

MARINE MAMMALS COMMITTEE

by

Å. Jonsgård

1974

Canada

(A.W. Mansfield and K. Ronald)

The following programmes of research on marine mammals were carried out by staff of the Arctic Biological Station, Fisheries and Marine Service, Department of the Environment, Ste. Anne de Bellevue (near Montreal) Que.

Whales

Northwest Atlantic (E.D. Mitchell)

Studies were centred on northwest Atlantic cetaceans, mainly on biological materials from fin, sei, sperm, humpback, blue and minke whales. Related ongoing studies were continued on the zoogeography, morphology and life histories of delphinid, phocoenid and ziphiid cetaceans.

In light of the need for estimates of minke whale population size in the Canadian Atlantic, and the difficulties of estimating abundance of minke whales by sighting methods due to certain behavioural characteristics of the species (such as the tendency to approach ships, biasing estimates from shipboard censuses) a whale observation project was instituted in May 1973 and continued into 1974, near Escoumins on the north shore of the Gulf of St Lawrence. An average of more than one whale sighting per day was made in the spring, summer and autumn months. Species observed in order of approximate local abundance included: minke, fin, blue, white, pilot and humpback whales. Right whales, once abundant in the Gulf, apparently have been extirpated from this region.

Pacific (M.A. Bigg)

In 1974 the public once again were asked to contribute information on sightings of killer whales off British Columbia. Over 20 000 log books were distributed and 4 500 sightings were reported. The use of detailed photographic records of peculiarities of the prominent dorsal fin and of variation in "saddle" markings permitted elucidation of movements of individual animals and of cohesiveness of groups of whales.

(M.W. Cawthorn)

Observations were made on porpoise mortality associated with the eastern tropical Pacific tuna fishery, by two observers aboard Canadian purse seiners.

Arctic (D.E. Sergeant, W. Hoek, K. Hay)

Data on the bowhead or Greenland whale (Balaena mysticetus) were obtained in studies in the Beaufort Sea in the summer of 1974. Bowheads appear to penetrate leads in the pack ice as soon as melting exceeds freezing in spring, and arrive in the Canadian sector of the Beaufort Sea in late May departing westward in September. Their numbers in this sector of their summer range are not accurately known but may be little more than 100. Several standard animals have been found in recent years on the Canadian coasts of the Beaufort Sea and the question arises

whether these are natural deaths or the results of wounding from Inuit (Eskimo) hunting on the north Alaskan coast.

In Lancaster Sound two pairs of bowheads were seen in summer 1974, one pair with a calf. It seems that this species continues its slow increase in the eastern Canadian arctic. Its capture by Canadian Inuit is now forbidden by law in order to hasten its return.

The severe ice conditions in 1974 had little effect on the migrations of white whales (Delphinapterus leucas) into the Beaufort Sea, except that they were halted by solid ice a little west of their normal limit. Southward ice persistence forced large numbers close inshore to the Mackenzie river estuary during the calving season of July, making counting of numbers easier than usual. Some five thousand animals were counted and simultaneously other scattered animals were present outside, but not far from the Mackenzie Delta. Feeding evidently takes place in the other summer months, in the leads and in the open sea, probably mainly on the ice-loving small pelagic cod Boreogadus saida.

In Lancaster Sound, two observers made a detailed study of the behaviour of a population of about 1 500 white whales which gathers annually in the estuary of a small river emptying into Cunningham Inlet, northern Somerset Island. Although they saw no births, their excellent photopgraphs showed numerous newborn whales, many of them suckling, and often hugging the mothers' back as shown so often in Inuit carvings. The hypothesis is therefore maintained that these warm river mouths are entered by whales for the purpose of calving, although some puzzles remain; for example, on one occasion the whole herd moved out to sea when loose ice was present at sea, and returned within 24 hours. Thus, if the warmth of the river is necessary for birth of the calves, this necessity does not last long !

### Seals

#### Harp and hooded seals (D.E. Sergeant)

A photographic aerial survey was carried out by commercial charter in the Gulf of St Lawrence in March 1974 in order to count adult harp seals (Pagophilus groenlandicus) on ice with their young. A new technique which uses ultra-violet instead of visible radiation enables the whitecoat pups to be detected as black objects on a white background instead of white on white as occurs with visible radiation. Results show very great promise and it is planned to incorporate a UV-transparent filter in future routine surveys.

For many years a population of hooded seals (Cystophora cristata) has been suspected to exist in Davis Strait. On 25 March 1974 the population was discovered by two of our staff flying with a Canadian Armed Forces Argus crew and a group of ice observers from the Atmospheric Environment Service of Environment Canada.

#### Grey seal (A.W. Mansfield, B. Beck)

The current research on the grey seal is oriented towards assessing the effectiveness of a control programme which is being carried out in response to complaints about damage to fishing gear following increase in numbers of seals.

#### Ringed seal (T.G. Smith)

Studies on the predation of ringed seal pups by arctic foxes, a description of the breeding habitat of the ringed seal, large scale surveys to determine ringed seal pup production in Amundsen Gulf, and cooperative studies with the Canadian Wildlife Service to determine the extent of predation by polar bears, were conducted during the period February to June.

A project carried out in the Cape Parry region had as its goal the determination of the effects of crude oil on ringed seals. It was found the 24-hour exposure of ringed seals in sea water containing crude oil from Norman Wells did not cause permanent damage to healthy animals.

During May and June 1974, two aerial surveys were conducted, one in James Bay and the other in Hudson Bay. Preliminary population estimates were made from the data obtained on these surveys. A summary of information available on the level of harvest of ringed seals over the last 20 years was gathered from RCMP and Hudson Bay Company records.

#### Fur seal (M.A. Bigg)

Research on pelagic fur seals was conducted in two localities in the north Pacific during 1974. The MV "West Hawk" was chartered for use off south-western Vancouver Island and the state of Washington, and the MV "Pacific Venture" was chartered for sampling in Unimak Pass, Alaska. About 60% fewer seals were seen this year than during the last sampling period in 1962.

The following programmes of research on marine mammals were carried out by staff of the Biological Station, Fisheries and Marine Service, Department of the Environment, St John's, Newfoundland.

#### Whales (M.C. Mercer)

The interaction between the Northern Pilot Whale (Globicephala melaena) and the short-finned squid (Illex illecebrosus) was examined and population models developed for the pilot whale populations formerly exploited at Newfoundland. Initial stock size (1947) was estimated at less than 60 000 and it is considered that overexploitation occurred in the 1950's and 1960's. (Ref. IWC Montreal, Doc. M8 and ICNAF Res. Doc. 74/49. Paper in press JFRB).

Based on catch per unit effort data it was estimated that the non-Greenlandic drift-net fishery took 1 500 harbour porpoise (Phocoena phocoena) in 1972. Greatest abundance and/or availability of the species at West Greenland is during the first half of August from Frederikshaab to Disko (Ref. IWC Montreal, Doc M7).

