SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH

WORKING GROUP ON BIOLOGY BIRD BIOLOGY SUBCOMMITTEE

MINUTES OF MEETINGS, 22 & 28 AUGUST 1988, HOBART, AUSTRALIA

1. PARTICIPANTS AND AGENDA

Dr J.P. Croxall, as Chairman, welcomed members and observers (Annex 1) to the meeting. Apologies for non-attendance were received from D.G. Ainley, R. Bannasch, P.C. Harper, P.A. Prince and W.R. Siegfried. The Subcommittee expressed its deep regret at the death of G.W. Johnstone.

The draft agenda was adopted and 15 papers (published, in press and in preparation) were tabled. Copies of minutes of the previous meeting (*Cormorant* 14:63-80) were distributed.

The chairman announced that, in view of the ample time for discussion of current and prospective research initiatives at the recent First International Conference on Penguins (Dunedin, New Zealand, 16-19 August) and at the forthcoming SCAR Fifth Symposium on Antarctic Biology (Hobart, Australia, 29 August - 3 September), there would not be a special session of the present meeting devoted to this topic.

2. CURRENT STATUS OF ISAS (INTERNATIONAL SURVEY OF ANTARCTIC SEABIRDS)

2.1 Surveys

Participants described their current and prospective activities providing data on the distribution and abundance of breeding sub-Antarctic and Antarctic seabirds. The previous review of survey activities (*Cormorant* 14:64-67) was updated (Table 1). This revised compilation is not quite complete, lacking any up-to-date information from the German Democratic Republic, the Federal Republic of Germany and New Zealand. Noteworthy gaps, at least so far as penguins are concerned, are still the South Sandwich Islands and (in terms of assessments of total populations) the Falkland Islands. Data from these areas, and from certain parts of the Antarctic Continent, remain priority requirements.

2.2 Synthesis of data

The value of updating the published synthesis of the numbers and distribution of sub-Antarctic and Antarctic penguins (*BIOMASS Sci. Ser.* 4:1-46) was discussed. As a first step it was agreed that all participants should forward relevant published papers, manuscripts and results of unpublished surveys and censuses to E.J. Woehler by 1 September 1989, so that a draft update could be prepared before the next meeting of the Subcommittee. A new synthesis of penguin data is an important undertaking, of considerable use for Antarctic biologists generally and the Working Group on Biology is asked to investigate whether SCAR would consider funding the publication of this volume. Failing this, outside sponsorship will be sought.

The desirability of producing similar syntheses for other species of sub-Antarctic and Antarctic birds was then discussed. It was recognised that this was potentially a much more complex task. Appropriate inventories were already available or in preparation for most sub-Antarctic islands, the Antarctic Peninsula and the Australian Antarctic Territory. Participants were asked to provide the Secretary with additional relevant information by 1 September 1989 so that an initial review could be made at the next meeting.

TABLE 1

RECENT, CURRENT AND PROSPECTIVE (MARKED AS *) SURVEY OPERATIONS COUNTING BREEDING ANTARCTIC SEABIRD POPULATIONS

Area/Site	Species	Date	Method	Comments	Reference
			ARGENTINA		
Stranger Point	Adélie & Gentoo Penguins		Ground counts		Vergani pers. comm.
Mossman Peninsula	Adélie Penguin		Ground counts	First count of colony	Vergani pers. comm.
			AUSTRALIA		
Davis, Mawson (incl. Prydz Bay)	Adélie Penguin	1981/82 and 1987/88	Vertical aerial photos	Processing 1987/88 photos nearly complete; comparison with 1981/82 and 1956 photos	Whitehead (in prep.)
Wilkes vicinity	Adélie Penguin	1983/84	Ground counts	Comparison with 1958-60 counts	Martin & Johnstone (in prep.)
Commonwealth Bay	Adélie Penguin	1982/83	Ground counts		Ensor & Bassett 1987 *ANARE Res Notes* 50
Scullin & Murray Monoliths	Adélie Penguin	1986/87			Alonso *et al.* 1987 ACTA 2nd Symp. Espanol estudios Antarcticos
Amanda Bay	Emperor Penguin	1983	Ground count	First count of colony	Cracknell 1986 *Emu* 86 113-117
Rauer Islands	Antarctic & Pintado	1981/85	Ground counts		Green & Johnstone 1986

	Petrels, Antarctic Fulmar				*ANARE Res. Notes* Whitehead (in prep.)
Scullin Monolith	Antarctic Petrel	1986/88	Ground		Alonso *et al.* 1987 ACTA 2nd Symp. Espanol estudios Antarcticos
Macquarie Island	Royal & King Penguins		1982/83 from photos	Counts	Rounsevell & Brothers (1984)
	Imperial Cormorant	1976	Ground counts		Brothers (1984)
	Albatrosses & Giant petrels	1970 & 1980	Ground counts		TLPW & Antarct. Div. unpubl.)
	Gentoo Penguin	1984/85	Ground counts		Robertson 1986 *Aust. Wild. Res.* 13
Heard Island	King Penguin	1985/88	Ground counts		Gales & Pemberton In press. *Aust. Wildl. Res.* Woehler In press *ICBP Tech. Publ.*
	Gentoo Penguin	1987/88	Ground counts		Woehler In press *ICBP Tech. Publ.*
	Imperial Cormorant	1985/88	Ground counts		Pemberton & Gales 1987, *Cormorant* 15 Woehler In press. *ICBP Tech. Publ.*
*Heard Island	King Penguin Imperial Cormorant	1992/93	Ground counts	Planned	
			BRAZIL		
King George Island (Keller Pen.)	All species	1985/86	Ground counts		

