NORTH ★ POLAR ★ EXPEDITION

TEACHER'S/

INSTRUCTOR'S GUIDE

A MULTI-ROLE

EDUCATIONAL

ADVENTURE

ACKNOWLEDGEMENTS

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WARNING

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programme.

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NORTH POLAR EXPEDITION

Introduction

Aim
The aim of the programme is to encourage group and team building with the group working towards a common goal through taking on the roles of members of an expedition to the North Pole.

The combination of audio and moving images from the region enables them to gain a realistic idea of survival in a hostile environment which they are unlikely ever to visit.

Quiz
As with real expeditions, whose members' aptitude and background knowledge is tested before their inclusion in a team, the team of five will have to complete a preliminary quiz, during which they may seek advice from the database, with their scores going forward to provide the basis for a successful (or otherwise) foray onto the ice pack. Before or after this quiz they may request a briefing, via the audio track, on each of their roles from world famous Polar explorer Sir Ranulph Fiennes who successfully traversed both the Poles in the 1979-1982 Transglobe expedition.

Journey
Whilst the objective of the disc is primarily to stimulate discussion and co-operation among team members than specifically to reach the Pole, such a journey is necessarily a testing and, sometimes frustrating, experience which may take several hours to complete, therefore Virgin have provided an abbreviated "novice" version which enables the Pole to be reached in about one hour. This stresses the importance of team work, acts as an introduction to the Arctic environment and may be used as a whole class exercise or as a task for 5 people at a time. Some teacher guidance may be needed for younger students.

On the journey from Northern Canada to the North Pole - some 450 miles as the gull flies, but normally much more due to the appalling terrain - the team will have to tackle the numerous difficulties and perils presented to the traveller across the ever-moving Polar ice, which begins to break-up in May.

To provide realism and re-usability the North Polar Expedition programme includes extraordinary film and slide footage taken during the actual historic expedition, together with an innovative software program and video database which throws up problems at random, as well as problems dictated by the team's previous choices. Thus every expedition is different.

If the expedition is going badly and scores are low, the committee in London will suggest that the team is evacuated. the recommendation may be ignored but it will re-appear, unless scores improve through good decision-making. To successfully complete the expedition within the possible 50-90 day timespan an appreciation of the Polar environment and the use of survival skills is necessary, together with the importance of planning and team-work.

Interaction
North Polar Expedition is designed to be used in the classroom by a group of five (or more) students actively involved in decision-making as a team. This new technique, facilitated by extensive use of the Tracker Ball which can be passed easily from hand to hand, is designed to bring out the inter-personal skills of the team members, and help combine the study of Geography with Social Studies.
Position-finding and other simulations require the practice of arithmetic at a level which can be easily understood, but must, nevertheless, be accurately performed, to avoid disaster to the Ice Team.

Additional Activities.
The package has been purposely designed with the software separate from the audio-visual material. This gives scope for the users to re-work the material using their own software according to specific needs The disc contains a large number of high-quality **slides** as well as moving film for further study on the formation, structure and movement of the ice pack; you will find details of the frame numbers with brief descriptions on pages 16 to 19.

Extra-curricular use
The experienced expeditionary version is well-suited to supported self-study and open access with content of particular relevance to Duke of Edinburgh students and those specially interested in expeditions/travel It is also extremely useful as a means of encouraging students of differing physical and intellectual abilities to work together. Teachers/Instructors may consider choosing a group and starting them on a journey in lesson time to continue at their own pace in their free time.

Save and Log
Key features of the North Polar Expedition allow the "current journey" to be saved to floppy disc for re-entry at the same point at a later date and the facility for members of the team to record their comments on a daily basis as the expedition progresses.

The North Polar Expedition package includes a single sided video disc, 2 floppy discs, 5 "role" booklets explaining the various roles, a teacher/instructor guide and a copy of Sir Ranulph Fiennes bestseller "To the Ends of the Earth", the actual story of the original expedition.

Getting Started

Ensure that your BBC Domesday system is correctly set up in accordance with the instructions in the User Guide and attach an 80-track floppy disc drive (single- or double-sided) to the port underneath the BBC micro labelled "DISC DRIVE" (on the left hand side of the micro).