Reviews of the status of whale and seal stocks exploited in the Newfoundland area were compiled. (Ref. IWC Montreal, Doc. M27 and a bulletin of FRB submitted for publication).

The following marine mammal research programmes are being carried out at Canadian universities. The universities involved are : British Columbia, Dalhousie, Guelph and McGill.

#### Harbour porpoise Phocoena phocoena

There is presently a programme to study the biology and ecology of harbour porpoise in the Bay of Fundy region. Emphasis at the present time is on behavioural ecology. Schooling behaviour within a suitable cove in New Brunswick has been intensively studied for two years, and in 1974 this work was supplemented by radiotelemetried and visible tagging in the outer Quoddy region of New Brunswick. Three P. phocoena were tagged with radio transmitters and their movements tracked over periods of up to two weeks. This study will be continued in 1975 if conditions permit. (D.E. Gaskin, Guelph).

The on-going programme of pesticide and heavy metal monitoring is approaching completion after 6 years of continuous sampling. Reports are now in manuscript form (D.E. Gaskin, Guelph).

Other aspects of the harbour porpoise programme currently active include studies on sub-population discrimination, endocrine organ histology and histochemistry, cardio-vascular modifications, reproductive cycles and distribution in relation to food species. (D.E. Gaskin, Guelph).

#### Killer whale *Orcinus orca*

A project concerned with a detailed analyses of killer whale phonations in relation to different social units and areas is going on (H.D. Fisher, U.B.C.).

#### Narwhal *Monodon monoceros*

The ecology and behaviour of the narwhal is being studied. (R.C. Best, Guelph).

A basic biological study of the narwhal, initiated by Dr A.W. Mansfield during 1963-65 is being continued and extended with the logistic support of the Arctic Biological Station in Ste Anne de Bellevue. This work will include collections of samples from narwhal killed by the Inuit from Pond Inlet and Arctic Bay, northern Baffin Island, with the aim of establishing basic life history knowledge of this species, its role in the arctic marine ecosystem and in the economy of the North. Concurrent aerial surveys to document the distribution, migrations and population structure of the narwhal are planned (K. Hay, McGill).

The functional anatomy of the thoracic and cranial arterial systems of the narwhal is being compared with that of the white whale (H.D. Fisher, U.B.C.).

#### White whale *Delphinapterus leucas*

There is presently a cooperative programme with G.I.R.O.Q. (Groupe inter-université de recherche océanographique de Québec) on the social structure and behaviour of the white whale in the St Lawrence estuary (D.E. Gaskin, Guelph).

There is currently a study on the functional anatomy of the thoracic and cranial arterial systems of toothed whales with a comparison between river otter *Lutra canadensis*. A project on the biology of the river otter in the marine environment in British Columbia is about to begin (H.D. Fisher, U.B.C.).

#### Manatee *Trichechus manatus*

Subsequent to the preparation of a review of the general biology of the Sireniidae (Ronald and Healey, 1974), a summary report on manatee research has been issued through the National Science Research Council of Guyana entitled "An International Centre for Manatee Research". Future studies on the manatee are expected to start in the new Guyana research centre later in 1976. This will include nutritional, breeding, physiological and ecological studies aimed at increasing the numbers of this useful herbivore. (K. Ronald, Guelph).

#### Polar bear *Thalarctos maritimus*

The eco-physiological studies on the polar bear are continuing. This work is being carried out both at Churchill and Guelph. (N.A. Øritsland, K. Ronald and R.C. Best, Guelph).

Future work on the polar bear will include basic nutritional studies, the audiogram and an extensive study of the chemo-physical blood properties of laboratory and free-living bears. An ecophysiological centre has been set up at Churchill under the sponsorship of the Canadian National Sportsmen's Show and the World Wildlife Fund (Canada). It is operated by the University of Guelph (K. Ronald), Canadian Wildlife Service (C. Jonkel) and the Province of Manitoba (D. Robertson). Much of the present research is based on denning activity and bioenergetics (N.A. Øritsland, University of Oslo).

The holding facility for polar bears has been completed on the Guelph campus and apart from the work mentioned above, it is expected that there are opportunities for research to be carried out by visiting scientists (K. Ronald, Guelph).

An investigation of the nutritional dynamics of the polar bear as related to the energy and nutritional content of its main prey, the ringed seal, is in progress. (R.C. Best, K. Ronald and F.W.H. Beamish, Guelph).

#### Bearded seal *Erignathus barbatus*

During the summer of 1974 biological specimens of the bearded seal were collected from the Inuit catch on the Belcher Islands, southeastern Hudson Bay. The analysis of this material is in progress and will form the basis of an M.Sc. thesis on the life history of this seal (L. Griffin, McGill).

#### Grey seal *Halichoerus grypus*

Social behaviour in the grey seal is being examined. For the past five seasons an attempt has been made to identify the principles which govern the spacing of the grey seals on their breeding grounds on Sable Island, Nova Scotia. The behaviour of this herd does not fit the descriptions which have been published of grey seal colonies elsewhere: they are polygynous, but the social organisation bears little resemblance to either the territoriality or the hierarchical systems of other land-breeding pinnipeds (H. James, D. Boness and E. Miller, Dalhousie).

Captive grey seals are being used in a study of the pathology and course of infection with anisakines (*Terranova decipiens* and *Anisakis* sp.) and coccidiosis (*Eimeria* sp.). (G. McClelland, Dalhousie).

#### Harbour seal *Phoca vitulina*

Navigation in harbour seals is being studied. Harbour seals on Sable Island, Nova Scotia, cross extensive sand flats to reach some inland lakes on the island, where they breed. The research on this behaviour has been designed to find out whether the seals find the lakes (and, on their return journey, the sea) by using local landmarks or by using the equivalent of a map and compass. It has been shown that the latter is the case, and that the seals can identify the magnetic meridian. (H. James, R.W. Dykes, Dalhousie).

The vibrissae of the harbour seal are being examined. Harbour seals are being trained to use their vibrissae discriminatively to obtain food, in order to determine the absolute and differential thresholds for this sensory modality. Studies of free-swimming harbour seals are also being made, to find out what functions are served by the vibrissae in this species. (D. Renouf, Dalhousie).

The characteristics of sensory receptors serving vibrissae of seals comprise another study. In the light of several hypothesized functions for these sensory structures, the functional limits of the afferent nerve fibres innervating the vibrissae have been defined in terms of amplitude and frequency of mechanical stimuli which will elicit sensory signals. Afferent inputs controlling diving bradycardia have been studied in other experiments (R.W. Dykes, Dalhousie).

Captive harbour seals are being used in a study of the pathology and course of infection with anisakines and coccidiosis (G. McClelland, Dalhousie).

#### Harp seal *Fagophilus groenlandicus*

The harp seal will be examined in the future as to diving responses, sensory physiology, normal parental-offspring behaviour, periodicity and seasonality of phonations, target discrimination, migratory pathways and socio-economic values to man (K. Ronald, Guelph).