Penguin Island	Southern Giant Petrel		1983/88 counts	Ground programme	Continuing
Elephant Island Group	All species	1986/88	Ground counts	Continuing programme	
Nelson Island	Pintado Petrel		1986/88 counts	Ground programme	Continuing
			CHILE		
S. Shetland Islands	penguins	1982/83	Aerial		Sallaberry & Schlatter (1983), Valencia & Sallaberry (1983), Torres *et al.* (1982)
	giant petrels Wilson's Storm Petrel	1986	Ground counts		Roby *et al* (1986)
Diego Ramirez	all seabird species	1983	Ground counts		Schlatter (unpubl.)
Isla Noir	Macaroni Penguin	1983	Ground counts		Venegas (in press)?
			FRANCE		
Adélie Land, Pointe Geologie	all species	1980s	Ground counts	Continuing Programme	Thomas *Oiseau* (1986)
Rest of coast	all species	current	Ground counts	Continuing programme	
Kerguelen	all surface breeding species	1980	Ground counts	Continuing programme	Thomas *Oiseau* (1983) Weimerskirch *et al.* (1988, in press) *Emu*
Crozet	mainly	1980s	Ground	Continuing	Jouventin *et al.*

Islands	surface breeding species		counts	programme	(1984) *ICBP Tech. Publ.* 2, Weimerskirch *et al.* (1986) *Ibis*
Amsterdam &	breeding	1980s	Ground		Jouventin *et al.*(1984) *ICBP Tech. Publ.* 2
			JAPAN		
Continent (Syowa & Umeboshi Rocks)	Adélie & Emperor Penguins	1980s	Ground and aerial photo counts		Naito
			NEW ZEALAND		
Western Ross Sea	Adélie Penguin	1983-85	Aerial vertical photos, ground counts		
*Eastern Ross Sea	Adélie & Emperor Penguins	?	Aerial photos	Awaiting support	
*Balleny Islands	all species	?	Ground counts	Awaiting support	
			NORWAY		
Peter 1 Island	Adélie Penguin, Antarctic Fulmar	1987	Aerial photos		Mehlum (unpubl.)
Mühlig-Hofmannfella & Gjelsvikfjella,	Antarctic & Snow petrels, South Polar Skua	1985	Ground		Mehlum *et al* (1988)

POLAND				
S. Shetland Islands (King George Is.)	Penguins	1982-83	Aerial photos, ground counts	Jablonski (1987)
SOUTH AFRICA				
Continent (Dronning Maud Land)	Snow Petrel	1987-88	Ground counts	Ryan & Watkins (1988) *Cormorant*
Marion & Prince Edward Islands	penguins, albatrosses, giant petrels, gull, skua, terns, cormorant	1980s	Ground counts, photos	Watkins (1987) *S. Afr. J. Antarctic. Res.* Adams (*Polar Biol.*1987) Ryan & Hunter (1985) & FitzPatrick Institute Unpubl.
Gough Island	Wandering Albatross, Rockhopper Penguin	1980s	Ground couts	Watkins (*S. Afr. J. Antarct. Res.* 1987)
Tristan da Cunha Group	Wandering & Yellownosed Albatrosses	1980s	Ground counts	Ryan *et al.* 1988 *Cormorant,* FitzPatrick Institute Unpubl.
UNITED KINGDOM				
S. Orkney Islands	penguins	1983-84	Ground counts	Poncet & Poncet (1985)
NE Antarctic Peninsula	penguins	1982-83	Vertical aerial photos	
Antarctic Peninsula (rest)	penguins cormorants	1983-86	Ground counts	Poncet & Poncet (1987) and in prep.

Antarctic Peninsula	all species		Review of all published and unpublished data		Due 1990
South Georgia Willie Island NW Area	albatrosses, penguins	1985-86	Ground & photo counts vertical and oblique aerial photography		Prince in prep.
*Rest	all surface breeding species	1986-87	Ground & photo counts		Prince in prep.
	burrowing species	1987-88	Quadrats, etc.		Prince in prep.
*S. Sandwich Islands	penguins		Vertical aerial photos		
	petrels		Ground & photo counts USA		
Antarctic Continent	Emperor Penguin	1983-84	Aerial photography Ground counts counts		Kooyman, ms submitted
S. Shetland Islands	Adélie, Gentoo & Chinstrap Penguins		1977-78 counts	Ground	Point Reyes Bird Observatory
Palmer Station	Adélie Penguin	1987/88	Ground counts	chicks only	Point Reyes Bird Observatory
Seal Island	Chinstrap Penguin, Pintado Petrel	1987/88	Ground counts	chicks only	Point Reyes Bird Observatory

2.3 Satellite remote-sensing of penguin colonies

The proposal for a detailed follow-up to the successful pilot study (see *Cormorant* 14:75-76) had to be postponed because the resolution of the imagery was inadequate at present to match the detailed distributional data available for penguins in the selected trial areas. Appropriate work was progressing at the NASA Space Flight Center and when adequate resolution was achieved the project would be resubmitted for funding.

