWAY	Professor J. T. Ruud
UNITED KINGDOM	Dr. N. A. Mackintosh Dr. R. H. Clarke Mr. S. G. Brown Mr. J. A. Gulland

U.S.A.	.. .. ..	Dr. J. L. McHugh Mr. D. W. Rice
U.S.S.R.	.. .. ..	Dr. V. A. Arseniev Dr. S. G. Fedorov
Secretary	.. .. ..	Mr. R. S. Wimpenny
F.A.O. Observer	.. ..	Mr. S. J. Holt

Dr. Mackintosh was elected Chairman.

3. A provisional agenda circulated before the meeting was adopted.

II. EVIDENCE AVAILABLE TO THE COMMITTEE

Review of Material and Progress Reports

4. The Committee had before them the following papers:

(1) Statistics of recent catches prepared by the Bureau of International Whaling Statistics.
(2) Progress Reports from Australia, Japan, the Netherlands, Norway, United Kingdom, U.S.A., and U.S.S.R.
(3) "Australian catches of humpback whales in 1961"—submitted by Australia.
(4) "Catches of sperm whales in the North Pacific"; "Lengths at sexual maturity"; "Report on three right whales"—submitted by the Whales Research Institute, Tokyo.
(5) A Statement on age determination by the Baleen method—submitted by the Netherlands and Norway.
(6) A Paper giving details of recent whale marking—submitted by the United Kingdom.

5. Progress reports submitted for the 1962 meeting were primarily brief inventories of operations. As such, they are useful as accounts of the past year's work. It was not possible, however, to prepare a summary that was appreciably briefer than the individual national reports.

6. It was difficult to derive a summary of progress in research from these progress reports because for the most part results of research were not reported. In future, annual progress reports would be more useful if they were to contain two major items: (1) Inventory of operations, to be based on the items in Form A; and (2) Current results of research. It would be preferable to delay preparation of an annotated outline for progress reports until the joint meeting has been held, for out of this meeting will come suggestions for future investigations by the Commission.

7. The work of the joint meeting may well lead eventually to development of long-range research plans. While the Commission may not be able to support research on the scale desirable, such a long-range programme would be extremely useful in determining priorities and other aspects of co-ordinated investigations. Eventually this should lead to development of statistical areas for the world oceans, and permanent arrangements to carry on the work of the Special Committee, perhaps based at the B.I.W.S.

8. The Committee's Workshop operation is planned to provide, for each whale species

(a) an estimate of population parameters,
(b) a diagnosis of the state of each separate stock,
(c) an estimate of the appropriate magnitude and composition of catch to be taken from each stock.

9. Upon completion of this operation the Scientific Committee's task each year will be to review the foregoing conclusions in the light of new data obtained from the latest season's whaling. For the purposes of this review the Committee will need a compilation of data along the following lines:

(1) Equipment, and effort expended,

(2) Catch, magnitude and composition,

(3) Evidence on stock status: e.g. $\bar{L}$, C/g.

The Committee would then prepare a discussion of these data, and formulate conclusions.

10. The Committee suggest that an additional week of scientific meetings may be necessary prior to the next annual meeting of the Commission, to review the work and recommendations of the Special Committee, and to give further attention to future plans. The joint meeting is requested to give special consideration to these suggestions when it convenes in Seattle in late 1962 or early 1963.

III. RESEARCH PROGRAMMES

11. *Study of North Pacific Whale Stocks* After considering how to implement the resolution of the 13th Meeting of the Commission dealing with the study of the North Pacific whale stocks the Committee recommends as follows:

A. A working group should be set up composed of:

CANADA, Mr. G. C. Pike,
Fisheries Research Board of Canada, Nanaimo, British Columbia.

JAPAN, Dr. H. Omura,
Whales Research Institute,
12–4, Tsukishima Nishigashi-Dori, Chou-Ku, Tokyo.

U.S.A., Mr. D. W. Rice,
U.S. Fish and Wildlife Service,
Sand Point Naval Air Station, Building 192,
Seattle 15, Washington.

U.S.S.R., Dr. V. A. Arseniev,
All-Union Research Institute of Marine
Fisheries and Oceanography,
Moscow, U.S.S.R.

B. The group will exchange such data as are available and can be readily exchanged in order to make a review of the situation. Copies of all correspondence will be sent to all the other members of the group and the Secretary of the Commission by any member communicating on the studies.

C. A meeting of the group should take place at the Annual *Ad Hoc* Scientific Committee meeting held before the annual meeting of the Commission, and the group should report to this Committee.

D. The programme of work suggested is given below:

(a) Whales should be marked by each participating country. Marking by the U.S.A., using a chartered vessel, is contemplated off Alaska and southern California and Lower California. The U.S.S.R. expects to mark all species in all regions where possible. Japanese marking will be from commercial vessels working off the Aleutian Islands. If it is possible for Canadian marking to take place off the coast of British Columbia the Committee considered that this would be an important contribution to the work.

(b) As methods of separating whale stocks serological and morphological differences should be investigated. In the case of the serological investigations now being undertaken by Japan and the U.S.A., the other members of the group would help where possible.

(c) Knowledge should be accumulated on age determination methods through correlation of marks recovered with ear-plug readings, tooth rings and other means. The marking of young whales should be undertaken where possible.

(d) The condition of stocks of protected whales should be studied and in support of this the counting of migrating gray whales off the coast of California would be continued by the U.S.A. A paper on the biology of one of the species of right whales is at present being printed and will shortly be published in the U.S.S.R. An exchange of information on all whales in this area is urgently required.

(e) An endeavour should be made to define "unit of effort" for coastal whaling and to record effort data that can be used in detecting changes in catch per unit of effort.

(f) The possible use of a data card system following the example of the one adopted for Antarctic whaling data should be examined. As a start it was agreed that the Canadian and U.S. members of the group might see whether it would be possible to deal with this year's catches in their areas in this way.

(g) The group mentioned above should consider the possibility of a procedure for the exchange of scientists of any two countries.

12. The Committee consider it would be helpful to have an exchange of information with the Permanent Commission for the Exploitation and Conservation of the Marine Resources of the South Pacific which co-ordinates the research conducted by the countries now engaged in whaling in the South-east Pacific.

13. *Whale Marking* The Committee were given information on the recent results of whale marking and noted that 139 whales had been reported as marked in the Antarctic season 1961/62 by Japanese expeditions under the International Marking Scheme, and about 100 by the U.S.S.R. So far 70 marks have been reported as returned from this last Antarctic season, and some particulars of these are given in the document attached to the United Kingdom Progress Report.

14. The Committee endorsed the views set out in detail in their Report last year (IWC/13/3). In view of the expense of marking, the Committee then considered that future programmes should be confined in the first place to obtaining information on (1) migrations and movements, (2) age and growth, and the merits of marking programmes in various regions were discussed. The Committee now confirm the desirability of marking in certain warm waters of the Southern hemisphere such as are specified in Paragraph 21 of the Report last year. In the light of the high proportion of recent recoveries in the Antarctic of fin whales marked off the west coast of South America, and further examination of the local facilities which might be available, they now think that the best prospects would be off (1) Natal, (2) the west coast of South America. (3) the west coast of South Africa, since such marking would provide some of the information specially required on migrations and distribution of the fin whale populations.

15. Much, however, depends upon costs and facilities, and the Committee would like if possible to obtain the views of whaling companies and other

authorities having vessels available in these regions, on the extent to which these recommendations could be implemented.

16. Humpback marking as at present conducted off the coast of Australia, New Zealand and the Pacific Islands is yielding valuable results, for example on the migration routes, on the segregation of, and inter-change between, groups of whales, and on aspects of age determination. The Committee hopes that this marking will be continued. They consider that any extension of marking in the waters of the Pacific Islands to increase the geographical coverage would be helpful, since little is known of the humpback populations in the South Pacific Ocean east of the whaling areas of Australia and New Zealand.

17. The Committee would welcome the continuation of Antarctic marking, but would not give priority to this marking should further financial support be forthcoming. They hope that wherever possible special attention will be given to sperm, sei, and pigmy blue whales since so few individuals of these species have been marked. The Committee noted that for geographical coverage the marking of fin whales is less needed in Areas II and III than in the other Areas, where much smaller numbers have been marked.

18. The Committee again confirmed the importance of marking calves and yearling whales especially in warm waters. They are, however, concerned at the risk of using the standard mark on these smaller whales. If the .410 mark about to be tried on minke whales in the North Atlantic should prove successful the Committee recommend that it also be used for the marking of smaller animals belonging to the larger species.

19. The above paragraphs express the Committee's views at the present stage, but for the purposes of making assessments on existing data and planning programmes for the longer term, they ask that there should be prepared and submitted to the next joint meeting the following documents:

(1) a comprehensive compilation on marking so far, covering whales marked and marks recovered, by species, season and area. For the Antarctic this would be made using Forms G (see page 69) by Mr. Brown and by the Soviet biologists. A corresponding form would be adopted by the national groups concerned for other regions.

(2) a summary statement of the results obtained so far with regard to the biology of the species marked, a definition of the problems to be solved and to which marking experiments will contribute, and a comprehensive programme of marking according to statistical principles showing the number of whales of each species and each stock to be marked in each interval of time, and at each locality. Some estimates of the costs of marking in various localities should be given and an examination made of the possibilities of obtaining the participation in such a programme of various types of institutions and oceanographic programmes now being organised. The programme should include proposals for further research into the methodology of marking, including studies pertinent to the analysis of results, such as the estimation of per cent recoveries of recaptures, etc. This programme should be drafted by the small group nominated in the report last year.

20. *International Population Studies* The Committee took the opportunity to consider the present position regarding the population studies initiated at the joint meeting in Rome of the Special Committee of Three and the Special *Ad Hoc* Scientific Committee meeting as a Workshop, and further considered by the *Ad Hoc* Scientific Committee at the 13th Meeting. The

Committee proposed that the second joint meeting should be held in Seattle in December or early in 1963.

21. Attention was then given to the position in the preparation of the various material which will be required for the joint meeting. The Committee noted that Form A (for the catalogue of biological data) had been sent to Dr. Chapman by some countries, and those who have not yet completed material for this are asked to do so as soon as possible. Form B (data relating to operating days) is to come from the B.I.W.S. Forms C and D (the principal biological data) have all been sent in to Dr. Chapman in respect of material up to 1959-60. It is requested that all more recent data available should be sent to Dr. Chapman as soon as possible. Forms E1 and E2 are also to come from the B.I.W.S., as is the catalogue of catching material.

22. Discussion followed on the outstanding work for National Research Groups which is an analysis of the effect of visibility and wind on the number of whales taken. Forms for tabulation (Form F) have been prepared and distributed and research units are asked to enter the necessary data on these forms and send them by air mail to Dr. Kesteven as soon as possible, and in any case not later than 1st September. It would be very useful if expedition log-books for the period of this study could be available at the Seattle meeting.

23. There is needed a tabulation of marking and recoveries in such a way that the data can be examined in relation to mortality rates (see "Whale Marking").

IV STATUS OF STOCKS

24. *Baleen whales* With an annual catch over the period 1953 to 1962 of about 15,000 B.W.U., maintained by a continuous increase in the effort during that period, the catch per catcher day has declined from about 0.9 in the years 1953 to 1959 to about 0.5 in 1961/62, that is to barely half its level at the beginning of the period. This decline in catch per catcher day includes no correction for increased efficiency of the expeditions and therefore reflects a decline in the stocks of at least this amount. It is clear therefore that the catch of 15,000 B.W.U.'s was greater than could be sustained by the stocks in the 1950's, and a level closer to the 11,000 B.W.U.'s recommended by the scientific sub-committee in 1955 would have been necessary to maintain the stock (at the level of those years).

25. However, 11,000 B.W.U.'s removed from the present stock is a much greater percentage harvest than it would have been when first proposed in 1955. If the proportional catch recommended seven years ago were to be proposed now, the allowable quota probably should not be greater than 5,000-7,000 B.W.U.'s. This quota would then have to be maintained for some years to enable the stock to build up to a level at which a reasonable sustained catch could be maintained. If such a quota is not introduced at once, and if the catch is held at the level of recent years, a further and probably accelerated decline in stock will occur. In that event an even smaller quota, maintained for a longer period, would be necessary to enable it to recover.

26. These very small quotas are of course necessary only because the stock has been reduced to a level well below the optimum. After the stock had been built up by a period of reduced catches it would be possible to take a sustained catch at a higher level—possibly as high or higher than the present quota. The Committee hope that the Seattle meeting will have sufficient evidence before it to decide what is the desirable level of stock abundance, what is the sustainable yield that can be taken at that stock level, and what levels of catch need to be set by quota, and for how long, to permit the stock to build up to that level.

27. However, whilst the above is valid in general, the Committee must again

draw attention to the inadequacy of setting an overall limit for several species together. Experience has shown that within such an overall limit, operations can be concentrated excessively on individual species and stocks.