A study is underway on the interaction of metabolic rate, dive patterns and selected respiratory parameters with water and body temperature in restrained and free-swimming harp seals (J. Gallivan and K. Ronald, Guelph).

A study was carried out to determine how harp seal pups survive birth in arctic winter when they are born without a thick layer of subcutaneous blubber. Brown adipose tissue was examined in connection with this. (J.H. Grave, A.S. Blix and A. Pásche, University of Oslo and University of Tromsø in conjunction with K. Ronald, Guelph).

An electromicroscopic study of the structure of three skeletal muscles (pectoralis major, psoas and longissimus dorsi) of the harp seal was carried out. Two types of fibres, the dark and the light, comparable to the red (type 1) and the white (type 2) of other vertebrate skeletal muscles, were recognised while an intermediate third type could clearly be distinguished in the pectoralis major. All the fibre types contained considerable amounts of glycogen, and large aggregations of mitochondria and lipid droplets were seen in dark fibres. Although the presence of large mitochondrial aggregations and lipid droplets suggests the possibility of fat being used as fuel for muscular energy, it is postulated that the seal muscle is geared basically for anaerobic use of carbohydrate and a limited amount of fat may occur during surface swimming. Also mitochondrial aggregations and lipid droplets in dark fibres of adult and pup muscles may represent an adaptation for thermogenesis comparable to that of brown adipose tissue. (J.C. George and K. Ronald, Guelph).

Three types of fibre, dark (type 1), light (type 2) and intermediate (type 3) were distinguished in the caval sphincter muscle of the diaphragm of the harp seal by histochemical and electromicroscopic techniques. The dark fibre contained large peripheral aggregations of mitochondria, numerous lipid droplets and dense aggregates of glycogen granules. The same features were observed in the dark fibre of the diaphragm muscle. In the light of the low oxidative enzyme activity and high lipase activity observed in the diaphragm and other skeletal muscles of the harp seal in previous studies, it is postulated that these mitochondrial aggregations and lipid droplets represent an adaptation for the generation of heat through non-shivering thermogenesis comparable to those in brown adipose tissue. The lack of regional differences in the fibre composition of the harp seal diaphragm, as has been reported in the rat diaphragm, is attributed to the seal's larger body size, lower metabolic rate and diving habits (J.C. George and K. Ronald, Guelph).

Seals must mobilise energy reserves during migration for necessary exercise, thermoregulation, dietary changes, etc. In other mammals it is known that necessary reserves such as lipids and carbohydrates can be regulated by growth hormone. It was therefore of interest to determine to what extent harp seals of different sexes and ages could regulate body reserves. Blood samples from male and female seals of different ages indicate that plasma growth hormone levels change and therefore that this hormone may indeed be one of the internal parameters regulating energy requirements for seal migration. (B.A. McKeown and K. Ronald, Guelph).

Investigations on levels of plasma free fatty acids and glucose have been carried out so as to correlate these with changes in the levels of plasma growth hormone. (T.M. John, J.C. George and K. Ronald, Guelph).

The following studies are planned for 1975. The respiratory activity of harp seal blood is to be carried out. The capacity of harp seal

skeletal muscle to oxidise fatty acids will be studied. The ability of the mitochondria of seal tissues to uncouple oxidative phosphorylation for thermogenesis is also expected to be investigated. (J.C. George, Guelph).

An experiment consisting of the controlled exposure of captive harp seals to methyl mercury chloride was conducted in order to establish the distribution of mercury residues in the various tissues and the effects of such distribution (K. Ronald, Guelph and J. Uthe, H. Freeman, Halifax Laboratory, Fisheries and Marine Service, Nova Scotia).

The distribution and accumulation of methyl mercury in the brain of the harp seal and the resulting pathological consequences are being studied (S.V. Tessaro and K. Ronald, Guelph).

#### Monk seal *Monachus monachus*

Three different surveys of the distribution and population dynamics of the Mediterranean monk seal were made in 1974 covering most of the Mediterranean Sea and Aegean Sea. The result was that conclusions were made regarding the present distribution and numbers of this seal and the measures necessary for its preservation (K. Ronald and P. Healey, Guelph).

Further studies will be carried out on the monk seal, especially in regard to its ionic and thermal regulatory function. It is expected that two Hawaiian and two Mediterranean monk seals will be brought into captivity at Guelph and Rodos. These will provide basic data on the future of *Monachus monachus* in the Mediterranean and also a possible breeding colony. (K. Ronald, Guelph).

#### Ringed seal *Pusa hispida*

A comparative anatomical study of the cochlea and cochlear nuclei of the harp and ringed seals was done. See under harp seal for details. (F. Ramprashad, Guelph).

Polar bear and ringed seal energetic relations. An investigation of the nutritional dynamics of the polar bear as related to the energy and nutritional content of its main prey, the ringed seal, is in progress. (R.C. Best, K. Ronald, Guelph).

Investigations of the underwater hearing abilities of the ringed seal considered the absolute sensitivity and the influence of noise masking on the threshold. A determination of upper frequency discrimination limit is currently being conducted. (J. Terhune and K. Ronald, Guelph).

A study is underway on food conversion efficiency and metabolism in ringed seals, with emphasis on defining its trophic position and influence in the arctic food chain. (J.R. Geraci, Guelph).

Ringed seals will be examined further as to diving responses, sensory physiology, normal parental-offspring behaviour, periodicity and seasonality of phonations, target discrimination, migratory pathways and socio-economic values to man. (K. Ronald, Guelph).

#### Walrus *Odobenus rosmarus*

A behavioural study of the walrus was conducted at a major haul out site on Coats Island, northern Hudson Bay, during the summer of 1974. The results of this study, integrated with a literature review of the biology of this species, will form the basis of a M.Sc. thesis (B. McCulloch, McGill).

Steller and California sea lions *Eumetopias jubata* and *Zalophus californianus*

An intensive study of the breeding biology of the main pupping rookery of the Steller sea lion at Cape St James, southern tip of the Queen Charlotte Islands, is in progress. Factors influencing survival of pups in the first two months of life are being determined and behavioural studies on male territories are being done. A ten year project of pup tagging at the Cape and through the Kerouard archipelago is going into its third year. Its purpose is to determine mortality rates, seasonal movements, relations between pupping and non-pupping rookeries. Periodic aerial censuses of sea lions along the entire British Columbia coast are being done to discover population trends, seasonal movements and also to follow trends in the winter northward incursion into British Columbia waters of the California sea lion. Behavioural interactions between Steller and California species in winter in the main areas of their overlap are being observed. The two field stations for the sea lion work are Cape St James and an island in Barkley Sound (H.D. Fisher, U.B.C.).

General

Distribution and synthesis of vitamin C is being examined in arctic marine mammals with a view towards tracing its origin and abundance in the diets of hunting native peoples. (J.R. Geraci, Guelph).