3. MONITORING STUDIES

3.1 General

Participants described their monitoring activities. The previous review (*Cormorant* 14:68-70) was updated (Table 2). Up-to-date information is lacking from the German Democratic Republic and New Zealand.

Since the last meeting there had been a major initiative in this field with the development of the CCAMLR Ecosystem Monitoring Program (CEMP). This programme had selected five species of seabirds for monitoring: Adélie Penguin *Pygoscelis adeliae,* Chinstrap Penguin *P. antarctica*, Macaroni Penguin *Eudyptes chrysolophus*, Blackbrowed Albatross *Diomedea melanophrys* and Pintado (Cape) Petrel *Daption capense.* These are to be monitored in three "integrated study regions": the Bransfield Strait and adjacent areas of the Antarctic Peninsula, South Georgia and Prydz Bay, and at a number of sites outside these three regions. The integrated study regions are defined, and other sites listed, in the CCAMLR document on standard methods for monitoring parameters of predatory species.

It is clear that the CEMP will now co-ordinate monitoring of its selected species that uses these methods at these sites and regions. Because the CEMP has so far confined its attention to species believed most likely to provide data on predator-krill interactions, it is especially important that the SCAR Bird Biology Subcommittee continues to provide accurate information on current monitoring studies of other predatory species and at other sites.

The Subcommittee emphasised that seabirds are at present the group best suited (e.g. in terms of accuracy and precision of data available and collectable, cost-effectiveness of field operations, etc.) for monitoring changes in the Southern Ocean environment. This suitability is not only for documenting natural variations and trends and detecting potential harvest-induced changes, but also for revealing changes due to pollution, alien introductions and incidental mortality resulting from man's activities (see section 4 below).

3.2 Review of CCAMLR proposed monitoring activities

The Subcommittee welcomed and endorsed the CCAMLR initiative and especially the production of detailed instructions for carrying out the fieldwork.

It was emphasized that implementing these instructions could only be done satisfactorily by an annual commitment sustained in each season at least from the time of egg-laying to chick fledging for each species studied.

Scientists involved in implementing these monitoring programmes were urged to collect the appropriate ancillary data (listed on the standard method sheets). In many cases these are relatively simple to obtain but standardization is highly desirable and would be greatly aided by appropriate methodological instructions.

Comments on the content of the standard method sheets should be sent direct to the Convenor of the CEMP, Dr K.R. Kerry. It was noted that the booklet is to be updated as required and the Subcommittee recommended that the binding of

Table 2

CURRENT STATUS OF SUB-ANTARCTIC AND ANTARCTIC SEABIRD MONITORING STUDIES

Species	Site	Nation	Start	Frequency	Counts		Method		Breeding
					Incubation	Rearing	Colony	Sample	Success
Emperor Penguin	Kloa	AUS	1957	annual	x	x		x	
	Fold Island	AUS	1956	annual	x	x		x	
	Taylor Glacier	AUS	1954	annual	x	x		x	
	Auster	AUS	1957	annual	x	x		x	
	Pte Geologie	FR	1952	annual		x	x		x
	Umeboshi Rock	JPN	1981			x			
King Penguin	Heard I	AUS	1962	c.5 y		x	x		
	Possession I	FR	1980	5 y	x		x(photo)		
	Baie du Marin	FR	1980	annual	x		x		x
	Marion I	SA	c.1984	annual	x	x	x		x
	Prince Edward I	SA	1982	c.5 y		x	x		
Adélie Penguin	Stanger Point	ARG	1987	annual	x	x	x		x
	Mossman Peninsula	ARG	1987	annual	x			x	x
	Commonwealth Bay	AUS	c.1982	c.3 y	x		x		
	Davis	AUS	1960	annual	x			x	
	Casey	AUS	1961	c.5 y	x		x		
	Ardley I	CHI	1981	annual	x		x		some
	Pte Geologie	FR	1983	3 y	x		x		
	Syowa	JPN	1970	annual	x		x		
	W.Ross Sea	NZ	various	1-2y	x	x			
	Cape Bird	NZ	1968	annual	x		x		x
	Cape Royd	NZ	c.1970	annual	x		x		x
	Cape Crozier	NZ		1-2y	x		x		
	Signy I	UK	1978	annual	x		x		x
	Palmer area	US	c.1974	annual	x		x		some
	Pt Thomas	US/POL	1977	annual	x		x		x
Chinstrap Penguin	Elephant I	BRA	1986	annual	x	x	x		?
	Ardley I	CHI	1981	annual	x		x		some
	Signy I	UK	1978	annual	x		x		x