28. *Blue whales* In examining the statistics of blue whales it is necessary to take account of the increasing proportion of pigmy blue whales in recent years. Of the total catch of blue whales about 1,000 in 1960/61 and 383 in 1961/62 were reported as pigmy blue whales, and the total catch of whales from the main blue whale stock in both seasons was probably in the neighbourhood of only about 700.

29. Making some allowance for the catch of pigmy blue whales, it is clear that the catch and catch per catcher day from the main blue whale stock have now declined to a level a tenth or less of that immediately after the war, and that the decline shows no sign of slowing down—the 1961/62 level was more than 30 per cent below that of 1960/61. If catching of blue whales were allowed to continue it is obvious that the stock would continue to decline rapidly. The stock would in fact fall to such a low level that the likely catch in future seasons would be very small—probably well below 700 blue whales (excluding pigmy blue whales) in 1962/63 and a few hundreds or less thereafter, and such catches, though small, would represent a very heavy drain on the much depleted stock.

30. If substantial catches of blue whales are to be taken in the future this will only be possible if complete or nearly complete protection is given to the blue whale stocks. This protection would be necessary for a period of years to enable the stock to recover to a level at which a moderate level of catch can be sustained. Before the full data are examined by the Seattle workshop, it is not possible to make more than very rough estimates of how long protection would be needed, what level of stock is desirable, and what level of catch could be sustained. However, an examination of historical records suggests that though the recovery of the stock might take some time, once the stock had been built up a sustained catch of several thousand blue whales would be possible. Every year by which this protection is delayed postpones, possibly by several years, the time when it will again be possible to take an appreciable quantity of blue whales.

31. *Humpback whales* The Committee had before them a report compiled by the C.S.I.R.O. on Australian humpback whaling in 1961. They also examined the statistics of recent catches in the Antarctic and comment as follows on the separate groups.

32. Group I; it was noted that 125 had been taken from this group. No recommendation is made.

33. Group II; humpbacks cannot be taken in Antarctic Area II and very small numbers are taken off Brazil and Cape Province. The question will arise next year whether the protection of this species in Area II is to be continued. The Committee have no reason to suppose that there has been any recovery of the stock in this region.

34. Group III; only 33 were taken in the Antarctic Area III and 36 at Natal, which is also in Group III. The Committee take the same view as last year. They consider that although no new restrictions are suggested in relation to this reduced stock, regeneration can only be expected to take place if there is no substantial increase in the present catch.

35. Group IV; analysis of the catches off Western Australia in 1961 shows that although increased efficiency of catching and new technical aids enabled a reduced quota to be attained, there is clear evidence that the condition of the stock has still further deteriorated, and will continue to do so if the present level of catching is maintained. In Antarctic Area IV 56 were taken in 1961/62.

36. Group V; for some years the stock in this group had appeared to be in relatively good condition. The first signs of deterioration were observed two years ago, and were seen to be intensified last year. It is now apparent that the condition of the stock has further sharply deteriorated. The East Australian quotas were not attained and very few whales were either taken or observed off New Zealand. The scarcity of whales and trends in the composition of the catches combine to show that this population has been drastically reduced. At Norfolk Island rather better results were obtained and this is of some interest in its bearing on the independence of the streams of migrating whales. In 1961/62 no humpbacks were taken in Antarctic Area V.

37. Group VI; as noted last year it is not clear whether Group VI contains a stock which is, in fact, independent of that of Group V. In the region designated for Group VI whales, there is no new evidence from whale marking or observed whales. In the corresponding part of the Antarctic, 92 were taken.

38. *Sei whales* The total catch of sei whales in the Antarctic was 4,716 in 1961/62. Comparison with previous years shows that the Antarctic catch of this species is still increasing, though average lengths appear to be stable. The increasing catches of sei whales are believed to be due to the diversion of effort to this species in the absence of the larger preferred species. The rate of increase, however, is slowing down, and suggests that the maximum sustainable catch of this species from the Antarctic is being approached or may even have already been passed.

39. *Sperm whales* The Antarctic catch was 4,864 as against 4,681 in the previous season, and 4,173 in 1959/60. The average length continues to decline. The Committee noted that the Australian catch of sperm whales though less than in some other regions, is increasing.

40. *Sperm whales in relation to minimum lengths* The Committee had before them a report on catches of sperm whales in the North Pacific, prepared by The Whales Research Institute, Tokyo. This report was submitted in conformance with an undertaking given by the Japanese Delegation at the 1961 Meeting of the Commission following discussion of a Japanese suggestion that there might be grounds for reviewing the size limit for this species. The report gives a short review of world catches of sperm whales, discusses the catches of sperm whales taken in the North Pacific, the distribution and movement of sperm whales in that area, the percentage of immature whales in the catch, and the age composition of the catch; it then concludes with a discussion of the protection of sperm whale stocks and suggests that the present size limit of 35 feet is not a practical limit for the taking of whales from land-based stations in the North-west Pacific area. The Japanese representative gave the Committee to understand that his Government thought that the limit might be reduced by 2 or 3 feet, considering the action already taken by the Japanese Government to set limits on the numbers of sperm whales to be taken by the Japanese land stations.

41. At their meeting in 1961 the *Ad Hoc* Scientific Committee pointed out, in another connection, that not enough was known of the Northern stocks of sperm whales to permit them to say whether a lowering of the minimum length would have any injurious effects. In their report of that meeting (Paragraphs 33 to 43) the *Ad Hoc* Committee made some general observations on their position with regard to assessing the status of the stocks of whales. Their general position is unchanged, but they can restate the observations made at the 1961 Meeting, in a form with direct relevance to the present problem of the northern sperm whale stocks.

42. First, the Committee would emphasise the importance of carrying out, for these stocks, the stock assessment procedures now under way for the Antarctic stocks. The Committee reiterates their view that only the results of proper stock assessment can provide a sound and permanent basis for decisions on matters such as legal minimum size and catch limits. The Committee therefore recommends that the scope of the present project of the Workshop should be extended to include the northern sperm whale stocks, and that the Committee of Three be requested to advise also on this work. At this point the Committee recommend that the Workshop should be asked to consider extension of their work, at some appropriate time, to stocks of all cetacea of economic value, wherever located: there can be little doubt that the results from such work will be required some time in the future, and that advantage should be taken of the arrangements now set up for the conduct of such work.

43. Second, the Committee recommend, referring to Paragraphs 37 and 38 of its 1961 Report, that an early effort be made to establish the identity and limits of the northern sperm whale stocks. Figure 12 of the Japanese report indicates movement of these whales between the grounds off the Japanese coast and those around the Aleutians; the Figure does not show clearly the direction of these movements, nor does it show the 'time of freedom' of the marks. There is strong evidence in Figures 7, 14 and 15 of compositional differences between the stocks off the Japanese coast and those of the Aleutians, Kamtchatka and Bering Sea; the difference could be interpreted as being produced by segregation within a single stock. There is evidence of two-way movement between Japan and the Aleutians, and of a tendency for the old males to accumulate in the Bering Sea. The true nature, and intensity, of these movements will be of considerable significance to decisions on exploitation in each of these areas. For the present the Japanese evidence can be taken to show the presence of the smaller whales in Japanese waters, and of larger whales north-east of these.

44. Third, the Committee wishes to strengthen the observation made in Paragraphs 39 and 40 of their 1961 Report, with regard to the framing of regulatory measures, by saying that the measures themselves should be regarded as special features of an exploitation programme all of which should serve a chosen objective and be mutually consistent. That is to say, since the exploitation programme aims to take a catch of a certain magnitude and composition appropriate to characteristics of the stock from which it is taken, the regulations which are a formal statement of particular features of that programme must be consistent with one another and with the programme in general; a single regulation cannot be considered by itself.

45. Because of the lack of quantitative evidence, the Committee can only address itself to a qualitative examination of the question of whether a reduction of the legal minimum size would have a harmful effect on the stock. The Committee hold the view that provided the overall limit of 1,800 sperm whales is maintained a reduction of the legal minimum size to say 33 feet would probably not have greater effect on the stock than the overall catch by the Japanese land station in 1958 must have had. It is expected that this reduction would increase the number of females taken, and increase the proportion of females in the catch, but, with the overall limit in force, probably would not bring the female catch to the 1958 level. The Committee also note that 33 feet is still some 4 feet greater than the mean size of females at sexual maturity.

46. The Committee is of the opinion that if the minimum size limit for sperm whales is lowered it should apply only to the catch made from land stations in those areas of the North-west Pacific where there is enforced a catch limit which ensures that the number of females taken does not exceed the

number taken annually prior to the enforcement of the limit. This reduction of minimum size should be permitted only for an experimental period of not more than three years during which time extensive research, designed to provide quantitative data relative to effective minimum size limits, should be prosecuted.

47. *Stocks in the Northern hemisphere* The stocks in the North Pacific are dealt with earlier in this Report. The Committee briefly considered aspects of the catches in the North Atlantic and noted that in the catch at the Azores the numbers of sperm whales taken have tended to decline appreciably in the past five years. They were informed that the catch per whale boat has also been declining, and this suggests that fewer sperm whales are becoming available. The Committee were informed that a communication had been received from the Portugese Government, which has jurisdiction over whaling in the Azores, enquiring about the work of the Commission and asking for recommendations on research and the conservation of sperm whales.

V. OTHER MATTERS BEFORE THE COMMISSION

48. *Sanctuary* Since the sanctuary for whales in the Antarctic is on the Commission's agenda, the Committee considered whether from their point of view, there was anything to be said in favour of one or other of two alternatives which have been proposed, namely, that the area should remain open for three years, or that it should remain open until the Commission decide otherwise. They have no strong views, but on balance would prefer that the area should remain open until the Commission decide otherwise, since this would enable the sanctuary to be re-imposed without long delay should there be reasons for doing so. In recent years the Committee have taken the view that, so long as an overall limit is in force, there is no special advantage in maintaining the sanctuary, though it is possible that unforeseen circumstances might call for it to be reconsidered.

49. The Committee would like to make it clear that they do not necessarily regard the area between 70 W and 160 W as the only region in the Antarctic appropriate for a sanctuary.

50. *Opening date and length of the Antarctic season* The Committee have no recommendation to make on the opening date.

51. It is noted, however, that whaling in the Antarctic continued until the closing day, April 7th, in spite of an early start, and yet failed to reach the aggregate catch target. The season of 117 days in 1961/62 therefore had a limiting effect on the catch for the first time.

52. *Minimum lengths* Again, the Committee had no material on which they could base any new recommendations.

On behalf of the *Ad Hoc* Committee.

N. A. MACKINTOSH,
Chairman

29th June, 1962

APPENDIX V

ARRANGEMENTS FOR THE REGULATION OF ANTARCTIC PELAGIC WHALING

The Governments of Japan, the Kingdom of the Netherlands, the Kingdom of Norway, the Union of Soviet Socialist Republics and the United Kingdom of

Great Britain and Northern Ireland, being Parties to the International Convention for the Regulation of Whaling, signed at Washington on December 2, 1946, (hereinafter referred to as "the Convention");

Have agreed upon the following Arrangements:—

Article 1

For the purposes of the present Arrangements the term "season" shall mean the season during which the taking of baleen whales is permitted under Paragraph 7(a) of the Schedule to the Convention.

Article 2

The present Arrangements shall be operative until the end of the 1965/6 season.

Article 3

The total annual catch authorised under the Convention shall be divided among the countries of the Contracting Governments in the following quotas:

	per cent
Japan	33
Netherlands	6
Norway	32
Union of Soviet Socialist Republics	20
United Kingdom	9

These quotas are not transferable except as provided in Article 5 hereof and in Articles 3 and 4 of the Supplementary Arrangements signed at London on this day's date.

Article 4

None of the Contracting Governments shall permit any increase in the number of factory ships under its jurisdiction operating in the Antarctic except by purchase from the country of another Contracting Government of factory ships engaged at the time of purchase in Antarctic pelagic whaling, save that the Government of the Union of Soviet Socialist Republics may permit one additional factory ship to be added to the fleet operating during the 1960/61 whaling season.

Article 5

(1) None of the factory ships under the jurisdiction of any of the Contracting Governments shall be transferred to the jurisdiction of another Government which is a party to the Convention, unless a part of the quota of the transferor Government is allocated to the transferee Government and the latter agrees to accept the obligations of the present Arrangements, or unless the transferee country gives a satisfactory guarantee that the factory ship will not be used as such in Antarctic pelagic whaling during the period of the present Arrangements.

(2) The part of the quota of the transferor country to be allocated shall be settled between the two Governments concerned, provided that no such allocation shall result in any country with only one factory ship having a quota exceeding 6 per cent of the total annual catch authorised under the Convention. The part of the quota allocated shall be notified by the two Governments concerned to the Government of the United Kingdom of Great Britain and Northern Ireland, which shall notify the other signatory Governments.

Article 6

If a factory ship under the jurisdiction of a Government which is not a party to the present Arrangements should engage in Antarctic pelagic whaling otherwise than as a result of a transfer as provided under Article 5 above, and that Government is or becomes a Party to the Convention, the present Arrangements shall be terminated.