A study of the behavioural, physiological and biochemical effects of oil immersion and ingestion in seals is underway. The study is designed to determine possible consequences of an oil blowout or spill in the western Canadian Arctic. (J.R. Geraci, Guelph).

A study of the distribution of tissue enzymes in three species of phocid seals is nearing completion. Eight enzymes have been located with tissues, and their release into the blood stream is being used as an indicator of damage to its parent organ. It is now possible to determine mild sub-clinical damage to organs due to environmental pollutants, trauma, and disease. (J.R. Geraci, Guelph).

Relationships between baleen whales, pelagic schooling fish and sea birds on a summer feeding ground are being studied. Particular emphasis is being placed on feeding of the greater and sooty shear waters off the coast of Nova Scotia (D.E. Gaskin, Guelph).

Denmark

(F.O. Kapel)

Institute of Physiology, University of Odense (S.H. Andersen)

The group working on the harbour porpoise (*Phocoena phocoena*) has continued studies on rearing of suckling porpoises, case studies of net-captured porpoises, training and taming of animals in captivity, short-tone audiometry, echolocation, and behaviour.

Studies of the general physiology of the harbour porpoise have been initiated, especially in relation to prevention and treatment of diseases of animals in captivity.

Greenland Fisheries Investigations, Charlottenlund (F.O. Kapel)

Hooded seal

New data on age composition of catches in South Greenland 1973 were presented at the annual meeting of ICNAF (Res. Doc. 74/85).



Sampling in 1974 resulted in material from South Greenland of the same size as the previous years (about 200 jaws) and a comparative large sample from Northwest Greenland, which will allow for an analysis of the composition of catches in that area. Very little was obtained from other parts of Greenland.

Plans for 1975 include continued sampling in East, South and Northwest Greenland.

#### Harp Seal

Sampling of jaws and data in northwest Greenland gave satisfactory material also in 1974. Results of age analyses of the 1973 and 1974 samples seem on the whole to confirm previous findings and are under preparation for presentation in ICNAF's Panel A.

Unfortunately, efforts to obtain material from other parts of Greenland gave disappointing results, and plans for sampling in 1975 will again concentrate on the main hunting areas in northwestern Greenland.

#### Ringed seal

In 1974 funds were obtained which made it possible to set up a special programme for investigation of ringed seal populations in Greenland, and to employ a scientist (Jens Christiansen) to develop this programme.

After initial studies of relevant literature and the material previously collected in Greenland, the northern part of Upernavik district was chosen as study area and two periods of field studies were planned in the spring of 1975 and 1976. In addition to extensive sampling of material for age determination and other biological data the project includes observations with the purpose of estimating population density in breeding areas and collecting of detailed information on hunting methods and catch effort. A computer programme has been developed in order to facilitate handling and combining all data.

#### Other studies

A survey of the catch of smaller cetaceans in Greenland was submitted to the relevant sub-committee of IWC in April 1974. Other studies on whales have not been possible.

Sampling of tissues from marine mammals for analysis of the content of heavy metal salts and chlorinated hydrocarbons was continued in 1974.

#### Finland

(O. Stenman)

#### Ringed seal (*Pusa hispida*)

A study of the ecology and etiology of the ringed seal in the Bothnian Bay has been carried out since the spring of 1956. In 1974 particular attention was paid to the occurrence of these seals, and research methods were improved and made more precise. The results of an aerial survey were compared with those obtained by observing seals from ships and boats. Samples for the analysis of pesticides were collected throughout the year. (Dr E.S. Nyholm, Kuusamo).

A study of the reproduction of the ringed seal in the Bothnian Bay has been carried out since the autumn of 1972. The material consists of individuals shot during the moulting time on the spring ice and those caught with seal nets in the autumn. In the study area ringed seals more than 20 years old are still common; the oldest individual in the material is 36 years old. The mean age of the females is higher than that of the males. The reproduction rate is low and declines with age; the proportion of pregnant females in the autumn material is over 30% among the young age classes, and only about 20% among the older ones. In order to reveal the reasons for this weak reproduction rate, a study of pesticides in the samples of this material was begun. Aerial surveys were started in the spring of 1974 to obtain data on the size of the population in the Bothnian Bay. (E. Helle, Department of Zoology, University of Oulu).

Jaws have been collected since 1969 to study the age structure of ringed seals caught. (Dr I. Koivisto and E. Niemelä, Korkeasaari Zoo, Helsinki).

#### Grey seal (*Halichoerus grypus*)

Jaws have been collected since 1969 to study the age structure of grey seals caught. (Dr I. Koivisto and E. Niemelä).

Aerial surveys of grey seals were started in the summer of 1974. (E. Niemelä and O Stenman, Finnish Game and Fisheries Research Institute, Game Division, Helsinki).

#### Damages caused by seals

An inquiry into damages caused by seals to salmon fisheries was sent to about 450 fishermen before the fishing season in the autumn of 1974. The results will be published in the spring of 1975. (O. Stenman and E. Niemelä).

### France

(R. Duguy & M.H. Aloncle)

Les travaux de recherches effectués au cours de l'année 1974 ont permis de poursuivre, en collaboration avec l'Institut Scientifique et Technique des Pêches Maritimes, le programme général d'étude établi lors de la création du Centre d'Etude des Mammifères Marins (C.E.M.M.) en 1972.

La partie fondamentale reste constituée par les données sur les échouages des Mammifères marins des côtes de France. Pendant l'année 1974, cinquante-neuf observations ont été relevées : 15 d'entre elles - 11 en Manche et 4 en Atlantique - concernent le Phoque gris (*Halichoerus grypus*) et 2 en Manche concernent le *Phoca vitulina*. Les Cétacés, 42 au total, se répartissent entre la Manche (4), l'Atlantique (18) et la Méditerranée (20); ils appartiennent aux espèces suivantes : *Stenella coeruleoalba* (8), *Delphinus delphis* (12), *Tursiops truncatus* (5), *Orcinus orca* (1), *Globicephala melaena* (3), *Phocoena phocoena* (1), *Physeter macrocephalus* (3), *Ziphius cavirostris* (7), *Balaenoptera borealis* (1) et *Balaenoptera physalus* (1).

Outre les données de biologie générale et de faunistique, ces animaux ont fourni un certain nombre de prélèvements destinés à la poursuite des recherches sur les pollutions, notamment les métaux lourds et les hydrocarbures. D'autre part, deux squelettes complets, trois crânes, et un phoque naturalisé ont pu être conservés dans les collections du Muséum de la Rochelle.

Une autre partie importante du programme de recherches a été poursuivie dans le domaine des observations de Cétacés à la mer. Dans l'Atlantique nord, les données ont été récoltées par différents navires océanographiques et, en particulier, par les frégates météorologiques "France I" et "France II". Ces observations, dont le nombre dépasse actuellement 300, nous ont permis de présenter une première étude sur les Cétacés du Nord-Est Atlantique au Conseil international pour l'Exploration de la Mer, à Copenhague, en octobre 1974.

