Report on the CSSU geological sampling programme July-Sept 1978 using the Cape Shore

by C.D.R. Evans

Contents

1 Introduction

The Cape Shore is a 650 ton oil supply vessel owned by Offshore Marine and subcontracted to Sub Sea Surveys Ltd. The vessel has recently been modified for handling unmanned submersibles and was hired by the I.G.S. from April 18 to mid-September. C.S.S.U. ran the ship from 30 June until 6 September and divided the period in five fortnightly legs. This report describes the sampling methods used and analyses the results obtained. A brief comparison of the ship with previous vessels used by the Unit will hopefully assist future chartering decisions.

The ship was handed over by CSNU in Barrow on 30 June and was handed back to them in Great Yarmouth on September 6. During the intervening ten weeks sampling work was carried out in the South West Approaches and Lyme Bay and four change-over port calls were made in Plymouth. Samples were collected using a 20' vibracorer, gravity corer and shipek grab and a Decca Pulse 8 system used for position fixing and navigation. C.S.S.U. normally carried six I.G.S. personnel during a cruise with four on the day shift vibracoring and two on the night shift using the shipek grab. During the five legs 122 vibracores, 110 gravity cores and 401 shipek-only stations were occupied. Most of the work was on the Cockburn Bank (49/$\overline{10}$) and Little Sole Bank (48/$\overline{10}$) sheets but a few days were spent on Labadie Bank (50/$\overline{10}$), Austell Spur (48/$\overline{12}$) and Portland (50/$\overline{04}$) sheets. (See enclosed maps).

2 Equipment

a) I.G.S.

When the weather permitted CSSU used a 20' vibracorer and shipek grab during daylight hours (0600-2130 hrs) and a shipek grab during the night. Sites were chosen by I.G.S. and approved by the Ministry of Defence earlier in the year and no provision existed for introducing new sites on an instantaneous basis. The original intention was to use the gravity corer when weather conditions did not allow the use of the vibracorer. However, it was found that when conditions were unsuitable for vibracoring then the gravity coring system was also dangerous and could not continue in conditions significantly rougher than those which terminated vibracoring. No midi drills, T.V. systems or other equipment was carried during the CSSU legs.

i Vibracorer The corer was pulled over the stem by the lifting cable (Photo 2) and the electrical cable was tied to the main lifting cable every 15-20m as the corer was lowered to the sea bed (Photo 5). The corer was left to vibrate for a maximum of 20 mins and then recovered: a second hauling cable and two rope guides (Photo 4) were attached once the corer was above sea level and it was then hauled inboard. The system worked smoothly and the main problem in rough weather was the releasing and attaching of the extra ropes and wires as the corer swung across the stem. CSNU used a cable hauler for handling the electric cable but CSSU preferred to tie it off and then lift it by hand during recovery. With the lightweight cables this latter system was not found to be too strenuous. Two switch boards were fitted, one in the workshop and one on the bridge. The former was used most of the time and the technician kept a constant watch on it whilst in operation.

Four pots were aboard at the start of the programme. One was lost when the vibracorer was lost and another two were found to be defective after one attempted run. At the end of the second leg only one pot was functioning. The first defective pot had stripped its gears and sheared its mountings and the second had an electrical defect. It is suggested that future pots be given a realistic mechanical as well as an electrical meter test before being put aboard the ship. Once the pots had passed the 'first hurdle' they proved reliable.

Two new electric cables were put aboard the ship at the start of the contract. These consisted of four power conductors and four signal conductors encased in a polythene sheath. The manufacturer later admitted that these cables were sub-standard but they proved adequate for the task and were easy to handle. By the

second leg of the CSSU cruise only one 400m length of this cable remained, the rest had been lost with the vibracorer. The remaining cable was in part water logged and the outer sheath repaired in many places. The only spare was the massive cable intended for the rectractor/penetrometer vibracorer. This was probably four to six times heavier than the cable in use and was considered almost unusable. No tests had been done using it with the cable hauler but it was certainly not possible to use it in the way CSSU had been using the lightweight cable. It was therefore decided to purchase 300m of standard 4 core cable in Plymouth at a cost of £140 (1.7 hrs ship time) and took on this as our spare. This cable was used for about 12 sites on the last leg and proved completely adequate if carefully used. Repairs were quick and simple to perform and it proved itself in terms of its reserve cable requirement. It is suggested that next year we have more lightweight electric cable in reserve in proportion to the number of vibracorers and pots available so that we do not have to use the extremely heavy new cable. Tests will have to be made to find the best way of using this heavy rigid cable.

Many of the sediment cores were very badly disturbed during recovery and structure in the top 1-2m of core was usually completely destroyed as the sediment slopped down the barrel when the core was landed (Photo 3). It is suggested that the old style leather/steel piston should be improved to obviate some of this effect. Is it possible to use a moulded plastic piston whose sole purpose is to prevent sediment slopping up the tube ? There is no great virtue in storing the cores vertically if the sediment is already badly disturbed during recovery. This effect is however much worse in sands than in more cohesive muds and silts.

One vibracorer was wrecked and one bent during the ten weeks. The wrecked corer had its lifting cable cut about 10m above the join to the pot. It was suggested that a bight of cable was caught on the frame and on pulling out of a firm substrate this bight became trapped and cut leaving the corer still in the sea bed. This frame was recovered after grappling but it was badly mangled and without pot or barrel. The second corer was bent around the top of the frame. Again it is thought that a bight of lifting cable became caught and the pull on the frame was not from the eye in the pot but from the side of the frame. This frame was repaired by Fox and Haggert Engineers in Plymouth. A few barrels were bent but this was not a major problem during the ten weeks. Most of these barrels bent when the ship was moored across the tide.