Article 7

The present Arrangements shall enter into force on the date on which all the signatory Governments shall have notified their acceptance to the Government of the United Kingdom of Great Britain and Northern Ireland.

In witness whereof the undersigned, being duly authorised thereto by their respective Governments, have signed the present Arrangements.

Done at London the 6th day of June, 1962 in the English language in a single copy which shall be deposited in the archives of the Government of the United Kingdom of Great Britain and Northern Ireland. The Government of the United Kingdom shall transmit certified copies thereof to all other signatory Governments.

For the Government of Japan	KATSUMI OHNO
For the Government of the Kingdom of the Netherlands (on behalf of the European part of the Kingdom)	C. W. BOETZELAER
For the Government of the Kingdom of Norway..	E. ULSTEIN
For the Government of the Union of Soviet Socialist Republics	A. SOLDATOV
For the Government of the United Kingdom of Great Britain and Northern Ireland	DUNDEE

APPENDIX VI

SUPPLEMENTARY ARRANGEMENTS FOR THE REGULATION OF ANTARCTIC PELAGIC WHALING

The Governments of Japan, the Kingdom of the Netherlands, the Kingdom of Norway, and the United Kingdom of Great Britain and Northern Ireland, having agreed upon the Arrangements for the Regulation of Antarctic Pelagic Whaling signed at London on this day's date (hereinafter referred to as "the Main Arrangements");

Have agreed upon the following Supplementary Arrangements:—

Article 1

For the purposes of the present Supplementary Arrangements

(a) the term "blue whale unit" shall have the meaning given to it in Paragraphs 8 and 18 of the Schedule to the International Convention for the Regulation of Whaling, 1946 (hereinafter referred to as "the Convention");

(b) the term "season" shall mean the season during which the taking of baleen whales is permitted under Paragraph 7(a) of the Schedule to the Convention;

(c) the term "due date" shall mean in relation to any season the date on which 80 per cent of the season shall have elapsed.

Article 2

The present Supplementary Arrangements shall be operative during the period of operation of the Main Arrangements and shall be terminated by the termination of the Main Arrangements.

Article 3

(1) An additional number of blue whale units shall be allowed to the Kingdom of the Netherlands in accordance with the following provisions:

If by the due date in any season the Kingdom of the Netherlands shall have caught

(a) not less than 75 per cent of their quota under the Main Arrangement but

less than 80 per cent of the number of additional blue whale units for that season shall be 45;

(b) not less than 80 per cent but less than 85 per cent of their quota, the number of additional units for that season shall be 60;

(c) not less than 85 per cent of their quota, the number of additional units for that season shall be 70.

(2) The number of additional units, if any, to be allowed to the Kingdom of the Netherlands in respect of each season shall be determined by the Bureau of International Whaling Statistics, and the Bureau shall inform the Contracting Governments of their determination. The Contracting Governments shall furnish the Bureau with such information as the Bureau may require, additional to that required to be provided pursuant to Article VII of the Convention, for the purposes of these provisions.

(3) Any additional units allowed to the Kingdom of the Netherlands under the present Supplementary Arrangements shall not be transferable to any other country.

Article 4

The Governments of Japan, the Kingdom of Norway and the United Kingdom of Great Britain and Northern Ireland shall reduce the catches made by their countries within their permitted quotas under the Main Arrangements by the number of blue whale units allowed to the Kingdom of the Netherlands under Article 3 of the present Supplementary Arrangements. The number of blue whale units to be contributed to the Kingdom of the Netherlands by each of the three Governments mentioned above shall be determined by agreement between the three Governments.

Article 5

The present Supplementary Arrangements shall enter into force on the date on which all the Governments shall have notified their acceptance to the Government of the United Kingdom of Great Britain and Northern Ireland.

In witness whereof the undersigned, being duly authorised thereto by their respective Governments, have signed the present Supplementary Arrangements.

Done at London the 6th day of June, 1962 in the English language in a single copy which shall be deposited in the archives of the Government of the United Kingdom of Great Britain and Northern Ireland. The Government of the United Kingdom shall transmit certified copies thereof to all other signatory Governments.

For the Government of Japan	KATSUMI OHNO
For the Government of the Kingdom of the Netherlands (on behalf of the European part of the Kingdom)	C. W. BOETZELAER
For the Government of the Kingdom of Norway..	E. ULSTEIN
For the Government of the United Kingdom of Great Britain and Northern Ireland	DUNDEE

APPENDIX VII

FIRST INTERIM REPORT OF THE SPECIAL COMMITTEE OF THREE

The Committee met in Rome from 24th April to 5th May, 1961 simultaneously with the Workshop Meeting of the *Ad Hoc* Scientific Committee. The three members elected Dr. Chapman as their Chairman. Having considered its terms of reference, the Committee felt that the objectives laid down for it were so

close to those of the *Ad Hoc* Committee and it would be so dependent on the members of the latter for basic data and for the greater part of the handling of the data, that the closest possible liaison between the members of the two committees would be essential. It accordingly requested that its members take part in the meeting of the *Ad Hoc* Committee as participating observers and they did so. The Committee also met separately on a number of occasions. During these meetings the nature of the problem and the kinds of data likely to be available to resolve it were examined. The Committee concludes that:

(1) The essential types of data for the desired estimates probably have been collected in varying quantities but have not been generally tabulated in a form suitable for a population assessment and there is also need for a much higher degree of collation of them between the various national groups.

(2) To obtain the data in the necessary form standardized tabulations covering all the essential points are required. The Committee has discussed these with the *Ad Hoc* Committee and fully supports the recommendations of that Committee in this respect.

(3) Until these tabulations have been prepared, it will not be possible to assess the amount and reliability of the data now available on a number of points. This applies particularly to the biological data. It will also not be possible until trial analyses have been made to determine whether it will be necessary to obtain additional data beyond that already being collected. Consequently, the essential first step in obtaining the desired assessment is the compilation of the recommended standard tabulations.

(4) If the Special Committee is to report even on a preliminary basis in time for the 1962 meeting of the Commission it will be necessary for the data to be available for a meeting to be held not later than the end of 1961 and it should be in the hands of members for preliminary study at least a month before this. If national groups are likely to experience difficulty in meeting this time table it is recommended that the Commission should consider what special steps are required to enable the work to be expedited.

(5) In general, the Special Committee will not work independently of the *Ad Hoc* Committee since it is members of the latter who are in possession of the basic data and are aware of its biological and practical limitations. Furthermore, it is the *Ad Hoc* Committee which will in the future need to maintain an up-to-date assessment of whale stocks once the techniques have been established. The function of the Special Committee should be to co-operate with the *Ad Hoc* Committee by guiding the preparation of existing data in an appropriate form, recommending what additional data are required, devising appropriate methods of analysis to determine optimum yield and assisting in the preparation of an estimate by these methods and to supply to the Commission an independent opinion as to the nature and reliability of the results.

(6) It is possible that assistance will be needed with the computations involved in the population estimates and hence it may be necessary for the Commission to consider special arrangements for this.

(7) Although the marking data are not fully analysed, it appears that if useful information on population dynamics is to be obtained by this method, operations must be greatly expanded. If this is not practicable, marking operations should be planned to yield maximum information on whale movements and migrations and data on the other aspects should be regarded as secondary.

While the first assessment of the stocks and the catch that can be sustained must deal with numbers of animals, close consideration must be given to assessing the stock levels in units more clearly related to economic needs taking into account both the yield of economically valuable products and the relative cost of production which is obviously related to the catch per unit effort.

Recommendations

(1) That every effort should be made by the Commission to ensure the completion of the standardized tabulations of existing data at the earliest possible date.

(2) That when this process has been completed copies of the data should be circulated to all organizations concerned and that shortly afterwards a further joint meeting of the *Ad Hoc* Committee and the Special Committee should be held. The purpose of this meeting should be to examine the data with special reference to any deficiencies disclosed by trial analysis, and to plan the next stage of the assessment with a view of considering its results at a further meeting prior to the 1962 meeting of the Commission.

(3) That the Commission should consider what financial provision can be made for handling the considerable number of computations which will be necessary to obtain the desired estimates from the collated data.

(4) That the scale of marking operations should be substantially increased so that the results will be more useful for stock assessments but if this is not practicable the marking work should be directed primarily towards obtaining data on movements and migrations.

D. G. CHAPMAN

Rome, 6th May, 1961 — *Chairman, Special Committee of Three*

APPENDIX VIII

MEETING OF THE SPECIAL *AD HOC* SCIENTIFIC COMMITTEE

24th April to 6th May, 1961

I. INTRODUCTION AND SUMMARY

Contents

1. The Committee assembled for its first meeting in Room 327 of the Food and Agriculture Organisation Building, Rome at 11 a.m. on 24th April, 1961. There were present Dr. V. A. Arseniev (U.S.S.R.), Mr. S. G. Brown (U.K.), Dr. R. G. Chittleborough (Australia), Mr. W. H. Dawbin (New Zealand), Mr. T. Doi (Japan), Dr. S. G. Fedorov (U.S.S.R.), Dr. G. L. Kesteven (Australia), Mr. R. Iwashita (Japan), Dr. R. M. Laws (U.K.), Dr. N. A. Mackintosh (U.K.), Dr. H. Omura (Japan), Professor J. T. Ruud (Norway), Professor E. J. Slijper (Netherlands), Mr. R. S. Wimpenny (I.W.C.). In addition there were in attendance Mr. K. R. Allen (New Zealand), Dr. D. G. Chapman (U.S.A.) and Mr. S. J. Holt (F.A.O.) constituting the Special Committee of Three. Mr. I. G. Guerrero (Mexico) arrived and sat as observer on May 2nd. Dr. Mackintosh was elected Chairman.

2. The Committee took as their agenda the five subjects they were instructed to work upon by the Commission's resolution at the Twelfth Meeting. These were:

(i) Review the data available and make a statement on their deficiencies.

(ii) Study the manipulative and analytical methods employed in whale research and propose ways of improvements and standardisation; or if such proposals would appear premature, to indicate, where possible, research work leading to developments of this kind.

(iii) Study the data available on selected problems, making the fullest use of developed methods of population dynamics research, and seek to arrive at conclusions on this data.

(iv) Review the methods at present in use for measurement and calibration of the efforts expended in capturing whales with a view to proposing ways in which these methods might be improved so as to provide more effective and reliable data and if necessary to propose details of a project of research in these matters.

(v) Consider what specific collections and observations could usefully be made as a routine in whaling factories. For example, comprehensive collections of ear plugs for age determination and certain records of whales observed are desirable.

As the Committee's work developed, however, it was found convenient to rearrange the sequences and subjects involved in the way shown in this report.

3. Attention was then turned to the relation of the Committee to the Special Committee of Three. At an early stage in the Joint Meeting the Special Committee expressed the view that their work was directed towards the same ends as those of the *Ad Hoc* Committee, and they asked if they might take full part in the latter's proceedings. The work of the *Ad Hoc* Committee was greatly assisted by advice given by the Special Committee.

4. Certain subjects were dealt with by Sub-Committees as follows:

Review of available data	Kesteven Laws Ruud
Measurement of catching effort	Kesteven Laws Ruud
Age determination	Chittleborough Dawbin Laws Omura Ruud Slijper

Whale marking

Brown
Chittleborough
Dawbin
Omura

5. The results of the work of these Sub-Committees are given in full below (Sections II—V) and the *Ad Hoc* Committee as a whole accepts their general conclusions. These and other matters dealt with by the Committee as a whole can be summarised as follows.

6. *Review of data* The full report below in Section II classifies the data, indicates what is available, distinguishes degree of relevance to problems of stock assessment, intimates in a table the steps required in treatment of raw data, and comments on the reliability of certain data. It is the view of the Committee that a catalogue of data is needed which could conveniently be compiled while certain other tabulations (referred to below under Section VI) are being made.

7. *Sampling problems* Discussions of sampling problems arose at a number of points in the Committee's work. There are two aspects of the sampling problems (a) whether the whales examined for biological data are a fair sample of catch, and (b) to what extent the catch is a fair sample of the stock. Generally the whales examined are a fair sample of the catch of the factory in question, although there is some uncertainty whether they are a fair sample of the whole catch. The relation between the catch and the stock is affected by both technical and biological factors and necessitates breaking down the data into groups comparable from year to year, as indicated in Paragraph 14 below.

8. *Measurement of fishing effort* This is also the subject of a full report in Section III below. It was noted that the Bureau of International Whaling Statistics has a record of the particulars of all ships engaged in whaling. The catch per unit of effort is an index of the abundance of available whales. It is considered that the total catcher-days used hitherto as a rough measure of effort could be improved by a closer estimate of the time spent in hunting whales. It is important, however, to find some means of calibrating the efficiency of the vessels so as to allow for the generally increasing efficiency of units over the years. It is proposed, therefore, to ask if the B.I.W.S. could assist by preparing a catalogue of the particulars of all factories and catchers and such other data as may allow for calculation of the catching time and a measure of the catching efficiency of the vessels based on the technical features and their catches. Examination of meteorological conditions in relation to catch, undertaken on a national basis, may also establish a helpful correlation.