En Méditerranée, plus de 200 observations ont été récoltées dont plus de la moitié concerne le Rorqual commun (Balaenoptera physalus). Une mission commune ISTPM-CEMM a permis d'étudier, en mai 1974, les Deplphinidés du Golfe de Marseille; aussi l'ensemble de ces données ont-elles été utilisées pour la présentation d'une note à la Commission Internationale pour l'Exploration Scientifique de la Méditerranée, à Monaco, en décembre 1974.

On doit également signaler la mise en route, depuis avril 1974, d'un programme d'étude sur le Phoque gris (Halichoerus grypus). Ces recherches sont organisées en collaboration avec la Faculté des Sciences de Brest et en liaison, en ce qui concerne les marquages, avec l'organisme anglais "Seal Research Division" du Laboratoire de Lowestoft.

Il est à noter, pour terminer, que l'inventaire systématique des Mammifères marins conservés dans les collections françaises a pu être continué et que deux catalogues ont été publiés : celui du Muséum de la Rochelle (1er supplément) et celui de l'Institut Biologie Marine d'Archachon.

Germany, Federal Republic of

(D. Sahrhage)

In continuation of the research on European seal (Phoca vitulina) which started in 1970, further aerial surveys have been made monthly between April and September 1974 for counting animals in the Waddensea along the Niedersachsen coast between the rivers Ems and Elbe. 1 086 seals were counted in July in this area (1973 : 828). Special attention was given to the age composition and recruitment of the population, and dead seals were counted and investigated as far as possible. Tagging was continued in 1974, and a total of 170 seals have been marked with yellow plastic tags so far in this programme. Only 2 recaptures were reported during 1974 from Holland and Denmark. Some tagged seals were found again at the locality where they had been marked. Studies have also been initiated on the protein in the blood of the young seals and the aetiology of ulceric disease of the skin. The investigations on the seal population will be continued in 1975, in collaboration with scientists from Schleswig-Holstein (where parallel studies will commence in 1975), and from Holland and Denmark. (Further details can be obtained from Prof. H. Kraft, Medizinische Tierklinik der Universität München, Veterinärstrasse 13, 8, München 22).

Iceland

(J. Jónsson)

In the 1974 season a total of 285 fin whales, 71 sperm whales and 9 sei whales were caught by the four catchers operated by the only whaling station in Iceland.

The number of fin whales caught is 43 animals more than the 1948 - 1973 annual average of 242.

There has been a decrease in the number of sperm whales caught since 1960, whereas the number of sei whales shows quite a big fluctuation from one year to another.

Biological material was collected from most of the landed fin whales for the National Institute of Oceanography, England.

#### Ireland

No report received.

#### Netherlands

(Th.J. Tienstra & R. Boddeke)

In 1974 research on marine mammals was carried out by the following persons and institutes :

van Bree, P.J.H.: Systematics of mammals (Cetacea). Institute for Taxonomic Zoology of the University of Amsterdam, Amsterdam-C.

Dral, A.D.G.: Anatomic research on the eyes of Tursiops truncatus. Netherlands Institute for Sea Research, Texel.

van Haaften, J.L. & P.J.H. Reijnders: Field studies of the common seal (Phoca vitulina) to explain the causes of the decrease of the stock in the Waddensea, in cooperation with scientific workers in Schleswig-Holstein and Denmark. R.I.N. Kemperbergerweg 1, Arnhem (van Haaften) and Netherlands Institute for Sea Research, Texel (Reijnders).

Dudok van Heel, W.H.: Research on medical problems in Tursiops truncatus notably on blood values and toxic elements caused by pollution. Dolfinarium, Harderwijk.

van Utrecht, W.L.: Growth, age determination, population studies and distribution of Cetacea. Zoological Laboratory, University of Amsterdam, Amsterdam-C.

#### Norway

(Å. Jonsgård & T. Øritsland)

#### Whales (Å. Jonsgård)

The only Norwegian whaling carried out in 1974 was for small whales in the northern North Atlantic Ocean. A total of 84 Norwegian vessels caught 1 820 minke whales, 6 killer whales and 1 pilot whale. Completed questionnaires containing information on date, locality, species, sex, body length, and if present length and sex of foetus, were received for almost every individual whale caught.

The Norwegian whaling for small whales is regulated by licences, area and time restrictions. The following additional restrictions were put into effect for the 1974 season : in the waters north of 70°N and east of 20°W (the White Sea included) whaling was limited to the period of 1 May to 30 June, for all other areas of whaling, except for the waters west of 44°W (Cape Farewell), whaling is permitted from 15 April to

August 31. For the waters west of 44°W whaling is permitted from 15 May to 31 August.

Further work on stock assessment of minke whales have been carried out at the Department of Marine Zoology and Marine Chemistry, University of Oslo. A paper on the subject is expected to be ready in summer 1975.

In the 1974 season a considerable amount of research work on small whales was performed by the Institute of Marine Research in Bergen. This work covered markings of whales, collection of biological material and sightings.

#### Markings

A marking voyage to the northeast Atlantic with the primary aim of marking minke whales was carried out with two vessels. The money was allocated from the "Hvalfangstnæringens Sikringsfond". The voyage began from Svolvær, 10 July and returned to the same place on 20 August. Each of the boats sailed a total of approximately 3 700 n.m. in open waters and all the observed whales were marked whenever they came within range. Unfortunately the weather was not of the best, and a majority of the trip was spent in fog with poor visibility. Altogether 51 minke whales and 12 humpbacks were marked. Two more minke whales were marked on an expedition to mark basking sharks in the North Sea and off the Norwegian coast in May and June.

#### Biological material collected

Collection of biological material from the western North Atlantic whaling grounds was continued in the 1974 season.

In May and June, an observer traveled with a small whale catcher boat to study the whales off east Greenland. Material has previously been collected from 69 animals caught in this area. Unfortunately the weather conditions in 1974 were exceedingly poor, and only 3 whales, all females, were taken south of Jan Mayen. There was also an observer on the whaling ground west of Greenland from May to September, with an additional 2 observers in July and August. One of these catchers also caught four minke whales off east Greenland.

A total of 163 minke whales were examined off west Greenland, 140 of which were females and 23 males. The percentage of females was nearly the same in 1974 (85.2%), as in 1973, (85.9%). In 1974 the females measured from 493 cm to 900 cm, with an average length of 774 cm, as opposed to the average length of 757 cm in 1973. The males in this area measured from 605 cm to 820 cm with an average of 743 cm as opposed to the average of 766 cm in 1973. In other words, the females in 1974 were larger than in the previous year, while the males were smaller. This was probably caused by segregation on the different whaling grounds.

Examinations of the stomach contents of 38 whales from west Greenland showed that 58% had eaten krill, 24% sand eels and 18% unidentified fish. The stomach contents of 2 animals from east Greenland were also examined. Both contained capelin. All 3 of the whales caught south of Jan Mayen had eaten krill.