Turn on the monitor, computer, floppy disc drive and videodisc player.

If you wish to use the "Save Game" facility, ensure that you have a formatted, 80-track, DFS floppy disc handy before running the program.

To use the "North Polar Expedition" programme, load the videodisc into the player with the label entitled "North Polar Expedition" uppermost. Then insert the floppy disc entitled "QuizDisc" into Disc Drive 0.

To start the programme follow this procedure:-

Press the two keys CTRL and Q together. Whilst holding these two keys down, also press and release the BREAK key. Then release these keys and the screen should display:-

Acorn TUBE 65C102 Co-Processor

Acorn VFS

*Disc Error 03 at ; 0/00000   (ignore this disc error message)

Press the two keys CTRL and D together. Whilst holding these two keys down, also press and release the BREAK key. Then release these keys and the screen should display:-

Acorn TUBE 65C102 Co-Processor

Acorn 1770 DFS

You should then press the SHIFT and BREAK keys simultaneously. The program should then load automatically from the floppy disc in Drive 0.

If there is still a problem see "Troubleshooting" on page 20.

Operation of the System

After the title sequence has finished, the following menu will appear:-

>*Team Briefing*
>*Pre-Journey Quiz*
>*Continue Journey*

A red arrow is used here, as in many places in the programme, to select the answer to a question or to choose a course of action to be taken. Move the arrow over the text to highlight your chosen response in red and press the left hand button on the Tracker Ball unit; this is known as "Selecting"or "clicking" an item. (Text will change colour from yellow to red when the red arrow goes near or over it). Keyboard entry is only required during the "Simulations" described below. The Team Briefing option will identify the characteristics of each role and display its Icon. The Icons read from left to right as follows:
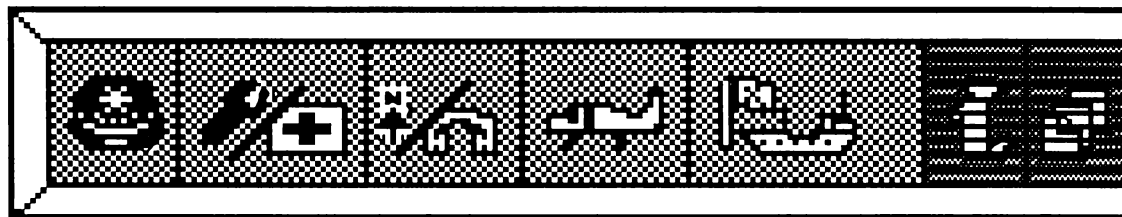
Leader	Mechanic/	Navigator/	Pilot	Land/Sea Base
	Medic	Radio Operator		Controller

The appropriate team member is chosen to respond to each question in the Quiz and each event during the Journey by a moving cursor stopping on the respective Icon. These icons are not usually "active" and cannot therefore be "selected", (except to allow individual diary input via Expedition Log facility). The three right hand icons are displayed as below when they become "active" and can be selected:-
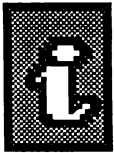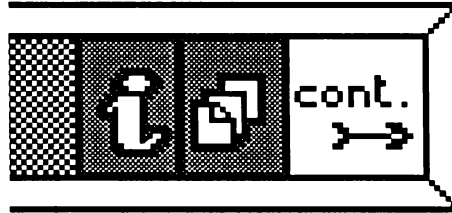
 "Advice" will be displayed in this form when more information is available and can be "selected" if desired.
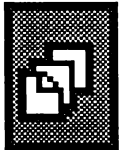
 "List" will be displayed in this form during the Journey Phase, when a daily list of tasks can be selected/de-selected.
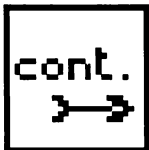
 Select "Continue" to allow the next operation to proceed.