9. *Age determination* Under item (ii) in the Terms of Reference (relating to methods) the Committee dealt first with age determination and a full report is given in Section IV below. There are three methods—by the ovaries, the baleen plates and the ear plugs. It was agreed that the ear plugs offered the most accurate and reliable method and should have priority in field observations. Two main points emerged from the Sub-Committee's work. First, it has been ascertained that there are no important discrepancies in reading the plugs, and that the counts of laminations by different workers can be accepted. Secondly, there is a problem of the absolute time scale which is not yet finally resolved, i.e. whether one or two laminations are laid down each year. There are also possibilities of some variation in the rate of accumulation. As a working hypothesis it is assumed

that there are two per year. Pending further evidence, age data will be presented in terms of the number of laminations as well as the number of years.

10. *Whale marking* The full report is in Section V below. The objects, problems and results of whale marking are reviewed and comments are made on the costs involved. It was agreed that marking should be continued and intensified with a view to better knowledge of the geographical limits of populations and to further evidence on mortality rates. It is considered that marking will need further financial support but specific figures cannot be given until a closer study has been made by the Committee of desirable marking programmes.

11. *Direct observation on whales* Some attention was given to the value of observations from ships, aircraft and shore-based lookouts, and to the significance of whales counted by catchers in relation to the number caught. The Committee decided that this matter merited further consideration.

12. *Method of treatment of data for stock assessments* This refers to item (iii) in the Terms of Reference (study of selected problems, etc.). The subject received considerable attention from the whole *Ad Hoc* Committee and the Special Committee.

13. The assessment of whale stocks, estimation of sustained yields and determination of the measures required to attain and maintain these yields entails the assembly of all the relevant accessible data.

14. The appended forms for age/length and maturity/length keys must be completed in the first place for each sample, season, species, sex, month and area in 10° sectors, the method of age determination being shown. It is hard to judge yet how much time will be required for completing these forms, but the first step in entering the primary forms, which may amount to several thousand, will alone be a very large operation, and more work will be involved in collating and analysing them.

15. *Projects to be undertaken* It will be seen from the above that a number of rather large projects are proposed for attention between meetings of the Committee. To clarify the position they can be listed as follows according to what should be undertaken by separate bodies, with an indication of priorities.

Research Units:

1. Primary tables of age/length and maturity/length keys in the following order of priority: (a) All humpbacks, (b) Post-war fins, (c) Pre-war fins, (d) All blues.
2. Catalogue of quantitative data.
3. Catalogue of other data.
4. Correlation of catch per catcher-day with wind and visibility.

(1—4 are in order of priority).

Bureau of International Whaling Statistics:

1. Length frequencies of total catch.
2. Catalogue of catching material.
3. Extracts from log books for studies of fishing effort.

(1 and 2 above can be done together from I.W.M. cards and take priority over 3).

16. Some research units which have large quantities of data for tabulation will not be able to assemble the required material soon enough without addi-

tional clerical assistance or suspending other activities relating to existing commitments. The Committee, nevertheless, strongly urges that national institutions begin this work immediately and they assume that the attention of the Commission will be drawn at its next meeting to the consequences of this programme so that the Commission may consider such further action as may be necessary.

17. Moreover the further collation of the primary data will entail a substantial amount of work before the next meeting of the Committee. The further treatment needed to prepare the material for use at the next meeting of the Committee includes its transference to punched cards. Enquiries are being made as to how and where this can best be done, and the cost, and it is hoped that some definite information will be ready at the time of the Commission's Meeting.

18. *Next Meeting* The question of one or more further meetings of the *Ad Hoc* Committee will no doubt be considered by the Commission, and it appeared to the Committee that it would be helpful if they took the opportunity, while members from different countries were together, to ascertain the time at which they were likely to be free. They also considered what types of facilities would be needed for their further work, since this will be a factor in the choice of the next meeting place.

19. It was ascertained that, subject to the preparation of the data being far enough advanced, the fortnight beginning December 4th, 1961, would be most convenient to the majority of those concerned.

20. With regard to location, it was agreed that the most important requirement would be the availability of computational equipment. Sufficient information on this point was not available, but there is reason to expect that a recommendation on this matter can be made by the time the *Ad Hoc* Committee meets in June. Another consideration is that the Committee very much hopes that the best possible representation of research workers on the biology of whales will be secured at the next meeting.

II. REVIEW OF AVAILABLE DATA

21. The Committee made a review of the kinds of data available with respect to whale catches, whaling operations and the natural populations of whales. These data, having regard to the operations in the course of which they are recorded and the systems for their collection, may be considered under five headings, as follows:

1. catch, inventory and operational information, furnished regularly to the Bureau of International Whaling Statistics by the whaling companies;
2. data that relate to individual whales resulting from routine biological examination of whales;
3. data that relate to the marking of whales and recovery of the marks;
4. data from observations of whales in their natural habitat (for example, on their schooling behaviour and on their respiratory rhythms) and on whale environment, obtained in the course of whaling operations by means of special research and other vessels, and from aircraft.
5. data that relate to whale anatomy, histology, physiology, ethology, etc., obtained as a result of laboratory examinations.

Some of these data, notably those relating to age, size and sex composition of the catch, and to population characteristics such as growth and reproduction, and those relating to effort, are of direct relevance to stock assessment work; the relevance of other types of data is less clear, but in general terms it may be said that some types of data may prove to be of relevance to some sections of stock assessment work, whilst other types are unlikely to be of relevance.

In reviewing data availability, and especially when considering the adequacy of data, distinction may need to be made between these 'relevance' categories.

22. For the purposes of stock assessment, the basic array of required data comprises the age, size and sex composition of the catch and the effort expended in making the catch. Such data obviously must be assembled separately for each species and, if a species is divided into separate and autonomous stocks, the data should relate to each stock. This obviously applies to data on growth rate and mortality obtained from marking, and to other data relating to population characteristics. Data of secondary relevance comprise information such as on distribution (as one of the determinants of accessibility of the whales), and on behaviour (e.g. schooling, respiratory rhythms etc.), as determinant of vulnerability.

23. Table I indicates the kinds of data required for the purposes of stock assessment, showing the use made of each and indicating by symbols, the mode of collection, following the classification given above.

24. A very considerable volume of biological data, of all kinds, has been accumulated over the past fifty or so years. Within its own terms, the greatest and most nearly complete collection of data is that held by the International Bureau of Whaling Statistics which has, on punched cards with respect to almost every whale caught, data from 1931/32 to 1938/39 and from 1945/46 onwards the following:

Species
Sex
Length
Pregnancy
Foetus
Noon position of factory ship
Date of capture
Season
Expedition by which taken

Supplementary data have been collected as a result of work by national institutions on whales taken in the course of whaling; these relate primarily to gonads, mammary glands, baleen plates and earplugs, and to the diagnosis of age and sexual condition made as a result of examination of these materials. In addition, these institutions have gathered a very considerable volume of information on whales in their natural habitat, their anatomy etc. The sets of information held by these institutions were described by members of the Committee.

25. The National Institute of Oceanography of the United Kingdom has a complete record of marks placed in whales and of marks recovered under the international scheme. Information on numbers and the area of these operations has been published in "Discovery" Reports, Norsk Hvalfangst-tidende, and the Scientific Reports of the Whales Research Institute, Tokyo. Detailed information on recoveries has also been published, showing: data and position of marking, date and position of recovery for each mark recovered, length of whale at recovery, and other data when available.

26. The B.I.W.S. has a complete record of the whaling equipment employed for pelagic whaling. This record shows the following detail:

Factory Ships
Tonnage
Horse power (?)
Year and place of building
Crew

Catchers
Tonnage
Horse power
Year and place of building
Type of engine
Crew

27. The Bureau also has the following record of whaling operations on punched cards for the same seasons for each individual factory ship day:

Factory code number
Season
Date
Noon position
Catch
Production of oil
Number of catcher-days work

28. For each catcher the following data are available (though not on cards):

Gunner
Total catch
Number of catcher-days work

29. There are similar but less complete data for land-based operations.

30. *Adequacy of data* The Committee was not able, at the present meeting to form a definite picture of the quantities of the required data that might be available. Certain types of raw data are available in considerable quantity; thus length measurement of almost every whale has been recorded. Other data are more scant. There is no doubt that considerable analytical work can be done on available data and later in this report the Committee proposes specific actions to assemble and analyse particular sets of information. At the same time it considers that the available data should be catalogued so that a comprehensive view of availability might be formed for use in future work by this Committee. Form A has therefore been drafted, to provide a form in which could be entered a statement of the quantities of data now available, of each of the several desired kinds. This Table could be completed by each country, chiefly in the course of assembling the particular sets referred to later.

31. *Reliability of data* The Committee did not have before it sufficient quantitative information by which to assess the reliability of certain kinds of data such as length measurement. There were some data available regarding the problem of age-determination and the use of marking results. The discussion of these is given in the report of its work in Sections IV and V below where various measures to improve these data are proposed.

32. *Notes on Form A*

Species: to be completed for blue, fin and humpback, sei, sperm.
Areas: to relate to Antarctic stocks, areas I—VI and whales from these stocks taken outside the Antarctic.
Time: for each season for which data are available.
Country: each whaling country to make a record.
Body of form: to show number of whales (Bureau record) caught and number with respect to which the indicated measurements, observations etc. have been made.
Bureau records: (1.1 and 2.1) these contain (at the Bureau)—with respect to each whale:

Species
Sex
Length
Position
Date
Season
Reference number
Pregnancy information
Foetus

Miscellaneous (1.7 to 2.7): indication might be given of records on the following:

1. serology
2. body weights
3. morphometrics
4. diatom film
5. stomach contents
6. mammary glands
7. blubber

Marking: Enter for each country total number of whales effectively marked and total number recovered irrespective of origin.

33. *Other information to be annexed to Form A*

Other Biological Records: notes to be given on records kept of observations on the following matters:

1. sightings--frequency
2. —numbers in schools
3. —direction of movement
4. —respiratory rhythms
5. reactions to catchers and factory ships
6. races (serology or other)
7. special marking experiments

Institutions and Staff engaged in whales research: Name of institution and for each member of staff.

Name:
Status:
Subjects (main interest)
Experienced (how long engaged in whales research)
Publications relating to whales

III. MEASUREMENT OF FISHING EFFORT

34. In the discussion that follows various terms referring to *fishing effort* are used. For clarity it is necessary to make arbitrary definitions of them here, recognising that the results of work yet to be done may require some revision of them. "*Days on ground*" signifies the total number of days spent by an expedition in the general area in which whaling takes place; it is generally calculated as the number of days between (and including) the first and last days in the area. "*Fishing*" (or "*Hunting*") signifies the totality of operations of all vessels of an expedition excluding the factory ship itself; "*fishing effort*" is measured as "*days fishing*" from which is excluded "*days of no catch*"—that is those days on which the expedition record shows that no catch was taken whatever might have been the reasons. "*Fishing*" thus includes "*searching*", "*killing*", "*flagging*" and all operations engaged in by vessels other than the factory ship. *Searching*, obviously, is the operation of looking for whales, whilst *killing* is the operation of pursuing a particular whale, harpooning it, making it fast or flagging it etc. Finally in this report use is made of the term "*catcher-day*" as unit of effort. This corresponds to the "*catchers' days' work*" of the Bureau of International Whaling Statistics except that the Bureau obtains its estimate of this quantity from the record of "*days on ground*" whereas the Committee proposes to use the measure of "*fishing effort*".

35. As noted with regard to available data, the B.I.W.S. has a record of all ships that have engaged in whaling, (both from land-based stations and from floating factories) showing their tonnage and horse-power and showing for each season the number of ships operated by each factory. A measure of effort expended in each season has been obtained by multiplying the total number of ships (excluding the factory ships themselves) by the number of days of the whaling season. The Committee considered that this measure could perhaps be improved upon, both as to the amount of time actually spent in searching for and killing whales, and as to the effectiveness of a day's work.

36. With regard to time spent, members pointed out that the actual fishing time of any catcher could be less than the full number of days of a season because of time lost from:

Weather
Bunkering
Repairs
Days on which killing was stopped
Missions for special purposes
Survey missions.

Loss of time from these causes might be: (1) a constant proportion of each season, or (2) a variable proportion; if the latter, the variation might be random or might show a trend. Loss that was of a constant proportion would not introduce error into calculations based on such data, but variable loss would introduce error of which the significance would depend upon whether it was random or showed a trend. Random variation of a small degree could be neglected and whether random variation of a high degree would be significant would depend on the variability of other statistics. Variation with a trend could not be ignored especially if it were correlated with changes in the abundance of available whales.

