Further Aspects of the Use of Aircraft in the Antarctic

The author before he left for the Antarctic. His clean-shaven appearance has now gone and he sports a beard comparable with those of his colleagues overleaf.

AIR-WHALING

By JOHN GRIERSON, Flight Commodore of Whaling Factory *Balaena*

IN our issue of March 27th, 1947, we published an account sent by John Grierson from the whaling ship "Balaena" while she was still in the Antarctic. The present article deals with subjects not covered by the first dispatch, and the author concludes by forecasting future developments in the use of aircraft for whaling

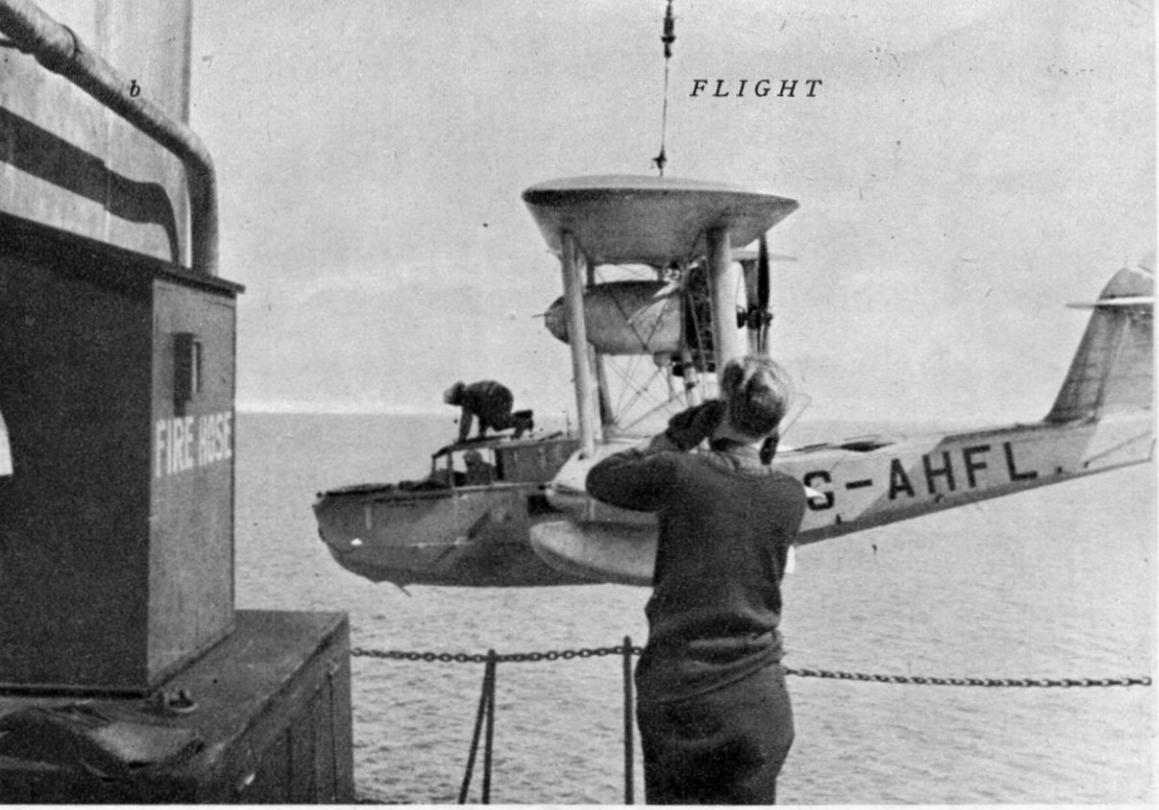
IT was not to be expected that the advent of a very modern device such as aircraft would be accepted immediately by a very old-established industry, like that of whaling. For this reason the reaction of the majority of Norwegians towards the experimental use of Walruses on *Balaena* was extremely critical. One of the best-known whaling-ship owners in Norway, Mr. Anders Jahre, stated his point of view in an address to his shareholders just two days before we reached the whaling grounds. He was reported in the *Tönsberg Blatt*, in an article under the heading, "Flying on the Whaling Grounds is an Advertisement—It is the Whaler's Cleverness which gives the Best Results," and this is the report of his reply when he was asked by one of the shareholders about the use of aircraft on the whaling grounds:—

An aerial-directed sperm whale chase. The catcher has just harpooned the whale and is playing it in.