During the Quiz and Journey Phases a Score Bar will appear:-
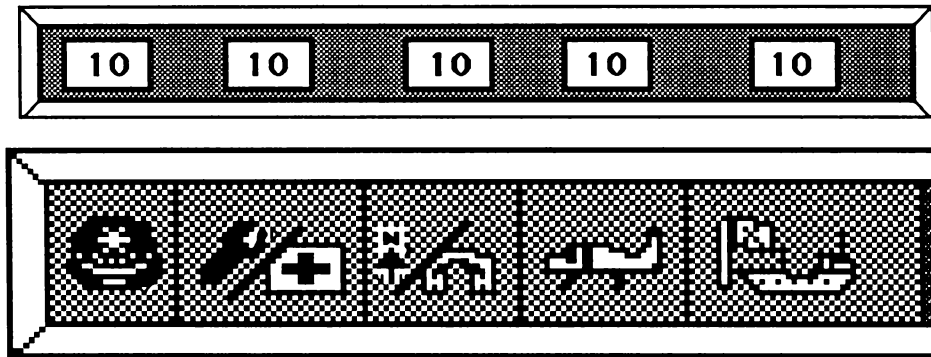
After a selection has been made it shows the results on individual team members' Energy levels as above.
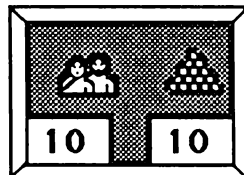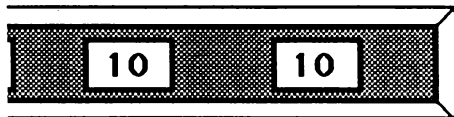
Team Morale & Supplies levels can also be affected, as shown « here.
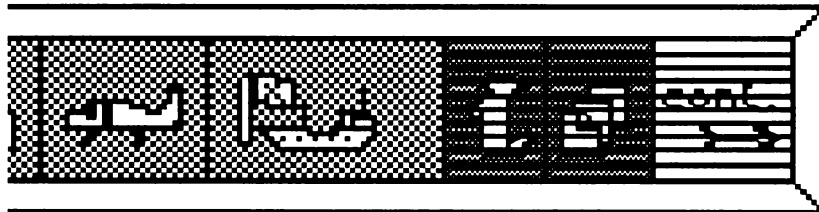
Individual scores are incremented/decremented according to the correctness of the response to a quiz question or the viability of a chosen course of action. The choice made may also affect the team's morale and/or supplies' situation.

Invariably the questions and events are based on actual conditions which occured during the expedition led by Sir Ranulph Fiennes and can be verified by reference to his book "To The Ends Of The Earth", included in the package.

After completing the Quiz Phase, you will start the Journey Phase. The computer will tell you when to remove the QuizDisc and insert the second floppy disc, entitled JourneyDisc, in Disc Drive 0. At this point you have the option of undertaking the journey as a "novice expeditionary" which omits the daily List functions and simulations, see below.

During the Journey Phase a Daily Log Display will give you information as to your current situation and location, with the option of displaying the team's actual whereabouts on a map of the area. It is also possible for any one team member to type in a "Diary" entry by selecting his/her icon.
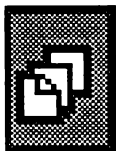
A daily List of tasks to be performed can be updated by selecting the List icon; if you make ill-considered choices you will find that the team's scores will be automatically decremented at the end of each day. Note that you can seek advice on the operation of the List facility by selecting the Information button.

You can display the scores for a given task by pressing the large centre button on the Tracker Ball unit when the selected text is highlighted, which will "lock it" as enabled, then you move the arrow to the Advice icon and press the left hand button. The right hand button is used to make a blue background appear/disappear to improve legibility of text overlaid on video.

You can Save the Current State by Exiting to the Main Menu (by moving the red arrow to the Exit button in the Log display) and when it appears selecting "Save Journey to file".

You will be required to insert a formatted 80-track DFS floppy disc in Disc Drive 0 and type the desired file name.
You can also Save the Personal Log or Print it out, by loading into VIEW or listing via *PRINT. To restart a "saved" Journey, select the "*Continue Journey*" option from the menu; the program will then tell you to insert the relevant floppy disc in Disc Drive 0 and type in the appropriate file name. In order to enable completion of the Expedition in a reasonable timeframe, for the classroom, you will find that, unless the situation is critical, the programme will, on occasion, jump forward one or more days.

SIMULATIONS

It is possible to set the Compass, Dead Reckoning/Theodolite and Tune Radio simulations to run automatically for up to 10 days each. This is done by 'clicking' the "List" icon when the Expedition Log is displayed at the end of each day's travel, and setting the days by 'clicking' in the appropriate place.