37. Of the above causes of loss, the Committee believes that the incidence of loss to special purpose expeditions and, in part, to weather, must be random. Loss of time because of bunkering, weather and stop-catching, might, in the view of the Committee, be found to show a trend to decrease, whereas loss because of repairs and survey expeditions would be found to show a trend to increase. This view is based on the following facts. The catchers have increased in size and changed in design and this enables them to continue in operation longer in adverse weather. Similarly, other whaling equipment has improved to permit operation in bad weather. Again, the introduction of diesel engines has served to reduce bunkering time, but at the same time, diesel engines are not as easily repaired as are steam engines, and the amount of repair time may have increased. The Committee consider that although all these factors, except stop-catching days, might be of so little importance, and, therefore, should be disregarded, nevertheless an examination of data should be made to test their significance.

38. In addition to causing an increase in the proportion of days of a season on which whaling could be carried out, the factors discussed might also have caused an increase in the average number of hours per whaling day in which effective operations were carried out. The Committee considered that an examination should be made of this possibility since, if it were true, it would mean that a day of catching in the early years would represent a smaller amount of whaling than a day in later years.

39. In measuring actual catching effort no attention need be paid to assessing the changes in factory equipment and method which have enabled factories to increase their through-put and hence to reduce the delays they impose on catchers, since these effects would be clearly represented in changes in amount of effective whaling time. They would however have to be considered in any analysis of expedition record as such.

40. The efficiency of catcher operations varies as between catchers at any one time, and from year to year. A major part of this variation is attributable to differences of skill of the gunners; this consists not only of the gunner's skill in hunting and killing, but also of the skill of the other members of the crew--the best gunners get the best crews. Other variations however are attributable to equipment. The increase in size, power and speed of the catchers and certain changes in their design, have made their operations more efficient. Changes

also have taken place in guns, harpoons and ropes that have increased efficiency. Similarly, the introduction of modifications in navigational aids, and of the use of aircraft, has increased searching efficiency. It was also reported that the length of time in killing a whale (from sighting to buoying) had been considerably reduced in recent years. This would mean that each day's work would have represented a progressively greater amount of searching. It is clear from this evidence that a day of work in 1960 therefore cannot be regarded as being the same as a day of work in 1945.

41. Since examination of these matters in comprehensive fashion, for all vessels, all expeditions and land based stations, in all years, would involve a very great amount of work, the Committee gave consideration to alternative approaches to the problem. One suggestion was that the expeditions would be classified and rated according to characteristics of the factory ship, and to characteristics and numbers of catchers and other vessels, and the operational record would simply be the number of days on which the expedition as a whole was engaged in whaling. The Committee considered that a catalogue of all vessels engaged in whaling, year by year, should be prepared and examined with a view to selecting one or more characteristic (e.g. tonnage, horse-power, cruising speed) as index of fishing power. At the same time, an effort should be made to ascertain the number of no-catch days of each expedition, and from the resultant figure of operating days, to obtain a new measure of effort by weighting according to the characteristic chosen as index of fishing power.

42. At the same time, the Committee considered that a pilot exercise in analysis of detailed records of catcher operations, in the sense of the preceding discussion would be advisable, both to appraise the use of the "expedition" approach, and to survey the processing problems of using the catcher as fishing unit, if that should prove to be necessary. Table II indicates the types of information that might have to be considered for this purpose. The Committee understood that the log books of catchers and factory ships contain, in most if not all cases, records from which data of the required kind could be extracted, although the accessibility of these log-books in all cases, is not assured. From its review of the factors that may increase the variance of the measure of effort, the Committee considered that:

(1) bunkering time could be disregarded, as being only a small proportion of the total;

(2) weather has been assessed only subjectively;

(3) repairs, stop-catch and special purpose expeditions could prove to be of important significance.

The Committee recommends that data on the third group of factors should be sought with respect to a selected part of the whaling season over a selected span of years. The Committee suggests that the record of fin whale operations in January in each of the seasons 1955/56 to 1960/61 should be examined for this purpose. This information should be assembled on Form B. If these data could be provided, the Committee could then make an analysis.

43. Again, the Committee considers that a study should be made of the significance of meteorological factors and recommends that data on wind force and visibility taken on selected factory ships should be assembled and an analysis made of the relations between these factors, operations and catches. This study should be made for two or three years.

44. The Committee heard an account of some preliminary work done, with regard to humpback stocks off the Australian coast, in an attempt to estimate sweep-area of searching by catcher boats, and to use data from surface and aerial sightings. The Committee considered that these methods might give

independent indices of abundance and might conceivably lead to direct census of the stocks concerned. At the least this work should give a basis for improving the use of catch-per-unit-effort data throughout the season, for these particular situations.

45. *Action to be taken*

1. The B.I.W.S. should be approached with a view to their preparing a catalogue showing for each year the following details of all factory ships and catchers. For each vessel should be given, where applicable, year and place of building, tonnage, horse-power, cruising speed, type of engine (diesel or steam), average 24 hr. cooker capacity of factory in cubic metres, asdic or whale scaring instruments, manager's name, gunner's name, and size of crews.
2. The B.I.W.S. should be asked to approach the whaling companies with a view to compiling a summary of the information indicated in Form B, in the first place for the seasons 1955/56 to 1960/61. This would enable the *Ad Hoc* Committee to make a pilot study of the significance of the days lost in whaling operations to the evaluation of the unit of effort (catchers—day). The cost of providing this information should be recorded, because the outcome of this pilot study may result in the *Ad Hoc* Committee asking for similar information for the whole period for which such material is available.
3. National research groups should be asked to analyse the possible influence of wind force and visibility on the number of whales taken. This study should be carried out if possible for all expeditions for the three seasons 1958/59, 1959/60, 1960/61.

IV. AGE DETERMINATION

Methods in use

46. *Ovaries* This method can only be used for mature females. The number of corpora lutea and corpora albicantia is correlated with the length of the whale, and gives an estimate of relative age. This is the oldest method of age determination and has been improved in recent years. It has been established that the corpora albicantia persist throughout the life of the whale and the average rate of ovulation changes very little with age. There may, however, have been secular changes in the rate of ovulation as the reproductive rate has changed, but again correlations with other methods indicate that they have probably been small.

47. Concerning the rate of ovulation, two separate lines of evidence have been considered. One is based on the duration and nature of regression of corpura albicantia. From the proportions of regressing corpora an estimate of the annual production can be made. This indicates for fin whales a rate of approximately 1.4 per year, with 0.7 per year as a possible alternative. The other used the evidence for a seasonally monoestrous sexual cycle to estimate the average annual rate of ovulation, as approximately 1.4. If the percentage rates of ovulation in these ovulatory periods are lower than the evidence suggests then a lower rate of ovulation could apply.

48. The few ovaries so far recovered with whale marks are difficult to evaluate but are not incompatible with either 1.4 or 0.7 ovulations per year.

49. It must be emphasised that there is considerable individual variation in ovulation rate, and estimates of individual ages are affected above all by the wide range of ages at puberty. A very close agreement in the ranges of ovulation numbers just after puberty and at the attainment of physical maturity has been

noted. An estimate of absolute age can only be obtained by adding to the estimated post pubertal age, the average number of immature years, determined by other methods (baleen plates or ear plugs). The accuracy of determinations of individual ages is therefore low, but mean ages should be reasonably accurate.

50. *Baleen Plates* This method is applicable only to young whales of both sexes and is complementary to the ovary method. For young whales baleen records may be preferable to ear plug readings, because of difficulty in reading some young ear plugs.

51. The use of baleen plates depends on the tracing of growth periods in the records of baleen plate thicknesses. The growth rates, and, therefore, the width of the growth zones declines with age and increasing wear at the tip limits the number of periods to be found. The possibility has been suggested of extending the method to higher ages by relating the width of baleen plate periods to average growth curves.

52. The suckling baleen is characteristic but there is a possibility that the "double hump" may be open to an alternative interpretation. This may, however, imply a marked discontinuity in the growth rate of baleen which is unlikely. In older animals it is possible that a different interpretation could double the age estimate, but it is difficult to interpret the traces in this way. Differences between the traces of males and females have been noted which are relevant to this problem. There are differences in interpretation by Norwegian and Dutch workers. The Dutch workers believe that the baleen method is inaccurate above 4 years according to their method. The Australian, Japanese and Norwegian workers are using the Norwegian method, and are confident in their interpretation up to 5 years.

53. *Ear plugs* The over-riding advantages of the method using ear plugs is that it is applicable to both sexes and all age groups. Growth layers are present in these structures and if their rate of deposition can be established they provide the most accurate of the methods at present available.

54. It has been assumed as a working hypothesis that 2 laminations are laid down each year and this was based on the nature of the annual cycle and the biannual migrations. There is no evidence that odd or even numbers of laminations pre-dominate in the counts, but it was pointed out that this could be due to subjective factors. The fact that ages estimated from ovaries and baleen plates agreed with the interpretation of ear plug ages on the basis of 2 laminations per year was taken to be strong confirmation of the hypothesis. Age distributions from ear plug and ovary samples are found to be identical, the length of the immature period being fixed by ear plug data.

55. The Committee took the opportunity to confirm that methods of counting ear plug laminations by different research groups gave comparable results. A number of ear plugs were available for examination and workers satisfied themselves that their results were in close agreement. It was pointed out that there are differences in ear plug pattern between the sexes and these may be related to the sexual cycle.

56. They cannot, however, overlook the fact that 5 ear plugs from marked fin whales which had been at large for periods up to 25 years indicate that the annual rate of deposition is less than 2 and nearer to 1. Conversely, a single humpback whale probably marked as a yearling and recovered five years later had 12 laminations indicating the deposition of 2 per year.

57. In view of the conflicting evidence even from marked whales, the Committee found difficulty in resolving this question, but it was pointed out that

further recoveries of marks together with ear plug data can be expected in the near future from the 1960/61 season. It was agreed that a final decision should be deferred until these new results were available.

58. It was pointed out that the seasonal formation of ear plug laminations could be timed and established in the Antarctic by reference to the extent of diatom film, and off Australia by reference to the new crop of young barnacles. Comparison of Antarctic and Australian humpbacks, with this in mind should be valuable.

Conclusions

59. The Committee agree that ear plugs offer by far the most accurate method of age determination and recommend that ear plug collection should have priority over other methods. Ovary and baleen plate collections should not be discontinued until the uncertainty over the rate of deposition of ear plug laminae has been eliminated. In addition, ovary collections are necessary to provide information on reproductive rates, and no method should be discontinued if this means reducing the size of samples for age determination of the catch. All three types of material should be collected from marked whales.

60. The Committee discussed the implications of acceptance of the hypothesis of 1 lamination a year as opposed to 2. They concluded that there were four possibilities:

(a) one lamination per year

(b) two laminations per year

(c) two laminations per year until maturity, thereafter one lamination per year

(d) variation in individuals from year to year.

61. Possibility (c) was thought to be unlikely and there was no evidence concerning (d).

62. The effect of (a) and (b) above on estimates at the age at puberty and the longevity of fin whales are as follows:

(a) 1 lamination per year. Puberty range 6 to 16 years, mean 10 years; longevity up to 100 years;

(b) 2 laminations per year. Puberty range 3 to 8 years, mean 5 years; longevity up to 50 years.

63. Estimates of instantaneous mortality rates would differ by a factor of 2 but estimates of total immature mortality rates and of the rates of fishing to total mortality exploitation rate would be unchanged.

64. Evidence relating to the adult sexual cycle is independent of age criteria. The gestation period is one year, lactation lasts under a year, and the resting state a few months in the great majority of cases. Calculations of the percentage pregnant and from this of the recruitment are not affected.

65. In view of the present uncertainty about the rate of deposition of ear plug laminations, all data should be presented as number of laminations as well as years.

V. WHALE MARKING

66. *Main objects of the marking programme in the southern hemisphere to date*

To provide information on:

1. Migration and movements
2. Age and growth
3. Estimation of mortality rates and population size.

67. *Approximate totals of different species marked in the southern hemisphere*
Table III summarises the data available but does not include numbers or whales marked by the U.S.S.R. expedition or the recoveries of these marks.