	Pt Thomas	US/POL	1977	annual	x		x		x
	Seal I	USA	1987	annual		x	x		some
Gentoo Penguin	Ardley I	BRA	1986	annual	x	x	x		
	Ardley I	CHI	1981	annual	x		x		some
	Possession I	FR	1978	annual	x		x		
	Signy I	UK	1978	annual	x		x		x
	Bird I	UK	1976	annual	x		x		x
	Pt Thomas	US/POL	1977	annual	x		x		x
Macaroni Penguin	Elephant I	BRA	1987	annual	x	x	x		x
	Isla Noir	CHI	1983	c.3 y	x	x			
	Possession I	FR	1980	5 y	x			x(photo)	
	Marion I	SA	1980	annual	x	x	x		x
	Bird I	UK	1976	annual	x		x		x
Rockhopper Penguin	Possession I	FR	1980	5 y			x	x	
	Campbell I	NZ	1984	annual	x	x	x		x
	Gough I	SA	1982	annual	x		x		
Wandering	Macquarie I	AUS	1950	annual	x		x		x
Albatross	Possession I	FR	1966	annual	x		x		
	Kerguelen	FR	1984	annual	x	x	x		x
	Prince Edward	SA	1979	c.5 y		x	x		
	Marion I	SA	1980	annual	x	x	x		x
	Gough I	SA	1979	annual		x	x		some
	Bird I	UK	1975	annual	x		x		x
Amsterdam	Amsterdam I	FR	1983	annual	x	x	x		x
Blackbrowed	Macquarie I	AUS	1974	annual	x		x		x
Albatross	Kerguelen	FR	1980	annual	x	x		x	x
	Bird I	UK	1975	annual	x	x	x		x
Greyheaded	Macquarie I	AUS	1974	annual	x		x		x
Albatross	Marion	SA	1984	annual		x	x		
	Bird I	UK	1975	annual	x	x	x		x
Yellownosed	Amsterdam I	FR	1980	annual	x	x		x	x
Albatross	Gough I	SA	1982	annual	x	x	x		x
	Tristan I	SA	1984	annual	x	x	x		x
	Nightingale	SA	1984	1-2 y	x		x		
Sooty Albatross	Possession I	FR	1980	annual	x	x		x	x
	Gough I	SA	1982	annual	x	x	x		x
Lightmantled Sooty	Macquarie I	AUS	1970	annual	x			x	x

Albatross	Possession I	FR	1980	annual	x	x		x	x
Southern Giant	Elephant I	BRA	1986	annual	x	x	x		x
Petrel	Penguin I	BRA	1984	annual	x		x		
	Casey	AUS	1960	annual		x	x		
	Davis	AUS	1960	annual		x	x		
	Ardley I	CHI	1986	annual	x		x		
	Pte Geologie	FR	1951	annual	x		x		x
	Possession	FR	1980	5 y	x		x		
	Pt Thomas	US	1980	annual	x	x		x	x
	Bird I	UK	1978	5 y	x		x		
	Palmer Station	USA	1980	irregular					
Northern Giant	Kerguelen	FR	1984	5 y	x		x		
Petrel	Possession I	FR	1980	5 y	x		x		
	Bird I	UK	1978	5 y	x		x		
Antarctic Fulmar	Gibbs I	BRA	1987	annual	x		x		
	Rauer Is	AUS	1983	annual	x	x		x	x
	Pte Geologie	FR	1952	annual	x	x	x		x
Snow Petrel	Pte Geologie	FR	1963	annual	x	x	x		x
	Signy I	UK	1976	annual	x	x	x		x
Pintado Petrel	Elephant I	BRA	1986	annual	x	x	x		x
	Nelson I	BRA	1986&88	annual	x	x		x	
	Signy I	UK	1976	annual	x	x	x		x
	Seal I	USA	1987	annual	x	x	x		some
Wilson's Stormpetrel	Ardley I	CHI	1986	annual	x	x	x		x
	Pte Geologie	FR	1962	annual	x	x	x		x
South Polar Skua	Elephant I	BRA	1986	annual	x	x	x		
	Pte Geologie	FR	1968	annual	x	x	x		x
	Palmer	USA	1970	periodic	x	x	x		x
	Pt Thomas	USA	1980	annual	x	x		x	x
Subantarctic Skua	Possession I	FR	1980	5 y	x	x	x		x
	Chatham I	NZ	1980	annual	x	x	x		x
	Gough I	SA	1983	annual	x			x	
	Bird I	UK	1976	5 y	x		x		
	Pt Thomas	USA	1980	annual	x	x	x	x	x

the next edition be changed to make this a simpler task.

The Subcommittee then reviewed the CEMP recommendations on selected and suggested sites for monitoring (Tables 1 & 2 of the booklet). The following recommendations were made to the CEMP:

1. Antarctic Peninsula Region (Table 1)

(a) Delete Adélie Penguin at Elephant Island, because only a few pairs breed there.

(b) Consider adding Adélie Penguin at Esperanza (Hope Bay).

2. Prydz Bay Region (Table 1)

The current long-term Australian programme is centred on Davis Station in Princess Elizabeth Land. Designation of MacRobertson Land is inappropriate and confusing (see 3c below).

3. Adélie Penguin (Table 2)

(a) Delete Pointe Geologie, because of significant disturbance to the colony by construction activities associated with airstrip developments.

(b) Change Budd Coast (probably referring to Australian programmes at Casey Station) from a selected to a suggested site.

(c) Consider adding MacRobertson Land to allow for the possible development of appropriate work at Mawson Station.

4. Macaroni Penguin (Table 2)

Delete Marion and Crozet Islands, because detailed dietary studies show that *Euphausia superba* does not form part of the species' diet there.

5. Pintado (Cape) Petrel (Table 2)

(a) Delete Pointe Geologie, where the monitoring programme has stopped because of disturbance from construction activities.

(b) Consider adding Rauer Islands (near Davis station).

6. Blackbrowed Albatross

Consider adding Kerguelen, as a monitoring site, to Table 2.