1.NAVIGATION.

A.Compass.
A compass reading giving a northerly line of progress is normally sufficient, although you must subtract from it the relevant Magnetic Variation depending on the current position. You will be asked to estimate the angle between the North Pole and the Magnetic North Pole and then adjust the Compass bezel, in order to allow for the considerable Magnetic Variation prevalent in this part of the world, using the icons shown, (at Alert Magnetic North is to the West of the Pole). Then line up the needle with the bezel. You are then required to turn in either direction until the compass is correctly aligned for your direction of travel. Lastly you must choose a suitable Landmark from among those circled to give an easy reference feature on which to steer.   Page 11

B. Dead Reckoning.

If the sun does not appear for some time, as in early March, when it is still below the horizon or because the weather is too bad, it is necessary to calculate your current location based on distance travelled since your last sunshot.

Note that one nautical mile of northerly progress (you are on the sea ice and therefore your progress is measured in nautical miles) is equivalent to one minute of Latitude North, often expressed as '. You must enter your new location as nn °nn N nn°W (using **D** for °).
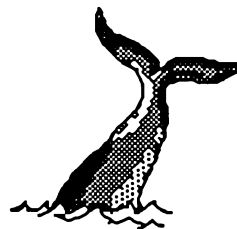
C. Theodolite.

A simulation of the operation of a theodolite is provided in the Journey Phase and, if you decide to tackle it yourself, you will be asked to level the instrument using the icons shown so that the graphics bubbles are centred over each other. You will then be asked to adjust the sight upwards or downwards until the (graphics) sun appears in the range finder. Using the reading of nn°nn' displayed when the instrument is correctly aligned, you must look up the relevant data in the tables below to find the correct Latitude to be entered in the box at the top of the screen. You must enter *D* for degrees and *N* and *W* as appropriate. Note that it is assumed that you will be progressing on a Northerly Longitude of 62°W directly from Alert to the Pole. An example of calculating the Latitude is shown on page 14.

Navigational Table 1.

Obs.Alt°.	6°	7	8	9	10	11	12	13	14	15	16	17	18	19	20	25	30	35
Corr.Mins.	5'	7	7	8	9	9	10	10	10	10	11	11	11	11	11	12	12	12

Navigational Table 2   Sun's declination for 1989.

	Mar.	Apr.	May	Jun.			Mar.	Apr.	May	Jun.
1	7°31S	4°36N	15°07N	22°09N	21		0°18N	11°55	20°13	23°26
2	7°08	4°59	15°07	22°12	22		0°42	12°15	20°25	23°25
3	6°45	5°22	15°43	22°20	23		1°05	12°35	20°36	23°25
4	6°22	5°45	16°01	22°27	24		1°29	12°55	20°48	23°24
5	5°59	6°08	16°18	22°34	25		1°53	13°14	20°59	23°23
6	5°36	6°31	16°35	22°40	26		2°16	13°34	21°09	23°21
7	5°31	6°53	16°51	22°46	27		2°38	13°53	21°19	23°19
8	4°49	7°16	17°08	22°51	28		3°03	14°12	21°29	23°16
9	4°26	7°38	17°24	22°57	29		3°26	14°31	21°38	23°13
10	4°02	8°00	17°55	23°06	30		3°50	14°49	21°47	23°10
11	3°39	8°22	17°55	23°06	31		4°13		21°56	
12	3°15	8°44	18°10	23°10						
13	2°52	9°06	18°25	23°13						
14	2°28	9°30	18°40	23°16						
15	2°04	9°49	18°54	23°19						
16	1°40	10°10	19°08	23°21						
17	1°17	10°32	19°22	23°23						
18	0°53	10°53	19°35	23°24						
19	0°29	11°14	19°48	23°25						
20	0°06	11°34	20°01	23°26						

Navigational Table 3. Correction for Longitude (50°,60°,70°W).