68. *Results obtained to date*

1. Migration and movements.
   (a) Blue and fin—in relation to movements on the Antarctic feeding grounds, the existence of relatively homogenous groups has been demonstrated but these do not all coincide with the six Antarctic whaling areas (e.g. there is a group of fin whales straddling the boundary between Areas II and III) and there is evidence of intermingling between the groups. Seven marks have been obtained establishing migrations between the Antarctic and warmer waters in north and south directions.
   (b) Humpback—a considerable amount of information establishing the connection between sub-tropical feeding and Antarctic feeding areas has accumulated and shows a high degree of segregation of at least six breeding populations. The degree of interchange of marked animals shows that there may be more than two breeding populations in the South Pacific, and that there is more intermingling in Antarctic waters than in temperate and subtemperate waters.
2. Age and growth.
   There is an increasing body of information on longevity with recoveries so far up to 26 years after marking. Since it has not proved practicable in the Antarctic to mark animals of known ages (e.g. calves or yearlings), nor to estimate accurately the size of a whale at the time of marking, the results obtained have not given definite information on growth rate and they restrict the age estimates to a minimal age. However, the much greater scale of collections of ear-plugs now being made in the Antarctic provide increased opportunities of checking the validity of age criteria. For humpbacks there has been a little material from animals marked in temperate waters giving information on age, growth and maturity.
3. Estimation of mortality rates and population size.
   Estimation of the population size has not been achieved because of a number of difficulties of which the most important are:
   (a) the small and variable numbers of recoveries in the annual catch
   (b) the difficulties in delineating the geographic limits of populations (see section 1 above).
   (c) the technical difficulties of both marking and recovery. Included under this heading are the difficulties of knowing the number of whales in which marks remain permanently embedded, and the percentages of marks entering each factory ship and shore station which are recovered from the carcasses or from cookers and other apparatus. The only experiments providing information of this type have been confined to some Norwegian and Japanese pelagic expeditions which suggested that from all the marked whales captured about 75 per cent were recovered of which one-third were taken in the cookers. This work should be extended.

Because of the above deficiencies it has not been possible to estimate the population size from mark recoveries.

These difficulties are also drawbacks in the use of mark recoveries to estimate the total mortality rate but nevertheless it may be possible to make such an estimate when a reliable measure of effort has been determined. Such estimates will be important to confirm or deny the estimates obtained by other methods and based on other assumptions.

4. Ancillary results.

In addition to the above three main objectives, a small amount of information has been obtained upon breeding rate and speed of individual movements.

69. *Future of marking:*

1. Migration and movement.

Accurate delineation of the geographic limits of populations is of very considerable importance to effective population assessments. For example, in fin whales, until there is a more accurate measurement of the degree of interchange between different populations, the effect of intensive fishing in one area upon the population in adjacent areas cannot be specified.

In the case of humpbacks, whaling can occur throughout the migration route e.g. those caught between 130°E and 160°W longitude are fished at the following latitudes: 70°—55°S, 41°S, 35°S, 29°S, 27°S, 22°S. It is therefore important to have an accurate measure of the interchange of humpbacks between all these localities in order to assess the effect of whaling in one locality upon the stocks of the other localities.

The marking technique is the best means of attacking this problem and the Committee considers that the results for this purpose alone justify continuation of marking; it considers however that the marking operations should be intensified for this purpose, and carried out over the widest possible geographic range, especially in warmer waters.

Whale marks can be recovered only from localities in which whaling takes place. Therefore areas in which there is at present no whaling, such as some of the breeding grounds, can be related only to the present catching grounds by marking programmes carried out in these non-whaling areas. For this purpose the Committee strongly recommend that marking in regions away from the catching areas should be greatly increased. This would reduce the numbers of short-term marks recovered from the area of marking; such marks do not provide any information on the geographic limits of the population.

The figures in Table III show that in post-war years sperm and sei whales have become much more important in the catch but very few have been marked. The Committee recommend that increased marking of these two species should be carried out.

2. Age and growth.

In carrying out the above recommendations, efforts should be made wherever possible to mark small individuals whose ages at the time of marking will be known more precisely when captured. The possibility of some devices being found for measuring whales in the water should be kept in view.

3. Estimation of the population size and mortality rates.

For marking to provide an accurate population estimate a great deal more research will be necessary on:

(a) the relation of marked animals, the catch and the stock;

(b) the exact number of whales which are permanently marked in any programme;

(c) the proportion of marks recovered from captured marked whales;

(d) mortality due to marking (and if necessary the development of a more efficient mark);

(e) the geographical limits of each population in relation to the problem set out in 1 above.

70. In order to clarify migrations and movements the widest possible spread of marking is necessary. On the other hand, for the estimation of fishing mortality concentrated marking in a limited area may be required as an additional programme.

71. The costs of marking vary in different localities. They are highest in Antarctic waters where large ocean-going vessels capable of operating on the high seas are essential, e.g. the "Enern" expedition which marked about 150 whales immediately before the 1953/54 season cost approximately £15,000, i.e. about £100 per marked whale. Costs are less if whale catchers do some marking while scouting prior to the opening of the whaling season. In more temperate waters costs can be reduced by chartering vessels from ports closest to the marking locality. Conditions are so different for regions adjacent to the various southern hemisphere land masses that the Committee cannot give even an average estimate of costs for operations in these waters. Marking of humpbacks in coastal regions can be carried out more cheaply, e.g. the average cost per whale marked off Australia, New Zealand, and the South West Pacific is £5 to £20 per whale.

72. Expansion of the marking programme will undoubtedly require greater financial support. The Committee proposes to make a more precise formulation of desirable national and international marking operations from which it would be able to advise the Commission on the additional funds that would be required.

VI. METHODS OF TREATMENT OF DATA FOR STOCK ASSESSMENT

73. To assess whale stocks, to predict sustained yields, and to determine the measures required to attain and maintain these yields, it is necessary to estimate the rates of natural and fishing mortality and the relation between the size of the mature stock and subsequent recruitment. Data for estimating these factors are the age compositions of the catches in successive years and the fishing effort exerted to take these catches. The fishing effort should be measured in such a way that the changes in catch per unit-effort of a particular category (e.g. a particular age group) are proportional to changes in the numbers of whales of that category which are available to the fishery.

74. Lengths of all whales caught are recorded but the ages of only a proportion of these, and not necessarily a representative sample, have been determined. From these samples, however, it is possible to draw up "age-length keys" which may be used to estimate the age composition of the entire catch from its length composition. For this purpose it is necessary to assemble data for all age determinations, for which purpose Form C has been drawn up. Similarly for the estimation of the size of the mature stock and its reproductive rate it is

proposed to draw up "maturity and pregnancy length keys" according to the form of Form D. The keys of Form C and D will then need to be suitably summarized and applied to catch length frequencies tabulated by the Bureau of International Whaling Statistics according to the form shown in Form E1.

75. Effort data available in the Bureau records will be analysed to eliminate, in so far as this is possible, trends in efficiency and standard units of effort derived. The effort in these standardized units will be summarized in Form E2 and used for the computation of age compositions on a catch per unit effort basis. From the latter can be derived estimates of total mortality rates in each year. Further, if changes in total mortality rates can be related to changes in effort the components of fishing mortality and natural mortality can be separately estimated.

76. Such estimates as are obtained should be compared with estimates of the same factors obtained from marking experiments.

77. The tables of maturity and pregnancy by age will, together with mortality estimates, serve for the analysis of the relation between stock and recruitment, since it will be possible to compare for each year a measure of the total number of mature females with a similar measure of recruitment the appropriate numbers of years later. The pregnancy data can be used to estimate the influence of reproductive rate on any changes in the recruitment relationship. Finally sustained yields will be calculated for a range of fishing effort, with special attention to the determination of a maximum sustainable yield.

On behalf of the Special *Ad Hoc* Scientific Committee,

N. A. MACKINTOSH

Rome, 6th May, 1962 *Chairman*

TABLE I

Dynamic Feature	*Structural Feature*	*Working Table*	*Intermediate Tables*	*Raw Data**
Mortality Index of recruitment	Age-composition	Age frequency per unit effort	Age-length keys Length-frequency C/E Tables Total effort tables	Age reading (2) Length measurements (1) Catch (1) Effort (1)
Mortality		Return per unit effort, experiment area and time period since liberation		Lists of marks (3) and returns effort (1)
Fishing Mortality	Population size	Ratio of catches to sightings		Sightings (4) Catches (1)
Growth rate		Age length key		Age-reading (2) Length measurements (2) Marking (3)
Reproduction potential and rate	Sex composition Maturity composition	Maturity, Pregnancy frequency per unit effort	Maturity, pregnancy length keys	Effort (1) Maturity (2) Pregnancy (2) Length measurements (2)
Mixing	Stock segregation	Return by experiment by time periods since marking per unit effort		Marking (3) Effort (1) Serological data (1) and (5)

*The figures in brackets in the column "Raw Data" refer to the five headings in paragraph 2

TABLE II

Level	*Characteristics*	*Operating Record*	*Influencing Factors*	*Effort*	*Remarks*
I. Industry (Whaling fleets)	Factories Pelagic Land-based Number of vessels operating: factories catchers buoy-boats scouting-boats aircraft	Operating time of: factories catchers buoy-boats scouting-boats aircraft Whales handled Production	Economic Regulations seasons sanctuaries	Total fishing effort in HP hours Total used capacity	This is the record of the entire industry, represents the sum of records at Level II.
II. Enterprise (Expedition)	Type (pelagic, land-based) Number of catchers buoy-boats scouting-boats aircraft Processing capacity	Time catching buoy-work scouting flying processing Whales handled Production	Whale distribution	Total fishing effort in HP hours Total used capacity	This is the record of separate expeditions, and represents the sum of records at Level III. of the individual vessels of the expedition.

TABLE II (*Continued*)

Level	*Characteristics*	*Operating Record*	*Influencing Factors*	*Effort*	*Remarks*
III. A Fishing Unit (catcher)	Vessel: tonnage horse-power engine-type speed Navigational aids Radar Gun, harpoon Gunner (name or code) Crew	Days on grounds Days fishing Hours fishing Time lost, in days and hours to: weather bunkering repairs buoy, tug-boat duty stop-catching special-purpose mission survey-mission Days (hours) on buoy-work scouting	Biological species preference size selection spatial and temporal distribution Meteorological Economic Technological (mechanical, factory etc.)	HP hours	This is the record of individual vessels.
III.B Processing unit (factory)	Type (pelagic, land-based) Tonnage Processing capacity	Processing time Whales handled Production	Tankering Meat transport Weather 33-hour regulation Whale distribution	Total used capacity	These records should be assembled for the operations on sperm, fin, fin and blue, humpback separately.

TABLE III

Available data on catches of whales, numbers of whales marked and numbers recovered in the Antarctic and at Southern Hemisphere land stations in the two periods 1932/33—1938/39 *and* 1945/46—1958/59

	1932/33—1938/39								1945/46—1958/59					
	Catch	Number Marked	As % of catch	Number returned: in same season	Number returned: in later seasons to 38/39	Returns to 38/39 as % of marked	Returns since 1938/39	Total returns as % of marked	Catch	Number marked	As % of catch	Number returned: in same season	Number returned: in later seasons	Total returns as % of marked
Blue	114,687	694	0·6	22	15	5·3	9	6·6	61,861	217	0·4	24	16	18·4
Fin	103,008	3,700	3·6	43	75	3·2	149	7·2	325,516	1,029	0·3	69	75	14·0
Humpback	26,237	570	2·2	5	31	6·3	2	6·7	34,683	2,342	6·8	18	75	4·0
Sei	1,750	20	1·1	—	—	—	—	—	18,561	7	0·04	—	1	14·3
Sperm	17,235	35	0·2	—	—	—	—	—	106,354	40	0·04	2	—	5·0

This table includes returns up to and including the 1958/59 Antarctic season and the 1959 winter season, except those relating to the U.S.S.R. scheme.

N.B. The percentage returns of the different species in post-war seasons are not strictly comparable. The "exposure years" for each species are not in proportion to the actual numbers marked.