"Jahre thought in his opinion aircraft could only be of use when applied to ice observations. When applied to observations of whales he thought that the result would be as good as nothing. The Cosmos Company (that is the company of which Mr. Jahre is chairman) were the first to try out aircraft at the end of the 20s, and this showed that it was very difficult to observe the existence of whales from any height. Time would show whether three aircraft could perform better than one Cosmos aircraft did. It was in his opinion the whaler's personal ability and experience which gives best results.

Conservative Scepticism

"Mr. Jahre's statement about aircraft on the whaling grounds was strongly underlined by an old whaler, whale gunner and whale manager, Herman Berntsen, who thought that aircraft were not of any use at the present time as the expeditions had no need to catch inside the



Flight Captain Nigel McLean, as directing officer, lowers "Booium" for a sea take-off. The telephone Captain McLean is using goes direct to the crane driver. Captain Collyer and Captain McLean took it in turn to direct operations when the other was flying.

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ice, but kept themselves out in the open sea. Mr. Jahre added that he believed aircraft were more of an advertisement than of use."

Several interesting points arise from the above newspaper report. The first is that the Cosmos Company did in fact use a Gypsy Moth seaplane as far back as 1929. The aircraft was carried on the deck of the whaling ship and slung overboard when the weather was fine enough to do so. The machine had no wireless whatever, or emergency equipment of the kind or on the scale which we would consider essential to-day. Consequently it was not very surprising that after two or three flights the machine disappeared into the blue and was never seen again. There were, therefore, no data of any conclusive type available as a result of the very small amount of flying done.

Another point is that if one is to accept as one's gospel that the whaler's personal ability and experience give the best results, then the door to science and all possible improvements in whaling is closed. Finally, the statement that at the present time expeditions keep themselves out in the open sea is quite contrary to our own experience. We worked along the ice edge for at least 90 per cent of the time while we were whaling, and I understand that the majority of other whaling ships did so too. How far our experience with aircraft proved that the theories of Mr. Jahre and his supporters were at variance with fact is illustrated by our ability to see whales under the water from 10,000 feet—a result which we had never expected ourselves and which was discovered accidentally as a result of a climb to obtain upper-air temperatures. Also we could see whales very easily, and follow them when they were beneath the surface, from 1,000 feet.

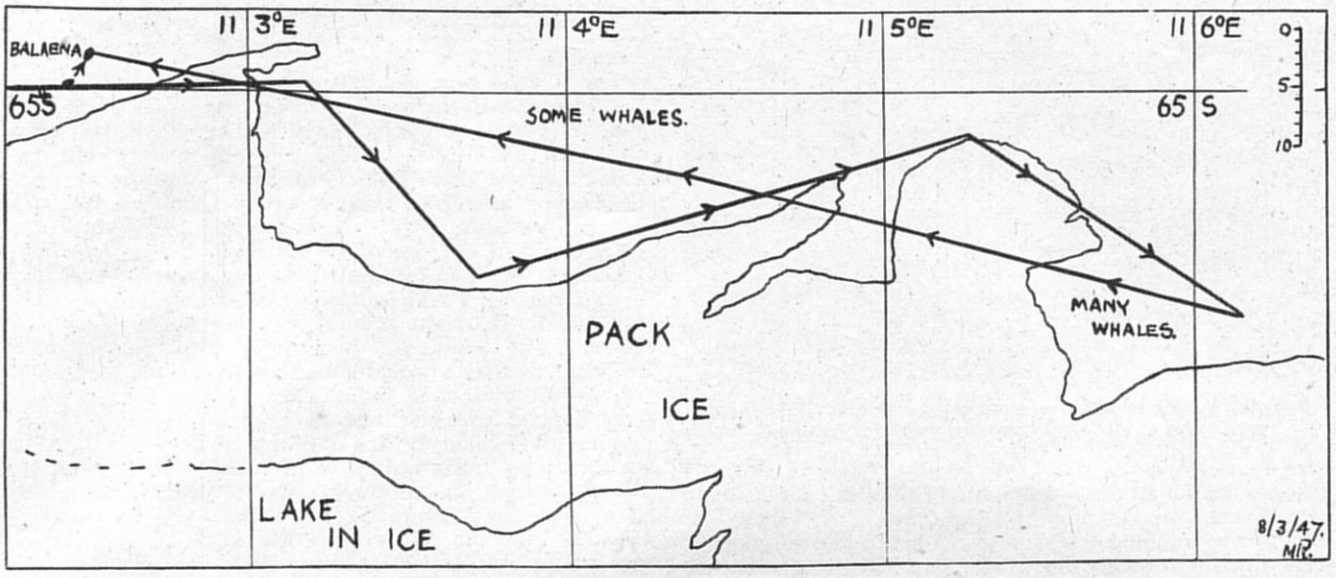
A typical whale-boat or catcher of 350 tons, lying astern of Balaena and about to pass a bull finwhale to the factory ship. The loaded harpoon gun is in the bows.