Declination.	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	21°	21.5°	22°	22.5°	23
50°W		3'	3'	3'	3'	3'	3'	3'	3'	2'	2'	2'	1'	1'	1'	1'	1'
60°W		4'	4'	4'	4'	4'	4'	3'	3'	3'	3'	2'	2'	2'	1'	1'	1'
70°W		5'	5'	4'	4'	4'	4'	4'	4'	3'	3'	2'	2'	2'	2'	1'	1'

NAVIGATIONAL TABLES-EXAMPLE OF USE-

1. Take the altitude of the Sun from our noon sunshot - say 10°.
2. Add the correction for the height of the Observer's eye above sea level, taken as 10 feet during this Expedition, related to the observed altitude of the sun, in this case 10° gives 9' , thus 10°+9'=10°9'S (see table 1)
3. Subtract this from 90° to (obtain the Zenith Distance)
    90° - 10°9'=79°51'N
4. Look up the Sun's Declination for the required date (see table2)
    - say 6th April gives 6°31'N
5. Look up the correction for your Longitude (see table 3) and add it to the Sun's declination to give "True Declination" say at 62°W gives +4'
    6°31+4'=6°35'N
6. Add the Zenith Distance to the True Declination - 79°51'+6°35'=86°26'N
7. Your position is therefore **86°26N 62°W**

2.RADIO.

A simulation of the setting up and tuning of the radio set is provided and when you opt to perform this function you are given the required frequency to tune the radio to, which must then be done using the arrow-type icons to make the appropriate adjustments. You must then adjust the aerial for direction. In this case you must point it towards Base, using the arrows on the lower right hand side of the screen, bearing in mind that it is a Dipole aerial, which is T shaped. When it is correctly adjusted and tuned to the correct frequency, you will observe the "gain" meter swinging to its maximum reading on the right.

3.AIRCRAFT PAYLOAD.

A simulation of the loading up of the aircraft with fuel and supplies is provided. First of all you are required to estimate and enter the magnetic variation between Magnetic North and "True North" in order to set the aircraft compass. You must then estimate and enter the compass bearing to the Ice Team, which will be to the North of you. Next you are required to estimate the distance to the Ice Team in nautical miles, with the help of the white line, extending towards the Pole, their location being at the end of the red portion of the line. Note that the Pole is 450 miles from Alert.

It is now necessary to calculate the amount of aircraft fuel, in lbs. (pounds) weight, (because by International Convention all aircraft weights are expressed in lbs.) needed to get to the Ice Team and back safely. All the necessary factors are shown on the screen and are based on the real loads carried by Twin Otter aircraft in these Latitudes. Essentially you will need to work out the number of hours flight to the Ice Team and then multiply that figure by the number of lbs. weight of fuel consumed during each flight hour to get the total number of lbs. of fuel required. (In reality a safety margin & other factors such as crew weight would also be included)
The next screen simulates the loading up of the "payload" of fuel, food and supplies to be carried on the aircraft to the Ice Team.
You are then required to work out how much fuel you can take out for the skidoos, (aircraft fuel is of a much higher octane than skidoo fuel so is not interchangeable) in cans. You will note that the total weight in lbs. is incremented in the bottom right hand box. You must then load up the food boxes and finally the other (medical, mechanical, etc.) supplies., all of which will add to the total payload weight. Note that at maximum ranges extra air-craft fuel must be taken on board as "payload" to allow a safe return.