4. STATUS AND TRENDS OF SUB-ANTARCTIC AND ANTARCTIC SEABIRDS

Because the CEMP does not include some species known to be increasing or decreasing, there had been a request from CCAMLR for a review of information on the status of all seabirds. In response to this, two documents were tabled. Using these and information from the long-term demographic research programmes at the French sub-Antarctic islands and Adélie Land as a basis, the meeting then reviewed the status and trends of Antarctic and sub-Antarctic seabirds (Table 3).

It was emphasized that conclusions made in the table for a number of species were tentative ones and the three main documents cited should be consulted for summaries of the available data and details of supporting references. The following points, in relation to Table 3, are important to note:

a) the generalizations may obscure regional, or other geographical, variations;

b) indication of the magnitude of changes is based on the numerical data available at the meeting, and the Subcommittee's assessment of the implications of this for the demographies of the species concerned,

c) indications of the extent (time-series) of data available and of the extent of year-to-year variation in population numbers can only be very

TABLE 3

STATUS AND TRENDS OF SUB-ANTARCTIC AND ANTARCTIC SEABIRDS

Species	Direction of change	Magnitude	Time-frame	Variability	Possible causes of change	Comments
Emperor Penguin	0/-*	halved*	long	high	physical environment	*Adélie Land
King Penguin	+*	major	long/short	low	?	*All sites
Adélie Penguin	0/+*	small	long	high	?	
Chinstrap Penguin	0/+*	small	short/long		-	*at some Peninsula sites
Gentoo Penguin	0	-	long	high	-	sensitive to disturbance
Macaroni Penguin	+	small	long	? low	?	
Rockhopper Penguin	?	?	-	?	-	
Wandering Albatross	-	major	long	low	incidental mortality, fishery associated	All sites
Blackbrowed Albatross	0*	small	long	high	-	*increasing Heard; decreasing Crozets
Greyheaded Albatross	0	-	medium	low	-	
Yellownosed Albatross	0	-	short	low	-	
Sooty Albatross	?	?	?	?		
Lightmantled Sooty Albatross	?	?	?	?	-	
Southern Giant Petrel	-	major	long	medium	Disturbance, entanglement	All sites
Northern Giant Petrel	+/0/-*	major	long	medium	Food supply ashore Disturbance, entanglement	*Increase S. Georgia decreases most other sites
Antarctic Fulmar	0/+*	small	long	high	?	*Some sites in Australian Antarctic Territory
Snow Petrel	?	?	?	?	-	
Pintado Petrel	0/+*	?	?	?	?	*S. Georgia
Other Procellariidae	0/-*	major*	medium/long	-	*decreases where cats and other alien	

Stormpetrels	0/-*	major*	medium/long	-	predators present* decreases where cats and other alien predators present	
Diving petrels	0/-*	major*	medium/long	-	predators present* decreases where cats and other alien predators present	
Cormorants	?	?	?	high		
Subantarctic Skua	o/+	major	long	medium	Food supply ashore	Most sites
South Polar Skua	o/+	major	long	medium	Food supply ashore	Most sites
Kelp Gull	?*	?	?	high		
Antarctic Tern	0/-*	major	medium	high	Disturbance	*Signy 1

NOTES:

Direction of change: 0 = stable; - = decreasing; + = increasing

Timeframe: duration of period over which data available

Variability: inter-annual variability in population size

approximate;

d) assessments of possible causes of change in numbers are, for the most part, simply informed assessments of available data.

A number of general conclusions were offered.

1) Most decreases are due either to the effects of human disturbance (e.g. Antarctic Tern *Sterna vittata*) or to incidental mortality associated with fishing operations (e.g. Wandering Albatross *Diomedea exulans)*, or to some combination of these (e.g. Southern Giant Petrel *Macronectes giganteus*).

2) Although precise data are lacking, burrowing petrels (Procellariidae, Hydrobatidae, Pelecanoididae) have been greatly reduced in numbers at sub-Antarctic localities where feral Domestic Cats *Felis catus* and/or rats *Rattus* spp. are present. The Subcommittee commends existing eradication programmes and recommends that new ones be started wherever possible.

3) No decrease can be attributed to decreases in food availability at sea, let alone any changes due to commercial harvesting.

4) Some increases are probably due to increased food availability on land e.g. carrion (resulting from increased seal abundance) or garbage (from increased human activity).

5) Other increases (especially of penguins) may be due to increased availability of food at sea but the precise nature of this is uncertain and, at least for King Penguins *Aptenodytes patagonicus*, may be confounded by recovery from previous overexploitation.

6) Continuation, on a long-term basis, of the monitoring programmes which have contributed to the assessment in Table 3 is of the highest priority, especially for those species showing population decreases.

7) Species in Table 3 for which data are unavailable are generally difficult to study. Their trends are likely to be similar to those of related species which are being monitored.

5. CENTRAL DATA BANK FOR ANTARCTIC BIRD-BANDING (CDB)

5.1 Submission of primary banding data

The 1983/84 and 1984/85 reports were tabled. During these two years 28 128 birds had been banded. The report of the CDB manager, Mr T.B.Oatley was then considered. It was noted that only New Zealand had not yet submitted 1985/86 data. Data for 1986/87 were outstanding from Australia, Chile, New Zealand and the United States. As yet no 1987/88 data were to hand and participants were urged to send these in as soon as possible. The SCAR Working Group on Biology was asked to remind all SCAR national committees of the requirement to submit either copies of primary banding schedules or species summaries to the CDB on an annual basis.