Many of the problems of operation turned out as we had expected them in kind, but varied considerably in degree. For instance, the weather was local and changeable, the magnetic compasses suffered in performance, but far less than we had expected because of the proximity of the Southern Magnetic Pole. The presence of small particles of ice in the sea proved a hazard, but a very much less important one than we had supposed, and special measures had to be taken to keep the aircrew adequately warm on flights ranging up to 5½ hours in duration.

Some Amphibious Problems

Above all, the correlation of flying with the normal practices and customs of an old-established business like whaling introduced a string of knotty problems. Weather affects seaplane flying more than landplane flying, because with the seaplane not only must the air conditions be suitable but also those of the sea. By using a catapult we could carry out our launches almost regardless of the roughness of the sea, but of course our sea limitation was still imposed by the conditions required for landing. The Walrus can alight in a sea with 15-20ft waves when flown by a skilled pilot. But there may be another limitation imposed by the rolling of the ship making the necessary cranework for the recovery of the machine impossible without risk of damage. However, such is the steadiness of a modern floating factory, and so skilled was our crane-driver, Leading Seaman Rogerson (on loan from the Navy), that we had few anxieties in this respect.

In the air, icing of wings and windscreens was encountered to a slight extent but never approached dangerous proportions. We had heard in England that Antarctic weather could change from sunshine to fog and falling snow within 20 minutes, and this proved no idle fallacy. Moreover, icebergs ranging in height up to 350ft provided a hazard never encountered over the sea in milder climes when flying low in bad visibility. The greatest care in



Furthest East. A typical ice sketch by Flight Navigator Jock Milroy.

maintaining a weather look-out had to be practised, both by the Flight Captain from the air and by Flying Control from the ship.

Much has been said about the danger of lumps of semi-invisible black ice floating mostly submerged, which are liable to cause severe damage to the hull or floats during landing. From my own knowledge of Arctic and Antarctic flying, I can only recollect one accident, and that in the Hudson Bay, due to this cause. There is no doubt that the risk exists, but perhaps by good luck it never developed as a serious danger in the area where *Balaena* was operating. On the other hand, we did find that a machine could survive collision with quite large lumps of ice during slow taxying, without sustaining any damage at all.

External and Internal Heating

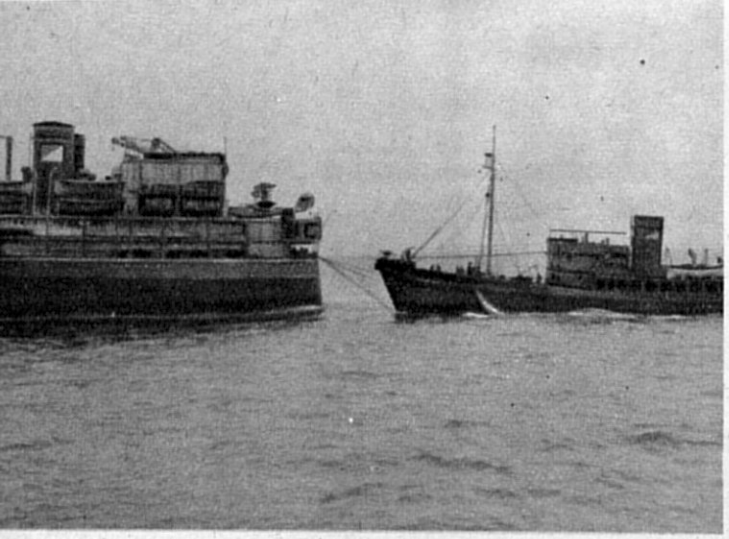
Keeping the aircrew warm in a small flying-boat is a hardy annual, rendered more acute by the conditions of the Antarctic. We tackled the problem in three ways—by fitting larger generators and batteries and wiring the aircraft to supply plugs for electrically heated clothing; by installing a petrol combustion heater to circulate and heat the air in the hull; and by carrying the usual vacuum flasks of hot tea, supplemented by self-heating tins of soup. Worn beneath the Naval immersion suit, which has already been described at some length in *Flight*, the electrically heated under-garments, comprising body liner, gauntlets and bootees, are very suitable for the flight captain, since he never leaves his seat during flight. On the other hand, a suit that has to be unplugged and replugged every time the wearer moves is a nuisance for the navigation officer and the radio operator. Here the petrol combustion proved a great asset and kept them warm even at 10,000ft. We had only one mishap with this heater. This occurred when ice formed on its fuel drain pipe and caused a series of intermittent explosions in flight, but no damage resulted.