<u>Frame #.</u>   <u>Description.</u>

24961	Tidewater glacier.
24962	Lateral moraine in glacier.
24963	Pattern of crevasses on the surface of a glacier.
24964	Crevasses in close-up.
24965	Mass balance data, summer & winter for glaciers.
24966	A crevasse in the side of an Antarctic tabular iceberg. Annual layering of snow can be seen, the freeboard of the iceberg is approximately 40 m.
24967	Arctic iceberg in summer in fjord, capsized, old water line visible & pattern of melt, due to warmer water being nearer the surface.
24968	Tabular iceberg in Antarctic, Helicopter on top, 2km long- freeboard 40m.
24969	A small Antarctic iceberg.
24970	"Bergy bit" or growler in Greenland Sea, photographed through periscope of submarine.
24971	Radar view of sea ice from ship in Bering Sea.
24972	Small Arctic iceberg surrounded by melting packice in summer.
24973	Arctic ice island in fjord in E. Greenland, it probably calved off Flade Isblink in NE Greenland.
24974	Satellite image of N. Hemisphere, computer processed.
24975	An ice edge eddy in Denmark Strait, seen on satellite imagery.
24976	Ice edge eddy in Labrador Sea in winter, seen from the air.
24977	Ice floes in marginal ice zone.
24978	Synthetic Aperture Radar (SAR) imagery of Arctic ice pack. SAR uses flight path as aerial.
24979	SAR imagery from aircraft at 10,000 ft. 2 metre square objects visible.
24980	Advanced Very High Resolution Radiometer (AVHRR) satellite imagery of ice edge eddy,
24981	AVHRR. ditto. Greenland Sea, 870 km. up, 1.1 km. resolution of objects.
24982	AVHRR. ditto.
24983	AVHRR imagery of Greenland Sea.
24984	Scoresby Sund (ice filled) on left; fast ice along coast; 'land water' gap between it & pack.
24985	AVHRR of Greenland Sea
24986	Pressure ridge at the edge of an ice floe.
24987	AVHRR image of Eastern Arctic.
24988	First stage of ice formation on the sea, under microscope, showing minute discs & platelets.
24989	Computer processed section of satellite image, clouds over ice.
24990	Finger rafting, a form of ridging found in thin ice sheets.

SCIENTIFIC SLIDE DESCRIPTIONS 2.

Frame #.   Description.

24991	A refrozen lead.
24992	Small ice floes from the air, being moved by wind through frazil ice.
24993	Types of remote sensing platform.
24994	Brine cells in sea ice, each cell is about 1/2 mm. across.
24995	Vertical aerial photo. of pack ice, with ridges & open lead, 2 km.
24996	Systems of parallel leads in Baffin Bay. Iceberg in foreground.
24997-9	Open leads in Arctic pack ice.
25000	Greenland Sea marginal ice zone, Floe diameters about 40 m.
25001	Marginal ice zone in Greenland Sea from a helicopter.
25002	Frost smoke & frazil ice, first stages of ice formation on open sea.
25003	Antarctic pack ice (consolidated pancake ice) in winter.
25004	Ditto
25005	Arctic pack ice with pressure ridges.
25006	Three Polar Bears crossing Arctic pack ice and open leads.
25007	Pancake ice. Diameter 2 m.
25008	Dense pancake ice in Antarctic
25009	Pancake ice in Antarctic with waves passing through it.
25010	As 25003, about to freeze to form consolidated pancake with head of Minke whale visible.
25011	Frazil ice on calm water.
25012	Nilas (transparent new ice) between floes, the nilas is covered with frost flowers.
25013	Marginal ice zone in Greenland Sea.
25014	Pattern of brine inclusions in a sea ice crystal.
25015	Crystal structure of sea ice.
25016	Crystal structure of Arctic sea ice sheet.
25017	Crystal fabric of first year ice.
25018	Sidescan sonar on the deck of a submarine.
25019	Design of ice profiling experiment carried out in 1976.
25020	Keel of a pressure ridge, photographed by a diver.
25021	Ditto.
25022	Shape of a pressure ridge as predicted by a computer model.
25023	Schematic of pressure ridges scouring sea bed in shallows.
25024	Under-ice sonar profile.

Frame #.	Description.
25025	Mean ice thickness contours for Arctic Ocean.
25026	Distribution of pressure ridge depths in Arctic- showing fit to negative exponential distribution.
25027	Upward looking & sidescan sonar imagery of Arctic ice, with interpretation.
25028	Sonar profile of Arctic ridges.
25029	Sidescan sonar imagery of floes in marginal ice zone.
25030	Sidescan sonar imagery of a lead and ridges in Arctic.
25031	Sidescan sonar imagery; first year ice with cracks.
25032	Sidescan sonar; heavily ridged ice.
25033	Sidescan: multiyear floe with cracks.
25034	Ditto: refrozen lead on left.
25035	Ditto: band of floes at ice edge.
25036	Distribution of ice speeds all year, and during summer only, from Arctic Ice Dynamics Experiment Camp in Beaufort Sea.
25037	Average August ice thickness(a) & compactness.
25038	Formation of open water round Spitsbergen.
25039	Average winter and summer ice limits in Arctic.
25040	Drift of two ice stations in Arctic Ocean.
25041	The East Greenland Current, and ice limits.
25042	Some drift tracks in Arctic Ocean.
25043	Ditto.
25044	Seals in Greenland Sea in summer.
25045	Gulls.
25046	Polar Bear destroying equipment; Greenland Sea.
25047	Harp Seals under breathing hole in 1st year ice.
25048	Dog Driving.
25049	Data buoy installed on Arctic pack ice.
25050	Ship fast in sea ice-icebreaker.
25051	First year ice in Bering Sea in winter.
25052	Motoring through a lead.
25053	Greenland Sea ice edge.
25054	Bell 206 Helicopter.
25055,6	Airlifting data buoy onto ice.