Dr W.Z. Trivelpiece pointed out that data on penguin banding by U.S. scientists (e.g. Point Reyes Bird Observatory) were not required and therefore not collated by the U.S. Fish and Wildlife Service Bird Banding Laboratory, and therefore had not previously been reported to the CDB. He undertook to supply the CDB with species summaries for *c.* 30 000 individuals of three species for the period 1980-1988.

Discussion followed on a number of procedural matters brought up by the CDB manager. It was agreed that where feasible the CDB should include data for individuals of all species of birds which breed within the CCAMLR area, irrespective of where they were banded. Thus, Wandering Albatrosses banded at sea in the Bass Strait would be included, but Brown Noddies *Anous stolidus* banded in the Tristan da Cunha group would not be

included.

Confusion had occurred in assigning banded birds to age categories, bearing in mind that several languages are used on primary schedules. It was agreed that the CDB should use only two age classes: "dependent young" and "full grown". Nations submitting primary schedules or species summaries should provide translations where necessary for age-class terms they used. It was further agreed that the list of species banded should be in taxonomic, rather than decreasing number, order and that a standard list of approved scientific names should be drawn up by the Secretary in conjunction with Mr Oatley. It was agreed that annual reports of the CDB should include full addresses of banding institutions. Mr T.B. Oatley was thanked for his continued efforts in managing the CDB.

5.2 Colour-banding inventory

The Secretary reported that the CDB Manager had received several requests for identifying the origins of colour-banded birds sighted away from banding localities. Some of these requests could not be dealt with, because the colour-banding inventory had not been updated since 1984 (Cooper & Oatley *Cormorant* 13:43-54). It was agreed that an update was desirable and that the SCAR Working Group on Biology should be asked to approach SCAR national committees to request provision of the relevant information to the Subcommittee by 1 September 1989 so that a new update could be tabled at the next meeting of the Subcommittee.

There is a particular difficulty within the US programme, because there are many different bird projects and no single investigator co-ordinates bird colour-banding data. Therefore, it was agreed that the US National Science Foundation (NSF) be requested, by the SCAR Working Group on Biology, to inform its principal investigators involved in ornithological projects in Antarctic and sub-Antarctic regions of the existence of the CDB and its banding and colour-banding inventories. The Secretary would also prepare a brief circular containing appropriate information to be sent to the Director of the Division of Polar Programs of NSF.

No report had been received on the suppliers and costs of colour bands. Any member of the Subcommittee who required such information should write to the CDB to obtain information on this subject.

6. COMPILATION OF SEABIRD MASS DATA

No progress had been achieved since the last meeting of the Subcommittee and, after such a long gap, during which many new data have become available, it was judged no longer feasible to proceed with the compilation.

Since the Subcommittee had advised Sea World (San Diego, California) of appropriate analyses and potential opportunities for publication of its data on seabird growth and egg dimensions (*Cormorant* 14:72-74), no progress had been reported.

7. BIBLIOGRAPHIES

7.1 Update to penguin bibliography

The Secretary outlined the difficulties of producing a thorough update to the published penguin bibliograpy. It was agreed not to continue with this endeavour, because the annual list of publications on sub-Antarctic and Antarctic birds (published in *Cormorant*) was considered adequate to inform ornithologists of current research on penguins in this region.

7.2 Procellariform/albatross bibliographies

The Chairman described the efforts being made by

Dr J. Warham (University of Canterbury, Christchurch, New Zealand) to produce a comprehensive bibliography on the Procellariiformes. The Subcommittee then considered Dr Warham's application for financial support of NZ$ 3 800 (*c.* US$ 2 600) to complete the word processing of his bibliography. Because a majority of the Procellariiformes breeds in the Southern Ocean, or closely adjacent regions, this work, about three-quarters complete at present, represents source material of outstanding interest to Antarctic ornithologists. It was therefore agreed to support the application and to ask the Working Group on Biology to request funding from SCAR.

If such funding was forthcoming, the final version of the procellariiform bibliography should acknowledge SCAR's support. In view of this decision it was decided not to continue with the albatross bibliography (under preparation by Drs W.L.N. Tickell, A.J. Williams and others), but to supply Dr Warham with a printout of it for his use. It was also agreed that the Subcommittee would not become involved in the production of further bibliographies, but would lend its support to any endeavour started by others.

8. INTERNATIONAL GIANT PETREL DISPERSAL PROJECT

This international project, co-ordinated by the Subcommittee, is due to start in the coming 1988-89 austral summer and Dr S. Hunter's report (supporting document 10) was discussed. Ten nations had confirmed participation and it was still hoped that New Zealand might be able to contribute. In addition to allowing the first comprehensive study of dispersal patterns in these species, the project should also provide data (through recoveries) on causes of mortality. This is particularly timely and important because of the significant decrease in Southern Giant Petrel populations which is probably, in part, linked to incidental mortality associated with fishing operations. The SCAR Working Group on Biology is asked to request SCAR nations to lend logistic support (e.g. helicopter flights) whenever feasible to facilitate the banding of as many giant petrel chicks as possible. It was emphasized that, in doing this, maximum care should be taken to avoid undue disturbance. It was agreed that a letter be sent, as soon as possible, from the Chairman to the US National Science Foundation endorsing the need to band giant petrels in the Palmer region of the Antarctic Peninsula in the coming summer. The Secretary undertook to write to S. Hunter to enquire whether he was still prepared to continue as co-ordinator of the project.