Correlation of the needs of flying with the demands of the ship's management has always been a difficulty whenever aircraft have been located in a ship, whether naval or mercantile. From the captain's point of view, seaplane operations have certain disadvantages. During a launch and recovery the ship's head and speed may have to be altered, a crash-boat has to be manned and members of the ship's company will be needed to form a handling party. Moreover, whilst the aircraft is flying, the ship's course may have to be changed in order to avoid an area of bad visibility, or an icefield, and in the event of a forced landing the seaplane becomes the ship's liability. In whaling, further complications are added by the fact that whales are often in tow, so that there may be a whale-boat alongside, thus limiting the ship's speed and much reducing manœuvrability. This makes it sometimes difficult to provide the

Flight Radio Operator Leslie Holmes, who proved that one man could function effectively as combined wireless-op. and navigator.

Alec Bryce, the cinema cameraman, prepares to be catapulted off. He obtained a complete cinema record of an aerial hunt for a whale, right up to the moment of harpooning. A complete film of the expedition will be shown to the public later in the year.

Flight Captain Geoffrey Collyer, who grew the bushiest beard of the aircrew. He pulled off a safe forced-landing in the open sea.



Balaena's *hangar, aviation fuel storage and a Walrus on the flight deck. One of the larger catchers is delivering its whales.*

requisite lee for recovery and entirely rules out the making of a "slick" for landing at such times. A "slick" is obtained by running the ship at full speed and turning its head rapidly through the wind, thus leaving an area of calm water for alighting, even when the sea is otherwise too choppy to allow a safe landing.

The provision of manpower for the lifeboat and handling party is a serious problem on a whaler, because unless whaling is slack, every able-bodied man is needed either on the flensing deck or in the factory. Therefore, however fine the weather may be for flying, the aircraft can only fly during a "depression period" on board, unless the captain can foresee the possibility of obtaining from the flight information valuable enough to offset the hindrances.

The 1946/47 whaling season was remarkable in two respects—exceptionally fine weather and an abundance of whales. These two factors, whilst both favourable to the catch, did in effect militate against each other so far as flying was concerned. The days on which aircraft could have operated was surprisingly high in number, whilst the days on which air assistance was required were virtually non-existent. However, it would give quite a false picture if one were to try to assess the final value of aircraft on the basis of only one season, for whaling conditions are as variable as the English climate.

Theories Justified in Practice

Yet from the technical point of view we could say that the promises of theoretical advantages in using aircraft were fully justified by our practical experience. Perhaps one of the most impressive parts of evidence in presenting our case will be the film which was taken from the air showing the chase and harpooning of whales. We carried on board Alec Bryce, a cinematographer of the Rank organization, and later on this year a complete film of the expedition, incorporating the aerial operations, will be released to the public. We also took a number of air photographs and made sketches of the ice conditions. These sketches were the most valuable form of help which we could give in a season like this particular one. We had to develop the technique of these sketches, starting off without any very clear idea of what the captain wanted to know, but in the end we were able to give him quite a complete picture of the various details he wanted. The sort of assistance which came from knowing the outline of the ice and the disposition of the lakes and open water inside, sometimes at a depth of 70 miles, were as follows:—

The captain wanted to know whether it would be worth while steaming into the icepack in pursuit of whales in the lakes. In point of fact we never found whales in any of the distant lakes, and it was only towards the end of the season that it was worth pushing 10 or 12 miles into the ice-edge in search of whales.

Then there was the question of shelter from storms for the factory ship and for her ten attendant whale-boats or catchers. The pack ice damps down the swell and is, therefore, very valuable for sheltering a ship if one is able

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to find a good bight or bay within easy steaming reach. At the time when the tanker comes out to refuel the factory ship, it is particularly necessary to have sheltered water whilst the two vessels, the tanker and the factory ship, are lashed alongside each other, with three whales in between them acting as shock-absorbers, or "fenders" as they are called. We found a good bight for this very purpose on the occasion of the visit of the second tanker in February.