SCIENTIFIC SLIDE DESCRIPTIONS 4.

Frame #.   Description.

25057	US Coastguard icebreaker "Westwind" (1944) in Bering Sea.
25058-60	Sealer "Kvitbjorn" during ice experiment in Greenland Sea.
25061	Experimental U.S. Submarine"Protector" during ice trials 1903/4
25062	Tracks of early submarine voyages in Arctic.
25063	Submarine on surface at North Pole with aircraft overhead.
25064	Submarine in Arctic, surfaced in lead, from overhead.
25065	Submarine at North Pole
25066-8	Submarine surfacing at North Pole.
25069	Submarine surfaced in open lead at North Pole.
25070	Three submarines surfaced together at North Pole.
25071	Soviet sub. "Leninsky Konsomol" at North Pole 1965 (painting).
25072,3	Submarine surfaced in open lead at North Pole.
25074	Hacking ice from deck of sub. in Arctic.
25075	Bathythemetric chart of Greenland Sea.
25076	Max. & min. sea ice extent, North & South Hemispheres.
25077	Electromagnetic spectrum & other remote sensing instruments.
25078	Passive microwave imagery of the Arctic Ocean.
25079	Satellite image of Iceland, showing icecaps.
25080	Infra-red line-scan imagery of ice edge, & laser profile flow in waves .
25081	Ratio of ice drift to wind speed from an Arctic experiment.
25082	Depression of freezing point of water with increasing salinity, & decrease in temperature of maximum density.
25083	A typical case of salinity v. depth for a multi-year ice floe.
25084	Annual growth & decay of ice in glacier, defining terms used.
25085	Definitions of ice & snow extent in the polar regions.
25086	The growth of thick sea ice in a high Arctic fjord.
25087	Balance radiation in Earth's atmosphere.
25088	A typical profile through Antarctic sea ice.
25089	Temperature chart-North. & South. Hemispheres, v. snow & ice.
25090	Mid-month insolation on top of the atmosphere.
25091	Ward Hunt ice shelf in northern Ellesmere Island.
25092	Oxygen isotope ratios.
25093	Ice core samples at Ward Hunt Island, showing salinity v. depth.

Trouble shooting

If the system will not load and the display reads:-

Acorn TUBE 65C102 Co-Processor
Acorn 1770 ADFS

press CTRL and D together and whilst holding them down press and release BREAK as above until the display reads:-

Acorn TUBE 65C102 Co-Processor
Acorn 1770 DFS
*Disc Error 03 at; 0/00000 (To be ignored)

If you are still experiencing difficulties check the "Configuration" by typing
*STATUS[RETURN] and you should get a display as follows:-

Baud 7	+
No boot	
Caps	
Data 5	+
Delay 50	
No Directory	+
Internal Tube	
FDrive 1	
File 13	
Hard	
Ignore 10	
Lang 12	
Mode 0	+
Tube	+
Print 1	+
Repeat 3	+
Scrol	
_TV 0,0_	++
VFS Dir	+
Eject	

+ are of significance
   to this programme

> The use of *STATUS and *CONFIGURE commands are described in Acorn's "REFERENCE MANUAL PART ONE" to the Master Computer on pages C.5-12 and C.5-2

> NB. If the Computer tries to read from videodisc rather than floppy, press the Eject button on the vd player, close the drawer, and **while** it gets up to speed, do the CTRL Q - Break, CTRL D-Break, Shift-Break routine on page 6, but **quickly!**

Page 20

ARCTIC OCEAN

Seas and Waters
BEAUFORT SEA
Beaufort Basin
Polar Ice
CHUKCHI SEA
EAST SIBERIAN SEA
LAPTEV SEA
KARA SEA
BARENTS SEA
BAFFIN BAY
DAVIS STRAIT
Amundsen Gulf
McClure Strait
Melville Sound
Viscount Melville Sound
Lancaster Sound
Nares Strait
Smith Sd.
Kane Basin
Kennedy Chan.
Hall Basin
Robeson Chan.
Jones Sd.