International Whaling Commission, Ad Hoc Committee Special Meeting April 24th to May 6th, 1961—Form A

(Country—where applicable) (Species) Area

CATEGORY															
1. FEMALES															
1.1 Bureau record Caught															
" " worked up															
1.2 Ovaries															
1.2.1 Weights															
1.2.2 Counts															
1.2.3 Classification															
1.3 Physical maturity															
1.4 Sexual maturity															
1.5 Earplugs															
1.5.1 Collected															
1.5.2 Read															
1.6 Baleen plates															
1.6.1 Collected															
1.6.2 Read															
1.7 Miscellaneous															

(Country—where applicable) (Species) Area

CATEGORY															
2. MALES															
2.1 Bureau record Caught															
,, ,, worked up															
2.2 Testes weight															
2.3 Physical maturity															
2.4 Sexual maturity															
2.5 Earplugs															
2.5.1 Collected															
2.5.2 Read															
2.6 Baleen plates															
2.6.1 Collected															
2.6.2 Read															
2.7 Miscellaneous															
3. MARKING															
3.1 Marked															
3.2 Recovered															

FORM B

Year *Sector*

Expedition	Days on Ground	Number of Catchers	g1 Gross Catcher-days work	Repairs	Lost Hours		g2 Effective Operating Time	Number of No-catch Days	g3 Operating Days
					Stop-Catch	Special missions			

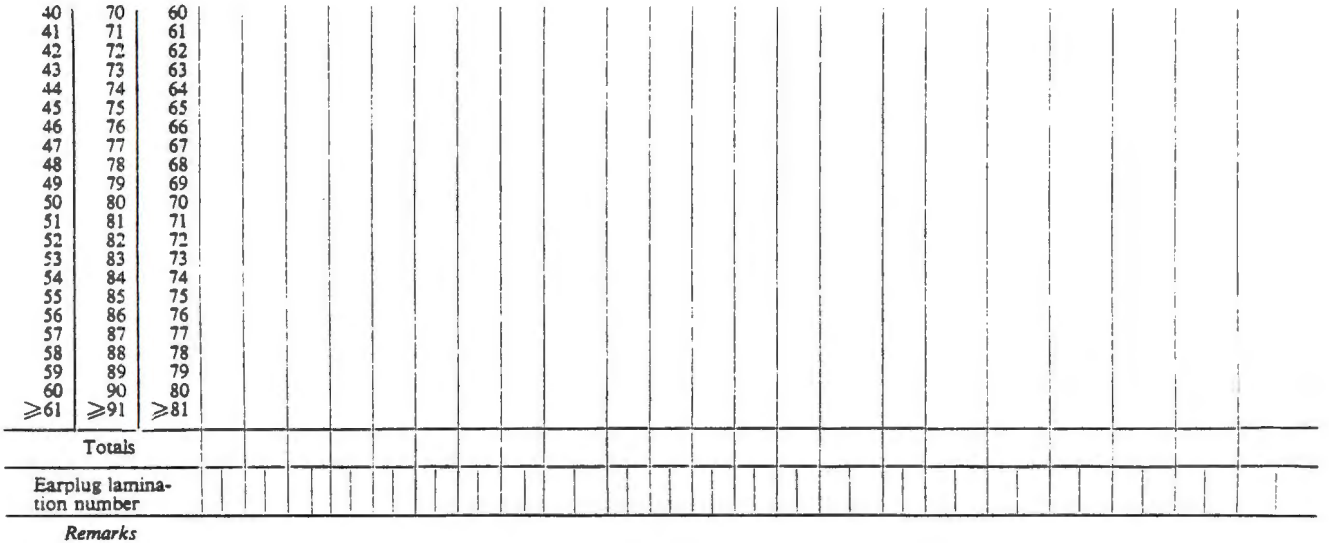
International Whaling Commission, Ad Hoc Committee Special Meeting April 24th to May 6th, 1961—Form C

Form C *Age-length key* (Lengths are commercial measurements unless otherwise specified) | Serial No. | Date table completed: By:

Species	Sex	10° Sector	Year/season	Month	Country	Expeditions	Methods of age determination

Note Specify assumptions made concerning age-readings. For ear-plugs enter separately in each column the frequency of whales with even and odd numbers of laminations (assume two laminations per year). For ovary counts divide number of ovulations by stated factor (ovulation rate); for Antarctic data (fin and humpback) add 4½ years and for tropical data (humpback) add 5 years; for age-group number ignore decimal.

Year Class																						Total
Age Group			0	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX+	
Length (ft.)			Actual Numbers Of Whales Examined																				
Hump	Blue	Fin																					
⩽24	⩽54	⩽44																					
25	55	45																					
26	56	46																					
27	57	47																					
28	58	48																					
29	59	49																					
30	60	50																					
31	61	51																					
32	62	52																					
33	63	53																					
34	64	54																					
35	65	55																					
36	66	56																					
37	67	57																					
38	68	58																					
39	69	59																					


40 70 60
41 71 61
42 72 62
43 73 63
44 74 64
45 75 65
46 76 66
47 77 67
48 78 68
49 79 69
50 80 70
51 81 71
52 82 72
53 83 73
54 84 74
55 85 75
56 86 76
57 87 77
58 88 78
59 89 79
60 90 80
≥61 ≥91 ≥81
Totals
Earplug lamination number
Remarks

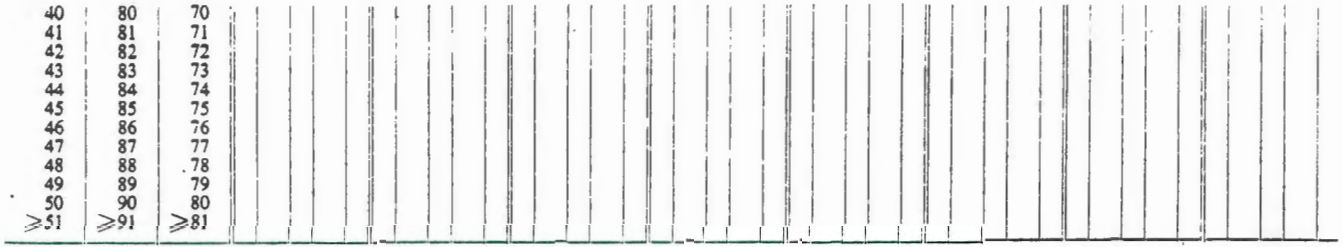
Form D	Sexual maturity and pregnancy-length key (Lengths are commercial measurements unless otherwise specified)	Serial No.	Date table completed: By:

Species	Females	10° Sector	Year/Season	All Months	Country	Expeditions	

Note I=Immature M=Mature P=Pregnant NP=Mature but not pregnant

Month																																										All Months				
			I	M			M + I	I	M			M + I	I	M			M + I	I	M			M + I	I	M			M + I	I	M			M + I	I	M			M + I	I	M			M + I	I	M			M + I
				NP	P	P + NP			NP	P	P + NP			NP	P	P + NP			NP	P	P + NP			NP	P	P + NP			NP	P	P + NP			NP	P	P + NP			NP	P	P + NP			NP	P	P + NP	
Length (ft.)																																															
Hump	Blue	Fin																																													
≤24	≤64	≤54																																													
25	65	55																																													
26	66	56																																														
27	67	57																																														
28	68	58																																														
29	69	59																																														
30	70	60																																														
31	71	61																																														
32	72	62																																														
33	73	63																																														
34	74	64																																														
35	75	65																																														
36	76	66																																														
37	77	67																																														
38	78	68																																														
39	79	69																																														

40	80	70
41	81	71
42	82	72
43	83	73
44	84	74
45	85	75
46	86	76
47	87	77
48	88	78
49	89	79
50	90	80
⩾51	⩾91	⩾81



Totals

Remarks

Form E1	Length Frequency of Catch (Bureau records)					Serial No.	Date table completed: By:
Species	Each sex	10° Square	Year/Season	All Months	Pelagic or Shore Station	Expeditions (see table 6B below)	

			Raw Data			Computation Of:		
Sex			Males	Females	Both Sexes			
Month			All	All	All			
Length (ft.)			Actual Number Of Whales Caught					
Blue	Fin	Hump						
≤54	≤44	≤24						
55	45	25						
56	46	26						
57	47	27						
58	48	28						
59	49	29						
60	50	30						
61	51	31						
62	52	32						
63	53	33						
64	54	34						
65	55	35						
66	56	36						
67	57	37						
68	58	38						
69	59	39						
70	60	40						
71	61	41						
72	62	42						
73	63	43						
74	64	44						
75	65	45						
76	66	46						
77	67	47						
78	68	48						
79	69	49						
80	70	50						
81	71	51						

82	72	52
83	73	53
84	74	54
85	75	55
86	76	56
87	77	57
88	78	58
89	79	59
90	80	60
⩾91	⩾81	⩾61
Total		

Form E2	Nominal effort expended		RAW DATA		COMPUTATION	
Expedition	No. of Catchers	Catch in each month	Days in Square in each month	Gross Catcher days	Gross catcher days, excluding days of zero catch	Catch per unit effort
Totals						

International Whaling Commission, Ad Hoc Scientific Committee—Form F

Form F Daily catches, visibility and wind (logbook records).

Species: All	Year/Season	Country	Expedition	Number of catchers	Sheet No.

Note: 1. Give noon wind force in Beaufort Scale.

2. Record noon visibility as: Good—A, Moderate—B, Poor—C.

(If observations made other than at noon, indicate time)

Date	Wind (1)	Visibility (2)	Number of whales taken						Computation	Computation	Computation	Computation	Date	Wind (1)	Visibility (2)	Number of whales taken						Computation	Computation	Computation	Computation	Date	Wind (1)	Visibility (2)	Number of whales taken						Computation	Computation	Computation	Computation
			Blue	Fin	Humpback	Sei	Sperm	Total								Blue	Fin	Humpback	Sei	Sperm	Total								Blue	Fin	Humpback	Sei	Sperm	Total				

Complete, and send airmail, to reach as soon as possible—and in any case not later than 1st September
—Dr. G. L. Kesteven, C.S.I.R.O., Division,
Fisheries and Oceanography, Cronulla, New South Wales, Australia.

International Whaling Commission Ad Hoc Scientific Committee Form G

Form G1 Data for Antarctic marking and recoveries by season and area (Areas I-IV)

Species		Season											Source of data						
Whales marked		Recaptured whales from which marks recovered (seasons after marking)																	
in Area	No.	from Area	0	1	2	3	4	5	6	7	8								
I		I																	
		II																	
		III																	
		IV																	
		V																	
		VI																	
II		I																	
		II																	
		III																	
		IV																	
		V																	
		VI																	
III		I																	
		II																	
		III																	
		IV																	
		V																	
		VI																	
IV		I																	
		II																	
		III																	
		IV																	
		V																	
		VI																	

International Whaling Commission Ad Hoc Scientific Committee Form G

Form G2 Data for Antarctic marking and recoveries by season and area (Areas V–VI and summaries)

Species		Season									Source of data							
Whales marked		Recaptured whales from which marks recovered (seasons after marking)																
In Area	No.	From Area	0	1	2	3	4	5	6	7	8							
V		I																
		II																
		III																
		IV																
		V																
		VI																
VI		I																
		II																
		III																
		IV																
		V																
		VI																
Summaries																		

APPENDIX IX

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MAY, 1962

I. ORDINARY BUDGET

Previous Year £ s. d.	EXPENDITURE	£	£ s. d.	*Previous Year* £ s. d.	INCOME	£ s. d.
	Secretary's remuneration:				Contributions for 1961/62 from 17 Contracting	
	Fees	550		4,250 0 0	Governments at £250 each	4,250 0 0
	Allowance in lieu of travelling expenses	200				
700 0 0			750 0 0			
	Administrative, clerical and typing staff provided by the Ministry of Agriculture, Fisheries and Food and overhead expenses of the					
1,100 0 0	Ministry		1,100 0 0			
150 0 0	Rent of Secretary's Office		150 0 0			
333 16 1	Stationery, printing and postage		376 12 10			
794 10 5	Cost of Meetings		974 10 0			
	Whale marking: Contribution to National Institute of Oceanography		500 0 0			
960 16 6	Cost of special scientific investigation ..		— — —			
	Balance, being excess of income over expendi-					
210 17 0	ture, transferred to Balance Sheet		398 17 2			
£4,250 0 0			£4,250 0 0	£4,250 0 0		£4,250 0 0

II. EXTRA-ORDINARY BUDGET

Previous Year £ s. d.	EXPENDITURE	£ s. d.	*Previous Year* £ s. d.	INCOME	£ s. d.
— — —	Travelling and subsistence expenditure ..	281 13 9	— — —	Provisional contribution from Japan	2,227 10 0
— — —	Printing of revised data forms C and D ..	12 17 0			
— — —	*Transport of data forms (air freight)*	149 5 2			
	Balance, being excess of income over expendi-				
— — —	ture, transferred to Balance Sheet	1,783 14 1			
£ — — —		£2,227 10 0	£ — — —		£2,227 10 0

BALANCE SHEET, 31st MAY, 1962

Previous Year £ s. d.	LIABILITIES	£ s. d.	£ s. d.
	Ministry of Agriculture, Fisheries and Food	1,323 13 2	
1.802 3 1	Others	125 8 7	1,449 1 9
	Income and Expenditure Account:		
	Balance 1st June, 1961	1,037 14 7	
	Add Balance transferred 31st May, 1962: I Ordinary Budget ..	398 17 2	1,436 11 9
1,037 14 7	II Extra-ordinary Budget		1,783 14 1
£2,839 17 8			£4,669 7 7

Previous Year £ s. d.	ASSETS	£ s. d.	£ s. d.
2,245 19 9	Cash at Paymaster General ..	3,557 5 5	
148 4 10	*Less* Payable Order outstanding at 31st May, 1962	131 3 0	3,426 2 5
2,097 14 11	Outstanding contributions:		
	Mexico 1961/62 (balance) ..	1 2 5	
	Argentina 1960/61 and 1961/62	500 0 0	
742 2 9	Brazil 1961/62	250 0 0	
	Panama 1960/61 (balance) and 1961/62	492 2 9	1,243 5 2
£2,839 17 8			£4,669 7 7

Note: The Commission's liability in respect of National Health and Graduated Pensions contributions of the Secretary to the Commission for the year ended 31st May, 1962 has been determined at £34 1s. 2d. which will be charged to the 1962/63 Income and Expenditure Account.

(*Signed*) R. S. WIMPENNY *Secretary*
International Whaling Commission

23*rd August*, 1962.

I have examined the above Account and Balance Sheet. I have obtained all the information and explanations that I have required, and I certify, as the result of my audit, that in my opinion the above Account and Balance Sheet are correct.