Another useful job we did when flying over the ice was to spot two dead blue whales, which had evidently been lost, and the harpoon gunner, who was flying with us at the time, was able to take his catcher in and recover these two animals which would otherwise have been lost.

Apart from whaling information we also brought back some data of scientific interest. For instance, we photographed the Shackleton Ice Barrier from the air—probably the first time it has been seen from this element, and we plotted the position of three 1,500-feet-high peaks which have never been shown on any map. Also we assisted, as far as we could, the work of the Air Ministry Meteorologist, Hugh Lamb. On every flight we brought back records of cloud, wind and icing conditions together with information of the state of the sea in regard to swell and ice. Whenever we could, we took air temperatures up to 10,000ft, which is a modest though useful height compared with the Meteorological Officer's record balloon: this reached 57,000ft, for the purpose of checking wind-speeds in the stratosphere.

International Handicaps

Probably our two greatest handicaps were due to difficulties of an international nature. The first, of course, was the lack of a radio sector homing beacon, which the U.S. Naval Dept. would not allow us to use, "on security grounds." We felt this lack continuously, as it both restricted our scope in range and introduced hazards in the event of sudden changes of weather. This handicap would have been reduced enormously with the beacon. To it there was added another in the field of meteorology. Before we set out, the Governments which owned other whaling factories, that is to say the Norwegian, Dutch and South African, had freely agreed to broadcast daily weather reports. This would obviously have entailed the sacrifice of disclosing the position of each ship every day, but nevertheless, the undertakings were given. The *Balaena*, carrying an Air Ministry Meteorologist, and the other two British factory ships were the only ones to honour this agreement. Consequently, with the nearest land reporting stations situated in Australia 2,000 miles away, and Madagascar 3,000 miles away, the difficulty of preparing an accurate weather map and flying forecasts may be imagined.

However, in spite of everything, we made 23 flights and completed nearly 100 hours' flying in the Antarctic, with no more serious breakage than one airscrew tip. It must be realized, however, that we were exceptionally lucky in being able to find such a very well qualified air- and flight-deck crew. This was due to the fact that, in 1946, a great many young men were coming out of the Navy, and there were still a sufficient number trained in catapulting and recovery (a process which had been discarded by the Admiralty in 1944) to enable us to obtain a first-class crew. The aircrew found their work particularly interesting from the point of view of new lessons learned about whaling, about ice and about weather. They took the new conditions so easily in their stride that flying over iceberg scenery soon became an ordinary routine.

The deficiency of the radio beacon was partly alleviated by the use of radar, which enabled the aircraft's movements to be traced within a limited distance of the ship, and radio contact was easily maintained at 120 miles distance, using nothing more powerful at the ship end than a spare aircraft transmitter. This had to be rigged up on a separate aerial because the heavy traffic between

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the ship's wireless room and the whale boats made the availability of an independent transmitter for aircraft work essential.

In looking forward to the future, one cannot help speculating on how aerial developments may follow now that the ice has been broken by the *Balaena* flight. The helicopter, when it has attained a useful range and load-carrying capacity and does not require too much maintenance, will certainly find a place in the whaling fleet. Elimination of crane and catapult will be a great saving and only a small flight deck will be necessary. Really long-range reconnaissance could only be carried out either by aircraft flying from an aircraft carrier (which could also be a supply ship for the factory) or by shore-based machines. The latter might eventually fly from the meteorological stations which before long are likely to be dotted round the fringe of Antarctica. It might well be feasible to combine the objects of whale and weather long-range reconnaissance.

Looking still farther ahead, it is by no means impossible that some day aircraft will kill the whale as well as find it. The shooting of a rocket projectile from an aircraft follows a technique which has already been well developed, and the only further experience needed would be in finding methods of inflating the whale so as to give it buoyancy, and of marking it so that it could be found by the tug which would have to take it back to the factory. At present the means of marking consists of a flag bearing the number of the whale-boat which shot it, and the Company's initials. Needless to say, if the weather closes down and there is fog and snow, the difficulty of finding the flagged whale is considerable. Modern methods, employing either radio sonde or radar responder beacons, could surely be employed and thus guarantee that the tug could find the whale independent of the visibility.