Features / Ridges / Basins
Laurent Basin
Mendeleyev Ridge
Lomonosov Ridge
Harris Basin
Angara Basin
NORTH POLE

Expeditions / Notes
+750
+750
Stefansson's 1917 Farthest
Soviet Expedition May 1937
Peary 6th April 1909
Nansen April 1895
Abruzzi April 1900
Peary 1902
Peary 1906
Apr 69
"Norge" 11-14 May 1926
Byrd 9th May 1926
Wilkins 15-16 April 1928
Mag. Pole 1980
Stefansson 1917

Lands and Islands
Banks I.
Victoria I.
Melville I.
Parry Is.
Bathurst I.
Prince of Wales I.
Somerset I.
Boothia Pen.
King William I.
Prince Patrick I.
Lands End
Prince Albert Pen.
Wollaston Pen.
Byam Martin Chan.
Bylot I.
Devon I.
Ellesmere I.
Axel Heiberg I.
Sverdrup Is.
Grinnell Ld.
Queen Elizabeth Islands
Grant Ld.
Craig Harb.
Coburg I.
Ellef Ringnes I.
Prince Gustav Adolf Sea
Hazen L.
M'Clintock Chan.

Greenland region
GREENLAND
Grant Ld.
Hall Ld.
Washington Land
Peary Land
Robert E. Peary Land
Independence Fd.
Danmark Fd.
Nordost Rundingen
Kronprins Christian Ld.
King Frederick VIII Ld.
Germania Ld.
C. Bismarck
Shannon I.
Wollaston Foreland
Gael Hamkes B.
Scoresby Sd.
Scoresby Ld.
Liverpool Coast
Mt Watkins
King Christian IX Land
Mt Forel
Nordenskiöld Glacier
Petermann Pk.
Humboldt Glacier
Sherard Osborn Fd.
C. Morris Jesup
C. Bridgman
C. Columbia
C. Richards
Nathorst Ld.

Svalbard / Islands East
SVALBARD
Spitsbergen
Nordaustlandet
Longyearbyen
Kong Karls Ld.
Hopen
Bjørnøya
Danskøya
Amsterdamøya
Kongsbreen
Edgeøya
Barentsøya
NOVAYA ZEMLYA
Franz Josef Land
Alexandra Ld.
Rudolfa O.
Graham Bell O.
Hooker O.
Northbrook O.
M. Churick O.
Z. Vil'cheka
M. Zhelaniya
O. Belyy
Uedineniya O.
Dikson
Dikson O.

Russia / Siberia
U.S.S.R.
Verkhoyansk
Yana
Lena
Olenek
Anabar
Khatanga
Khatangskiy G.
Taymyr Poluostrov
M. Chelyuskin
Severnaya Zemlya (Northland)
O. Taymyr
L. Taymyr
Pyasina
Tundra
Kolyma
Indigirka
Yana
Yanskiy Zaliv
Stolbovoy
Kotel'nyy O.
NEW SIBERIAN IS.
Ostrova Novo-Sibirskiye (New Siberian Is.)
Novaya Sibir'
Faddeyevskiy
Bol. Lyakhovskiy
Zhannetta O.
Genrietta O.
De Longa O.
Bennett O.
Shelagska
M. Shelagskiy
O. Vrangelya
Herald I.
Pt. Barrow
Colville
Brooks Mts.
Mackenzie Mts.
Great Bear Lake
Mackenzie B.
C. Kellett
C. Pr. Alfred
YUKON
FERRY

Other labels
Hammerfest
Nordkapp
Varanger Fjord
Murmansk
Kolskiy Poluostrov
Pechenga
Kolguyev Os.
Vaygach O.
P. Karskiye Vorota
Yugorskiy Shar
Obskaya Zaliv
Yamal Pol.
Matochkin Shar
Mezhdusharskiy O.
Jan Mayen
Ice