#### Sightings

In the area between the Norwegian coast and east Greenland (Iceland waters included) the following whales were observed : 109 fin whales, 15 sei whales, 40 sperm whales, 2 bottlenose whales and 3 unidentified large whales. In addition a minimum of 117 minke whales, 325 porpoises, 307 pilot

whales and 10 killer whales were seen. The majority of these were sighted in the waters from western Iceland to east Greenland. Off west Greenland, the following whales were observed :

3 humpback whales, 33 sperm whales, 2 killer whales, 1 bottlenose whale and 50 porpoises. In addition, a minimum of 583 minke whales, 138 fin whales and 70 pilot whales were seen. However, these two sets of observations cannot be compared. Off west Greenland, the observers remained on the grounds for a longer period of time than the observers off east Greenland where the boats tended to simply sail straight across. Another factor that enters into the picture is that the observers off west Greenland were frequently occupied gathering other material.

The following whales were seen during the marking voyage in the northeast Atlantic Ocean:

259 minke whales, 20 humpback whales, 1 fin whale, 1 500 - 2 000 white beaked dolphins and 17 porpoises. Sixteen minke whales, several hundred killer whales and about 10 Sowerby's whales were observed on the North Sea expedition in May and June.

At the Department of Marine Zoology and Marine Chemistry, University of Oslo, a part of the material from large whales being collected in postwar seasons is now under preparation. The studies now being undertaken include:

- 1) Biology of eastern North Atlantic sei whales, based upon material collected from land stations on the west coast of Norway. A paper will probably be ready in the summer of 1975.
- 2) Patterns in the baleen of large whales. The possibility exists that different populations of large whales may have different patterns in their baleen. A study on Antarctic blue whales is now in progress.

According to information received from the Norwegian Polar Institute, baleen plates and remains of skin and blubber originating from a Greenland right whale (bowhead) were found in August 1974 on the west side of the Barents Island (Storfjorden) in the Spitsbergen area. No bones were reported to be found. a 3.40 metre long baleen plate deriving from the animal has been received by the Department of Marine Zoology and Marine Chemistry, University of Oslo as a gift from the Polar Institute.

#### Seals (T. Øritsland)

In 1974 field work was continued by the Sea Mammal Section of the Institute of Marine Research, Bergen, for studies of the exploited stocks of harp and hooded seals (T. Øritsland, T. Benjaminsen and B. Bergflødt). Representatives worked at Newfoundland on a commercial sealer from 11 March to 21 April in the West Ice (the Jan Mayen area of the Greenland Sea) on the relief vessel from 22 March to 30 April in the East Ice (the southeastern area of the Barents Sea), on a commercial sealer from 2 April to 10 May and in the Denmark Strait on a chartered sealer from 19 June to 7 July. A partial survey of coastal seals was also initiated. In the laboratory efforts were directed towards the processing and analysis of accumulated material, particularly the age samples collected in recent years.

#### Harp seals (Pagophilus groenlandicus)

Ice edges and the distribution of seals on the ice were plotted at Newfoundland, in the West Ice and in the East Ice, and age samples were collected from 1 232 moulting harps at Newfoundland and 975 moulting harps in the East Ice. Long term studies of pup development and growth of changes in sex- and age-composition in moulting lairs and weight & condition through the

moulting season were continued.

Seven pups were tagged in the West Ice and six in the East Ice. At Newfoundland 4 sub-adults which had been tagged in the same area in 1971 and 1972, were recaptured. One sub-adult tagged at Newfoundland in 1972 was recaptured in West Greenland in June. In the East Ice one sub-adult tagged in this area in 1972 was recaptured.

Age samples from Newfoundland have been processed and a provisional analysis of samples collected from moulting seals from 1971 to 1974 show that the annual pup production at Newfoundland in the mid 1960's was about 400 000. This result implies that production was higher than assumed also in 1971 when ICNAF estimated the present TAC (Total Allowable Catch) for Northwest Atlantic harp seals. A full analysis will be submitted to ICNAF for consideration.

The age sample collected in the East Ice in 1974 has not been processed yet, but data from previous samples have been analysed. Using the strength of year classes and the statistics for Norwegian and Soviet catches in this area and in the White Sea, a minimum estimate of 150 000 was arrived at for annual pup production of White Sea harp seals before the fishery was restricted in 1965. Year class strengths indicate a further decline until the trend turned in 1969 or 1970. The minimum estimate of pup production for 1975 is 175 000, increasing at a rate of at least 4% per year. The present sustainable yield of White Sea-Barents Sea harp seals is estimated to be at least 65 000 per year.

#### Hooded seals (*Cystophora cristata*)

The distribution of hoods on the ice was plotted at Newfoundland, in the West Ice and in the Denmark Strait. Age samples were collected from 980 breeding seals at Newfoundland and from 1 200 moulting seals in the Denmark Strait. Special long-term studies of the growth and development of lactating and weaned pups, of age and growth of the species in different areas and of changes in weight and condition through the breeding and moulting seasons, were continued.

Frequencies of weaned pups among 1 535 counted at Newfoundland from 21 March to 2 April indicate that 50% were weaned and abandoned by their mothers on 25 March. Other observations strongly suggest that 50% of the births had occurred on 16 March and therefore also that hooded seals at Newfoundland on the average lactate for 9 days only.

Three pups were tagged in the West Ice and 101 sub-adults and adults were tagged in the Denmark Strait, the first hoods ever to be tagged in that area. Four adults were recaptured in the West Ice, from five to eight years after they were tagged in the same area. Incidentally, they were all tagged by "Jumbo Rototags" (Dalton Supplies Ltd., Henley-on-Thames, England), and thus we have an eight-year recovery of this tag which seems highly suitable for seals.

The age sample from the Denmark Strait has been processed together with a sample of 858 hoods collected in 1972. An analysis of the age compositions in all samples collected from moulting hooded seals in the Denmark Strait from 1955-1974, comprising nearly 13 000 seals, is being prepared for publication. Provisional results indicate that the average total mortality of adults decreased from about 0.27 in the years before 1960 to about 0.20 in recent samples. This development is believed to reflect the protection of hooded seals in the Denmark Strait which was introduced in 1961.

#### Common seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*)

Initial surveys on the coast of Norway at Vega in Nordland county and at Harø in Møre and Romsdal county, indicate that local populations of common

and grey seals have increased during the last decade. A similar survey made by the Zoological Museum in Trondheim (O. Frengen) at Froan in Sørtrøndelag county, suggest that the population of grey seals in that area probably has been maintained since the last survey in the middle of the 1960's.

#### Other species

A study of the general biology of bearded seals (Erignathus barbatus) was continued (T. Benjaminsen), and supplementary material from 50 seals was collected in the East Ice. Some 250 bearded seals and 23 walrus (Odobenus rosmarus) were recorded near Kolguev Island in the southeastern Barents Sea in April.