9. BIOMASS - RELATED ACTIVITIES

9.1 Otolith guide

The guide to otoliths of Southern Ocean fishes (*S. Afr. J. Antarct. Res.* 17:1-87) was formally tabled. Professor T. Hecht was thanked for producing the guide, which was first suggested by the BIOMASS Working Party on Bird Ecology.

9.2 Computerization of penguin distributional data

No progress had been made on computerizing the penguin distributional data. The Chairman explained the present heavy workload on the BIOMASS Data Centre and that discussions were soon to be taken on its continuation beyond 1990. Once the Centre's future was assured the Chairman agreed to circulate specimen data sheets for entering data on the distribution and abundance of breeding penguins by 1 September 1989.

9.3 SIBEX data

To date, data covering a total of 1 475 10-minute seabirds-at-sea cards (totalling 50 278 bird observations) from five SIBEX cruises has been deposited with the BIOMASS Data Centre. The

Subcommittee then identified SIBEX data sets not yet so deposited. These are: South Africa, SIBEX 1 to Prydz Bay (*c.* 400 cards), Australia, SIBEX 1 & 2 to Prydz Bay (*c.* 200 cards). In addition, there are other data sets covering the Bransfield Straits and Prydz Bay areas collected by USA (G.L. Hunt), Japan (Y. Naito) and Australia (E.J. Woehler).

Discussion was confined to SIBEX data for the two priority areas, the Bransfield Strait and Prydz Bay. After discussion, it was agreed that G.L. Hunt would chair a small group, including J.P. Croxall, A. Myrcha and the BIOMASS Data Centre Manager, to investigate in more detail the nature of the SIBEX bird data from Bransfield Strait, with particular attention to the data from other sources. (e.g. krill densities, oceanographic information) available for integrated analysis. If the data warranted they would make recommendations for appropriate lines of analysis and for a suitable timetable for a BIOMASS Workshop to conduct these analyses. As a first step, it was agreed to ask the BIOMASS Data Centre Manager to prepare detailed summaries of the Bransfield Strait bird and associated data using the instructions set out in *BIOMASS Report Series* No. 44 as a guide. At present the Prydz Bay data already in the Data Centre are inadequate even to make preparations for analysis. It is imperative that the Australian and outstanding South African data be submitted and the SCAR Working Group on Biology was requested to ask the appropriate national representatives to arrange to send their outstanding SIBEX data to the BIOMASS Data Centre as soon as possible.

9.4 Future of BIOMASS Data Centre

The Subcommittee then considered a request from Professor S.Z. El-Sayed, Chairman of the BIOMASS Executive, for its opinion on the future of the BIOMASS Data Centre. It was agreed to reply that although limited analysis of bird data has been made to date, the Data Centre should be maintained, because it would be prohibitively expensive to recreate it, and it was needed for the continued analyses of important (and unique) data sets collected during the BIOMASS programme.

10. NEW PROJECTS

10.1 Automatic recording devices

The drawing up of a list of automatic devices for use with seabirds has been shelved because the field was evolving so fast that such a list would be very quickly outdated. The Chairman informed the meeting that a workshop on this topic was to be held at the time of the 1990 International Ornithological Congress in New Zealand. The Subcommittee would try to advise anyone interested on appropriate contacts for obtaining the latest information on such devices.

10.2 Other projects

No document had been received developing earlier suggestions of a collaborative study on Antarctic Petrels *Thalassoica antarctica* so no action was taken. No other proposals for new projects had been received.

11. RECENT PUBLICATIONS ON ANTARCTIC AND SUB-ANTARCTIC BIRDS

The Secretary tabled the 1984-86, 1987 and draft 1988 publications lists. Participants were asked to send reprints of their publications to the Secretary for inclusion in the annual lists, including any publications previously omitted. It was agreed that these lists were very valuable and that they should be continued.

12. ANY OTHER BUSINESS

12.1 ICBP/IOC World Conferences

The Chairman informed the Subcommittee of meetings of interest to be held at the time of the International Ornithological Congress (IOC) and International Council for Bird Preservation (ICBP) Conference in New Zealand in 1990. A symposium entitled "Conservation of seabirds on islands" was to be held at the ICBP Conference and at the IOC there would be a workshop on instrumentation (Dr G. Gabrielsen, Norway, convenor), a round table discussion on seabird taxonomy (Dr P. Devillers, Belgium) and a symposium on "Seabirds as indicators in marine ecosystems" (Dr R.W. Furness, U.K.)

12.2 Co-ordination of bird research at King George Island

Co-ordination of bird research at King George Island, South Shetland Islands was discussed at some length. At present, confusion, due to overlapping studies, was likely only at Ardley Island (four nations with current studies) and with colour-banding of flying birds. It was agreed to ask the SCAR Working Group on Biology to request SCAR national committees to supply the Subcommittee with as much prior notice as possible of new, or changes to existing, ornithological activities on King George Island, so that undersirable overlaps in research could be minimized.