Exchequer and Audit Department
13*th September*, 1962

(Signed) E. G. COMPTON
Comptroller and Auditor General

APPENDIX X

SUMMARY OF INFRACTIONS

(The following details of infractions reported for the 1961/62 season (Antarctic) and 1961 season (Outside the Antarctic) should be regarded as an addition to the summary constituting Appendix VI to the Commission's Eighth Report, Appendix VIII of the Tenth Report, Appendix VII of the Eleventh Report and Appendix VII of the Twelfth Report.)

YEAR	Antarctic Season (Including South Georgia)						YEAR	Outside Antarctic				
	Whales taken	Undersized whales		Lactating whales	Whales lost	Whales remaining in sea over 33 hours		Whales taken	Undersized whales		Lactating whales	Whales lost
		No.	%						No.	%		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						BLUE WHALES						
1961/62	1,118	34	3·04	1	2	—	1961	101	—	—	—	—
						FIN WHALES						
1961/62	27,099	322	1·18	34	64	39	1961	2,846	37	1·30	5	13
						OTHER BALEEN WHALES						
1961/62	5,505	4	0·07	7	34	—	1961	3,731	44	1·18	1	24
						SPERM WHALES						
1961/62	4,950	44	0·88	—	15	5	1961	9,500	97	1·02	—	37

APPENDIX XI

List of Reports received by the Commission during the year ended 31st May, 1962 (arranged under countries or organisations alphabetically with date of receipt in brackets).

Food and Agriculture Organisation of the United Nations

The State of Food and Agriculture, 1961. (21st August, 1961).

World Fisheries Abstracts; January–February 1961, Vol. 12, No. 1 (11th September, 1961); March–April 1961, Vol. 12, No. 2 (11th September, 1961); May–June 1961, Vol. 12, No. 3 (30th October, 1961).

A list of experts concerned with the study of Algae. Prepared by Fisheries, Biology Branch, F.A.O. Rome, May, 1961 (24th July, 1961).

Current Bibliography for Aquatic Sciences and Fisheries. Indexes to Supplement I prepared by Biology Branch, Fisheries Division. (2nd October, 1961). Bulletin No. 13 1961 (30th October, 1961).

Recent trends in fisheries, 1960–61 by F.A.O. Fisheries Division, Rome. (11th December, 1961).

Yearbook of Fishery Statistics 1960 Vol. XII (17th January, 1962).

Current Bibliography for Aquatic Sciences and Fisheries. Taxonomic Classification Alphabetic Key to 8 Digit Code prepared by F.A.O. Fisheries Division, Biology Branch, Rome, December, 1961. (28th May, 1962).

Indo-Pacific Fisheries Council

Proceedings 9th Session, Karachi, Pakistan 6th-23rd January, 1961. Section I. I.P.F.C. Secretariat, F.A.O. Regional Office for Asia and the Far East, Bangkok 1961. (11th December, 1961).

International Commission for the North-West Atlantic Fisheries

Statistical Bulletin. Vol. 9 for the year 1959. Issued from the Headquarters of the Commission, Halifax, N.S., Canada 1961. (14th March, 1962).

Newsletter No. 39 June–September, 1961. (30th October, 1961).

Annual Proceedings. Vol. 11 for the year 1960-61. Issued from the Headquarters of the Commission, Halifax, N.S., Canada 1961. (30th April, 1962).

International Council for the Exploration of the Sea

Report of the 49th Meeting of the Council, 1961. (2nd April, 1962).

International North Pacific Fisheries Commission

Statistical Yearbook 1960 compiled H. Kasahara and L. M. Kissack, Vancouver, Canada. (23rd October, 1961).

Bulletin No. 4 (24th January, 1962); Bulletin No. 5 (24th January, 1962); Bulletin No. 6 (28th May, 1962).

Annual Report for the year 1960, Vancouver, Canada, 1961. (11th April, 1962).

International Union for Conservation of Nature and Natural Resources

Bulletin New Series No. 1 August, 1961. (28th August, 1961).

Annual Report 1961. (27th April, 1962).

National Institute of Oceanography

Discovery Reports, Vol. XXXI, pp. 327–486, plates IV–VII. Reproduction,

growth and age of Southern Fin Whales by R. M. Laws. Cambridge University Press 1961. (7th November, 1961).

Discovery Reports, Vol. XXXII, pp. 1–32, plates I–II. *Salpa Rusiformis* Cuvier and related species, by P. Foxton. Cambridge University Press, 1961. (5th October, 1961).

Discovery Reports, Vol. XXXIII, pp. 1054. The movements of Fin and Blue Whales within the Antarctic zone by S. G. Brown. Cambridge University Press, 1962. (3rd April, 1962).

Collected Reprints, Vol. 9. December 1961. (25th April, 1962).

National Oceanographic Council

Annual Report 1960–61. Cambridge University Press. (24th January, 1962).

North Pacific Fur Seal Commission

Proceedings of the Fourth Annual Meeting January 30th–February 4th, 1961, Tokyo, Japan. Issued from the Headquarters of the Commission, Washington, D.C. January, 1962. (4th May, 1962).

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission; Report on the First Session of the Commission, Paris 19th–27th October, 1961. (12th February, 1962).

Canada

The Canadian Fish Culturist. Issue Twenty-Nine. November, 1961. Published at Ottawa by the Department of Fisheries of Canada. (20th March,1962).

Fisheries Research Board of Canada, Arctic Unit, Montreal, Quebec; Circular No. 7 Whales and Dolphins of the Canadian East Coast, by D. E. Sergeant. November, 1961. (31st January, 1962).

Trade News January, 1962 (19th March, 1962); February, 1962 (11th April, 1962); March, 1962 (4th May, 1962); April, 1962 (4th June, 1962); Published monthly by the Department of Fisheries of Canada.

Chile

Revista de Biologia Marina. Publicada Por la Estacion de Biologia Matina de la Universidad de Chile. Valparaiso, Septiembre de 1960 (5th July, 1961).

Japan

Monthly Statistics of Japan No. 2 August, 1961 (9th November, 1961); No. 4 October, 1961 (4th January, 1962); No. 5 November, 1961 (4th January, 1962); No. 6 December, 1961 (5th March, 1962); Prepared jointly by the Bureau of Statistics, Office of the Prime Minister, and the Statistical Standards Bureau, Administrative Management Agency.

Netherlands

Proceedings of the 69th Meeting of the Netherlands' Association of Anatomists, held at the Department of Anatomy and Embryology of the University of Amsterdam, December 17th, 1960. Reprinted from Acta Morphologica Neerlando-Scandinavica, Vol. IV, No. 1 (5th February, 1962).

Die Entwicklungsgeschichte der Haut des Finnwals, *Balaenoptera physalus* (*L*) von C. Naaktgeboren. Sonderdruck aus "Zoologischer Anzeiger" Bd. 165, Heft 5/6, 1960. Akademische Verlagsgesellschaft Geest & Portig K.-G., Leipzig. (5th February, 1962).

Untersuchungen Uber die Auswuchse am amnion und an der Nabelschnur dei Walen und Huftieren, mit besonderer berucksichtigung des Europaischen

Hausrindes von C. Naaktgeboren und Helga H. L. Zwillenberg. Reprinted from Acta Morphologica Neerlando-Scandinavica, Vol. IV, No. 1. (5th February, 1962).

Grepen uit het leven van Walvissen en Dolfijnen door Prof. Dr. E. J. Slijper. Overdruk uit Natuurkundige Voordrachten, Nieuwe Reeks No. 39 Jaargang 1960-61. (5th February, 1962).

Locomotion and Locomotory Organs in Whales and Dolphins (Cetacea) by E. J. Slijper, Zoological Laboratory, University of Amsterdam. Reprinted from Symp. Zoo l. Lond. No. 5, pp. 77-94, Published August 1961. (5th February, 1962).

The Still Unexplained Mystery of the Whales by Prof. Dr. E. J. Slijper, Netherlands Whale Research Group T.N.O., Zoological Laboratory, University of Amsterdam. Reprinted from Norsk Hvalfangsttidende 1961, No. 2 pp. 41–54. In English and Norwegian. (9th February, 1962).

Einige Notizen uber Gewicht und Lange von Schweinswalen (Phocaena phocaena) aus Nord-und Ostsee von W. van Utrecht, Amsterdam. Sonderdruck aus "Saugetierkundliche Mitteilungen" BLV-Verlagsgesellschaft Munchen 3, 8.Fhg., Heft 3/4, Seite 142-144, 1.12.60 (5th February, 1962).

Foramen Ovale and Ductus Arteriosus Botalli in Aquatic Mammals by E. J. Slijper, Netherlands Whale Research Group T.N.O., Zoological Laboratory, University of Amsterdam. Extrait de Mammalia Revue trimestrielle publiee avec le concours du Centre National de la Recherche Scientifique, 55 rue de Buffon, Paris-V. Tome 25, No. 4 December, 1961. Publications de la Societe Pour L'Etude et la Protection des Mammiferes.

Norway

Populations Studies on the Minke Whale *Balaenoptera acuto-rostrata* Lacépède, Åge Jonsgård, Institute of Marine Biology, Oslo University. Reprinted from The Exploitation of Natural Animal Populations edited by E. D. Le Cren and M. W. Holdgate. Published by Blackwell Scientific Publications, Oxford. (31st May, 1962).

Hvalrådets Skrifter, Scientific Results of Marine Biological Research, No. 45, Development of tooth germs and adjacent structures in the whalebone whale (Balaenoptera Physalus (L.) with a contribution to the theories of the mammalian dentition, by Kjell Karlsen, Anatomical Institute, University of Oslo, Norway, 1962. (31st May, 1962).

On the Species of Dolphins found on the coast of Northern Norway and in adjacent Waters by Åge Jonsgård. Reprinted from Norsk Hvalfangst-Tidende 1962, No. 1 pp. 1–13. In English and Norwegian. (31st May, 1962).

United Kingdom

The Estimation of the Effect on Catches of Changes in Gear Selectivity by J. A. Gulland, Fisheries Laboratory, Lowestoft. Extrait du Journal du Conseil International Pour L'Exploration de la Mer. Vol. XXVI. No. 2, 1961. (24th July, 1961).

U.S.A.

Report of Committee on International Relations by William A. Dill. Reprinted from Transactions of the American Fisheries Society Vol. 90, No. 1 January, 1961 pp. 114-117. (24th July, 1961).

Year (1)	ANTARCTIC PELAGIC WHALING						Land Stations South Georgia	Outside the Antarctic	TOTAL
	Baleen season	No. of floating factories	No. of catchers	No. of humpbacks taken (3)	No. of blue whale units (4)	Oil production in barrels (2)	Oil production in barrels (2)	Oil production in barrels (2)	Oil production in barrels (2)
1951/52	2 Jan. 52– 5 Mar. 52	20	268	1,546	16,008	2,334,805	144,375	427,809	2,906,989
1952/53	2 Jan. 53– 16 Mar. 53	16	230	945	14,867	1,998,094	120,003	404,555	2,522,652
1953/54	2 Jan. 54– 18 Mar. 54	17	206	594	15,456	2,100,884	184,836	570,814	2,856,534
1954/55	7 Jan. 55– 19 Mar. 55	19	233	493	15,324	2,061,789	180,766	522,090	2,764,645
1955/56	7 Jan. 56– 4 Mar. 56	19	257	1,432	14,874	2,134,808	172,363	604,445	2,911,616
1956/57	7 Jan. 57– 16 Mar. 57	20	225	679	14,745	2,098,854	148,068	682,163	2,929,085
1957/58	7 Jan. 58– 16 Mar. 58	20	237	396	14,850	2,146,206	171,432	731,331	3,048,969
1958/59	7 Jan. 59– 16 Mar. 59	20	235	2,394	15,300	2,050,241	102,418	761,988	2,914,647
1959/60	28 Dec. 59– 7 April 60	20	220	1,338	15,512	2,050,892	97,546	733,192	2,881,630
1960/61	28 Dec. 60– 7 April 61	21	252	718	16,433	2,123,157	109,727	646,676	2,879,560
1961/62	12 Dec. 61– 7 April 62	21	261	309	15,253	2,005,087	49.815	—	—

1. The years indicated in this column cover not only the Antarctic Season, but also the catches outside the Antarctic in the second of the two years. The 1961/62 figures are provisional. The oil production figures for earlier years have been corrected in this report to the final figures published by the Bureau of International Whaling Statistics.
2. Barrel—170 kg. (Barrel=abt. ⅙ long ton=1/016 kg.).
3. The limit on the number of humpbacks taken was 1,250 during the seasons 1949/50, 1950/51, 1951/52, 1951/53, and thereafter the catch was confined to certain days.
4. The blue whale unit catch limit was 16,000 until 1952/53, when it was reduced to 15,500 and then to 15,000 in 1955/56 and 14,500 in 1956/57—1957/58. In 1958/59—1959/60, the limit governing the Antarctic pelagic whaling countries was 15,000 units. The limit was suspended in 1960/61 and 1961/62.

(990b) Wt.P.65859—610 400 1/63 [illegible] G.32