Data collected in 1964 on the feeding of seals in the Antarctic pack ice, have been analysed (T. Øritsland). Total consumption by the four species, the crab-eater (Lobodon carcinophagus), the leopard seal (Hydrurga leptonyx), the Ross seal (Ommatophoca rossi) and the Weddell seal (Leptonychotes weddelli), was estimated at 85 million tons per year. About 85% or 72 million tons of these are krill taken by crabeater seals.

#### Research at other institutions

Physiological studies on seals have been continued at the Institute of Zoophysiology, University of Oslo (J. Krog, A. Påsche and N.A. Øritsland), the Institute of Nutrition Research, University of Oslo (H.J. Grav) and the Institute of Medical Biology, University of Tromsø (A.S. Blix), partly in collaboration with other institutes.

#### Poland

No report received.

#### Portugal

No report received.

#### Spain

No report received.

#### Sweden

(S.J. Sjøgren)

Research on Baltic Seals, carried out at the Swedish Museum of Natural History, Stockholm.

- a) Material consisting of about 4 000 lower jaws collected from seals killed in Sweden during 15 years is now being investigated in order to clarify the status of the populations, as far as age composition, survival rate and population size are concerned.
- b) Blubber from seals killed is collected for analysis of DDT and PCB compounds. So far the results show no connection between the values found and the age of seals. No obvious difference in levels was observed between the sexes. The levels are clearly higher in the Baltic proper, than along the west coast, the Åland Sea or in the Bothnian Bay.



- c) DDT and PCB have been suspected to cause an increased frequency of abortion among Californian sea lions. The levels there have been of the same order of magnitude as those found in the Baltic seal populations. Seals have a delayed implantation. This mechanism is controlled by steroid hormones. Certain observations indicate that seal populations in the Baltic have partly suffered a disturbance in this mechanism. Studies have been initiated to throw further light onto this problem.
- d) Surveys by aircraft to carry out a census will (as well as the tagging operations) be intensified in order to improve the knowledge about population size and to supply data for the creation of seal sanctuaries.

#### United Kingdom

(B. B. Parrish and W. N. Bonner)

##### Seals (W.N. Bonner)

The Seals Research Division (SRD), Institute of Marine Environmental Research (a component body of the Natural Environment Research Council) continued its research on British seals. Other British seal research was done by the Department of Agriculture and Fisheries for Scotland (DAFS), the Natural History Society of Northumbria (NHSN) and in the Antarctic by British Antarctic Survey (BAS).

##### Common seals (*Phoca vitulina*)

A boat survey of Common seals in the Outer Hebrides was made in July from which a minimum population estimate of around 1 300 was derived. There was no seal hunting in the Wash in 1974 and it was not possible to make the usual population estimate based on recapture in the hunters' catch of previously marked animals. It is interesting to note that despite the absence of disturbance by the hunters' activities the number of reports of dead and starveling pups around the Wash fell within the range for previous years.

##### Grey seals (*Halichoerus grypus*)

A boat survey of the Welsh coast between Tenby and Anglesey was made in September-October and a pup production of about 800 was estimated; this is equivalent to an all-age population of nearly 3 000, considerably more than had previously been believed to inhabit this area. In Orkney Grey seal breeding localities were visited by boat in October. Pup production was estimated at more than 2 900, equivalent to an all-age population of over 10 000. Although this estimate is greater than earlier ones it is not certain that it represents an increase in seal numbers; analysis of earlier Orkney data, currently in progress, should clarify this. Combined ground counts and aerial surveys in the Outer Hebrides suggest a continuation of the upward trend of pup production; increases occurred at the Monach Isles and, to a lesser extent, at Gasker. An aerial survey of North Rona on 27 October, despite very bad weather, yielded high quality photographs from which 1 220 pups were counted. This is equivalent to a total production of 2 200, about usual for this assembly. At the Farne Island NHSN carried out a full programme of census work in which SRD participated. A total pup production of 1 685 was counted; this is almost identical with that of 1973 (1 662).

SRD has investigated improvements to aerial survey techniques; the use of long focus lenses has made it possible to distinguish age categories of seal pups on the ground and it is hoped to develop a method of distinguishing living from dead pups using infra-red line scan equipment.

The study of nematode infection of young Grey seals continues. Initial infection occurs at about 9 weeks after birth and the number of worms increase to a first year maximum at about 10 months. There is an increase of worm burden with age together with a seasonal fluctuation in the number of worms. This suggests that immature Grey seals may have feeding rhythms similar to those of adults. The ratio of adult to larval nematodes confirms that while the Grey seal in British waters is not an ideal host for Anisakis simplex it is probably the principal final host for Terranova decipiens and Contracaecum osculatum.

Activity analysis of 24-hour periods of Grey seal bulls during the breeding season has been studied using night-viewing equipment. This confirms that activity during the hours of darkness is similar to that during the day.

Studies of the effects of seals on salmon fisheries was continued by DAFS. Records of seal sightings in the vicinity of salmon netting stations and the incidence of damage to catch and gear were collected from commercial netmen. Observations on stomach contents of Grey and Common seals continued and samples of blubber were collected for analysis of organochlorine pesticide and PCB residues. An investigation into the development of an acoustic deterrent against seals at salmon netting stations was begun. SRD has studied the responses of a captive Common seal to different sounds using sound projection equipment and underwater television.

BAS completed the fieldwork on the population ecology of the Antarctic fur seal, Arctocephalus gazella, in South Georgia. The results show an increase from an estimated pup production of 4 500 in 1956 to a minimum total production of 43 000 (perhaps as much as 60 000) in 1972, implying an all-age population of around 150 000 - 200 000). Although in 1956 all births occurred on off-lying islands the majority now are on mainland South Georgia and many new breeding sites have been established. Increasing numbers of fur seals are observed at the South Orkney and South Shetland islands.

Age analysis of seals taken for dog food, mainly Crabeater seals, Lobodon carcinophaga, continues, as does the marking study of Weddell seals, Leptonychotes weddelli, at the South Orkney islands. The results of both these projects will be used in the study of the population dynamics of Antarctic seals.

#### Whales (R. Gambell)

The following programmes of research on whales were carried out by staff of the Whale Research Unit, Institute of Oceanographic Sciences.

With the cooperation of the Marine Research Institute in Reykjavik and the whaling company Hvalur H.F., a collection of ear plugs from 236 fin and 6 sei whales, and of teeth from 33 sperm whales, was made at the Iceland whaling station during the 1974 whaling season. These are being examined for studies of the age composition of the catch. The company also continued to record sightings of protected blue and humpback whales made on the whaling grounds during the season. Analysis of these records collected over a number of seasons provides evidence on the status of the stocks of these two species in Icelandic waters.

All the Unit's collections of ear plugs from fin whales made before 1960 have now been re-examined in a study of the age at sexual maturity of different year classes, and it is hoped to investigate any differences between the Antarctic whaling areas.