12.3 Plastic pollution in sub-Antarctic and Antarctic seabirds

The Secretary drew the attention of the Subcommittee to recent research conducted on plastic pollution of seabirds in the Southern Ocean. There is evidence that levels of such pollution are increasing and are already high in some species of procellariiform seabirds. The Subcommittee requested that the SCAR Working Group on Biology consider commencing a programme to monitor the levels and effects of plastic pollution in seabirds, involving both the ingestion of plastic particles and mortality through entanglements and similar effects.

Participants were asked to supply any published information they had on plastic pollution in seabirds to their national delegations to CCAMLR, so that that body is aware of the extent of the problem.

13. PUBLICATION OF MINUTES

The Subcommittee accepted with gratitude an offer to have the minutes of the present meeting published in *Cormorant.*

14. MEMBERSHIP

The Subcommittee requested the SCAR Working Group on Biology to appoint Professor M. Sander a member, especially because Brazil has, over the last few years, developed an active ornithological research programme in Antarctica.

The Chairman reiterated his regret at the death of Dr Johnstone and the effect that this has had on Australian ornithological research in Antarctica. The Subcommittee agreed that it was appropriate to note that in the past Australia had made a major contribution to Antarctic ornithology. It was currently playing a leading role in the development of the CCAMLR Ecosystem Monitoring Programme and this would require a substantial dedicated research programme. This programme alone would need to be managed by a senior ornithologist within the Australian Antarctic Division. It is to be hoped that such an appointment will be made in the near future.

Both the Chairman and Secretary agreed to continue in their present positions.

15. DATE AND PLACE OF NEXT MEETING

A meeting of the Subcommittee at the time of the next SCAR meeting in Brazil in 1990 was requested.

16. CLOSURE

The Chairman thanked all the participants for their contribution, the SCAR secretariat staff for their help and especially the Secretary for his work before and during the meeting.

He noted that a summary of recommendations would conclude the report (see below) and that a summary of the tasks allocated to members of the Subcommittee and to others would be circulated.

17. SUMMARY OF RECOMMENDATIONS FROM THE SCAR BIRD BIOLOGY SUBCOMMITTEE TO THE SCAR WORKING GROUP ON BIOLOGY

1. Support the production of, and consider funding, an updated synthesis of the numbers and distribution of sub-Antarctic and Antarctic penguins.

2. Remind SCAR national committees of the requirements to submit either copies of primary banding schedules or species summaries of sub-Antarctic and Antarctic birds banded to the Central Data Bank for Antarctic Bird-Banding (CDB) on an annual basis.

3. Request SCAR national committees to supply relevant information on colour-banding of sub-Antarctic and Antarctic birds to the CDB, so that an up-date colour-banding inventory can be prepared.

4. Request the U.S. National Science Foundation to inform its principal investigators conducting ornithological research of the existence of the CDB and both the banding and colour-banding inventories.

5. Support the funding. at a level of NZ$ 3 800, for the completion of a comprehensive bibliography of the Procellariiformes (albatrosses and petrels) by Dr J. Warham.

6. Request SCAR national committees to lend logistic support, whenever feasible, to facilitate the banding of giant petrel chicks, as part of the International Giant Petrel Dispersal Project, to take place in the 1988/89 austral summer.

7. Request Australian and South African representatives to send their outstanding SIBEX seabird data to the BIOMASS Data Centre as soon as possible.

8. Request SCAR national committees to supply as much prior information as possible to SCAR of planned ornithological activities on King George Island, South Shetland Islands, so that undesirable overlaps in avian research at that island can be minimized.

9. Consider initiating programmes to monitor the levels of effects of plastic pollution in sub-Antarctic and Antarctic seabirds, both from the ingestion of plastic particles and from entanglements.

10. Appoint Professor M. Sander a member of the Subcommittee.

ANNEX 1

SCAR BIRD BIOLOGY SUBCOMMITTEE

NAMES AND ADDRESSES OF PARTICIPANTS

22 - 28 AUGUST 1988

John Croxall, (Chairman)*
British Antarctic Survey,
Madingley Road
CAMBRIDGE, CB3 OET,
UK

John Cooper, (Secretary)*
Percy FitzPatrick Institute,
University of Cape Town,
RONDEBOSCH 7700,
SOUTH AFRICA

George Hunt, *
Department of Ecology and
Evolutionary Biology,
University of California,
IRVINE, CA 92717, USA

Pierre Jouventin,*
C.E.B.A.S.-C.N.R.S.,
79360,
BEAUVOIR/NIORT,
FRANCE

Boris Culik
MZ Inst. F. Meereskunde,
Dusternbrooker Weg 20,
2300 KIEL 1, FRG

Fridtjof Mehlum,
Norwegian Polar Research Institute
P.O. Box 158,
1330 OSLO LUFTHAVN, NORWAY

Yasuhiko Naito,
National Institute of Polar Research,
9-10, 1 chome Kaga,
Itabashi-ku,
TOKYO 173, JAPAN

Martin Sander
Unisinos Av. Unisinos, 950
93020 SAO LEOPOLDO,
RS - BRASIL

Daniel Torres,
Instituto Antartico Chileno,
Luis Thayer Ojeda 814,
Correo 9 - SANTIAGO, CHILE

Wayne Trivelpiece,
Point Reyes Bird Observatory,
4990 Shoreline Highway,
STINSON BEACH, CA 94970, USA

Eric Woehler,
Australian Antarctic Division,
Channel Highway,
KINGSTON 7050, TASMANIA,
AUSTRALIA

* Member of Subcommittee