During the survey of the common seal population in the Outer Hebrides undertaken by the Seals Research Division of the Institute for Marine Environmental Research in July, cetaceans seen in the area were recorded and the possibilities for developing studies of dolphins there were assessed. Of the strandings of cetaceans on the British coasts which were reported to the Unit with the cooperation of the British Museum (Natural History), only one specimen of Tursiops truncatus was in sufficiently good condition for collections to be made.

The international whale marking cruise in the Indian Ocean which started in November 1973 continued until February 1974. This was jointly sponsored by Australia, South Africa, USA and UK. The cruise had to be confined to the southwestern part of the Indian Ocean because of the international oil crisis. It was, however, still very successful and of 472 large whales sighted, 167 were effectively marked (157 sperm and 10 baleen whales). The diving and respiratory behaviour of 43 whales (28 sperm and 15 baleen whales of various species) were recorded for studies on metabolic rates. Six specimens of 5 species of smaller cetaceans were collected during the cruise for studies of their biology.

A short review of modern whaling in the northeastern North Atlantic and the status of whale stocks in the region was prepared for a symposium of the Mammal Society. This includes new compilations of catch statistics for British whaling stations. The relationship between the stranding mortality and population abundance of smaller cetaceans in British waters has also been examined. Biological and catch data bearing on stock assessments world-wide have been reviewed and the concept of inter-specific density dependent reproduction parameters developed for sei whales in the southern hemisphere. Weight/length data of commercial species have also been reviewed, and the biomass of the annual Antarctic catches calculated.

The Unit was represented at the meeting of a sub-committee of the Scientific Committee of the International Whaling Commission which met in Reykjavik in November to prepare proposals for an intensified programme of research on the commercially important whales in the North Atlantic.

U.S.A.

(C. H. Fiscus)

Northern fur seal (Callorhinus ursinus)

During 1974, research on several aspects of the fur seal resource were carried out including monitoring and management, population dynamics, physiology, behaviour and pelagic life in the Bering Sea.

The commercial harvest took place on St Paul Island, Pribilof Islands from 24 June through 27 July and 32 976 male seals, ages 2 through 6 years were taken.

The behaviour research programme on St George Island, Pribilof Islands underwent a major shift in direction and intensity in 1974. Based on the precept that all factors which affect maximum sustainable yield, such as competition, mortality and recruitment, have measurable behavioural correlates, an attempt was made to identify those correlates that could be measured for immediate use by management and those that would be useful for long-term comparisons between harvested and unharvested populations.

In searching for measurable correlates and programme both population-wide and individual behavioural patterns were examined, all of which might be density dependent. Descriptive, comparative and experimental studies were performed simultaneously during this search, and all studies were quantitative. In addition to the data collected, a capability for immobilising adult males without drugs was developed, as was one of holding females, males and pups in captivity. As a result of the research in 1974, a few specific topics were selected for more intensive study in 1975.

Northern fur seals formerly hauled out on San Miguel Island, off the southern California coast, as did the Guadalupe fur seal, but were extirpated before 1850 by sealers. A small breeding colony of about 100 individuals was found in Adams Cove on the west end of San Miguel Island in 1968, and another breeding colony on Castle Rock, a small island located about 2 miles north of the west end of San Miguel Island in 1972.

The San Miguel population has been monitored since 1969 and allowed to develop undisturbed. The size of the population is increasing.

#### Gray whale (*Eschrichtius gibbosus*)

The annual count of gray whales in southbound migration was carried out from land near Yankee Point on the central California coast from 10 December 1974 to 7 February 1975 and 3 822 gray whales were counted. D. Rice and A. Wolman estimate a stable population of about 11 000 gray whales.

#### Killer whales (*Orcinus orca*)

Bi-monthly aerial surveys of Puget Sound in Washington State, the southern Strait of Georgia, British Columbia, and the Strait of Juan de Fuca, are being carried out by the NMFS in 1974-75, to obtain data on killer whale population size in this restricted area, and determine if this population moves in and out of the area regularly or is resident here throughout the year.

#### Bowhead whale (*Balaena mysticetus*)

The Eskimo harvest of bowhead whales in northern Alaska waters was monitored in 1974 to collect data on numbers of animals taken, gather biological data from these animals, and obtain information on time and duration of spring migration. In 1974, 15 bowhead whales were landed during spring whaling and 5 during fall whaling. This programme continues in 1975.

#### Porpoise

The NMFS programme to reduce porpoise mortality in the southeastern North Pacific tuna seining fishery continues.

#### Whale stock assessment

Studies on the population dynamics of the eastern North Pacific stocks of fin (*Balaenoptera physalus*) and sei (*Balaenoptera borealis*) whales are being carried out.

#### General

Through the Marine Mammal Project section, Protection of Nature and Organization of Preserves, US-USSR Environmental Protection Agreement, two US scientists, Mr Dale W. Rice, NMFS and Mr William Evans were

observers on a Soviet whale marking cruise in the eastern tropical Pacific Ocean in February-April 1975.

The marine mammal reporting and recovery programme of the Smithsonian Institution to obtain records of strandings and collect biological data from stranded specimens along the US Atlantic seaboard continued in 1974.

Studies of the distribution and abundance of marine mammals in the Gulf of Alaska region, of the eastern North Pacific, were started in 1974. The programme, which will continue for several years, is part of an overall study of the Marine Resources of this region.

#### U.S.S.R.

(V.A. Zemsky & Lev. A. Popov)

In 1974 investigations of sea mammals were conducted in the White, Barents and Kara Seas with regard to main items of the International Programmes. The following investigations were carried out :

#### Harp seal (White Sea population)

Observations on the formation and movement of puppy rookeries in the first half of March were made; an analysis of the age composition of adult females on the puppy rookeries was made, on the basis of the sample that was determined prior to observations; many years' data on the age and sex structure of males and females made it possible to follow the influence of the existing protecting measures on the character and intensity of the population growth. Data on the harp seal abundance are indicative of the delayed growth of the population. 500 adult females were examined for age composition, 1 485 puppies for sex composition, 117 animals were taken for racial analyses, 168 animals were weighed.

#### Ringed seal

Observations on the ringed seal feeding in the estuaries of the spawning rivers in the summer period were continued; the abundance of adult females in the winter period was determined; data for racial analyses of animals were collected and treated; observations on the autumn distribution of ringed seals were made from a research ship in most of the areas of the White Sea. A total of 144 animals were taken for biological analyses; 124 animals were examined for age composition, parts and organs of the body of 63 animals were weighed; organs of reproduction were examined in 60 animals; 60 animals were taken for racial analyses; feeding was investigated in 63 animals.

#### Beluga

Stationary observations on the movement of animals and the composition of shoals were conducted during a month and a half in the main fishing area of the White Sea (Takhonovo); killed belugas were thoroughly examined: 105 animals were studied for sex and age composition, morphology, weight, organs of reproduction, and feeding.

Parallel with these observations, problems connected with the calculation and establishment of limits for hunting by species and by fishing areas and seasons of the year, with sub-division into age and sex groups were solved. These measures are intended either to maintain the herds at the existing level or to ensure an increase in abundance.

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