Extraction of the barrel on deck (Photo 3) was hazardous when the anchors were being lifted as was the carrying of the loaded barrel when the ship was rolling. It is suggested that next year this operation and loading the new barrel is written into the contract as part of the task of the ship's crew.

Recovery from the corer is shown in (Fig 10). The corer was left to run for twenty minutes unless the current started to climb when the period was curtailed prematurely. Recovery was generally disappointing but exceptions to the rule occurred and 4.3m was recovered at one site with nearly 4m of Tertiary muddy silts. On parts of the Little Sole Bank however recovery consisted of only a bag of gravel.

ii Shipek Grab The grab was used from a fairly exposed position on top of the I.G.S. Laboratory on the port side of the ship. The davit and winch system worked well although the winch kept breaking down and was worked on during most port calls. A substitute winch forward of the mainone was used during the second leg but this was less convenient. Recovery with the grab varied with sediment type and the results from fine slightly muddy sands were poor. In contrast the coarser sediments usually yielded full buckets. During poor weather the motion of the ship tended to snatch the shipek wire as it was being lowered and caused the grab to fire prematurely. This effect was minimized by lowering the grab slowly but at times even this failed and the operation yielded infrequent results.

Where possible small split samples were taken for Pal. Dept (to be sent to Dr. Robinson, University College) and Bristol University (for Dr D Hamilton). A rose bengal, methylated spirit mixture was added to the former sample. No priority system was employed with the splits and 398 of the former and 330 of the latter were collected. One grab was brought aboard without any locking wheels or catch spring. This had been put on John Murray in this condition and transferred straight onto Cape Shore. Equipment should be properly inspected before being put aboard a ship.

iii Gravity Corer The gravity corer trough (Photo's 2,3,4) was positioned over the starboard stern and the I.G.S. Sykeswinch (Photo 5) was used to haul the corer in and out. The ship's crane pulled the corer onto the trough and inboard. The crane was operated by the ship's crew who were often not at hand. One suggestion was for fitting a warping drum onto the Sykes winch which would then allow the whole operation to be completed using I.G.S. equipment.

The operation worked well except that the position of the trough made the operation of attaching the bowsing line (Photo 4) dangerous in moderate to rough conditions. The system was infrequently used in the Western Approaches because of the concentration of effort on vibracoring and the poor results in medium to fine sands. The range of conditions between when vibracoring ceased and gravity coring had to be suspended was very narrow (see Photo 6 vibracoring conditions near limit) and when vibracoring was suspended the ship generally went onto using the shipek grab. The gravity corer was used very successfully for 4 days on the Portland sheet where the thin superficial cover was easily penetrated and 67 solid samples recovered out of 115 sites.

iv Navigation Navigation and position fixing was by Decca Pulse 8 with an integrated mini-computer, data logger and track plotter. Tony Crosby attended a two week Pulse 8 'school' in May and then passed the information onto the other personnel on the ship. The basic system was easily understood but there were persistent faults in the recievers which were difficult to isolate. The mini computer and track plotter worked without problems but the data logger constantly gave trouble and was not used or in fact needed. One Pulse 8 receiver drove the track plotter and one the data logger. Having two aboard was useful in highlighting minor discrepancies which frequently occurred. At the end of the first leg a receiver was changed and this new one was also changed at the end of the fourth leg. The Fastnet Pulse 8 Chain was serviced from St Just Cornwall who kept the ship informed of any faults in the chain. However, these messages were received up to 24 hours after the fault had occurred and were of little value to the navigator.

Decca sold the system as being devoid of night effects however during the second to fourth legs distinct instability was noticed between 2330-0400 hours. [Fig 7] Its magnitude varied but was sufficient at times to cause the receiver to lose lock and on one occasion did not settle for five hours. This effect varied from receiver to receiver and the navigators were in no position to judge whether this was the fault of the Chain or of the receiver. The effect was also noticed to a much lesser extent during the day and on a few occasions delayed anchoring up using the track plotter. For a time Decca Engineers expressed surprise at this effect but eventually, when confronted by track plots, admitted its occurrence. They said that we had Mark 2 receivers which did not filter out these effects and that we should have the latest Mark 4 sets. The latter are in short supply and if we want the system for next year we should hire it as early as possible and insist on Mark 4 sets.

The 240v a.c. supply for the system came off the Dorman generator which also powered the vibracores. When these were shut down the alternative supply came off another generator. Changing over these supplies threw the receivers and it is suggested that a more permanent supply is fixed up next year which is not switched over while at sea.

The Decca Main Chain receiver worked without any problems but it was only used for navigation on passage and in the Portland Sheet for gravity coring.

v Laboratory The large if noisey laboratory was adequate for our needs and was well provided with bench space, drawers and sinks.

vi Ancillary Equipment The outside bench for core extraction and cutting was well positioned and safe. All safety equipment was provided and at hand. Core storage in the pallets and jars in the boxes was safe and protected. The two way-radios proved a great success and eliminated much running up and down to the bridge along the tortuous ladders and stairs. The technicians appreciated their own workshop which provided a good environment to carry out minor repairs.

b Ships' Equipment

i Equipment for handling I.G.S. gear The vibrocorer was launched and recovered using the ship's winches and moveable A Frame. On the last leg the winches gave constant trouble and were very slow but they were generally reliable on the previous four legs. The moveable A frame was easily adjusted and made handling the 20' vibracorer much simpler than usual. The crane for hauling the gravity corer in board was operated by the ship's crew who were not always on hand but otherwise there was no trouble with the system. The shipek winch broke down on numerous occasions and was worked on by Offshore Marine engineers on almost every port call. A similar reserve winch was provided but this proved less convenient because of the lead of the wire across the back of the operator.

ii Anchoring system The ship laid one forward (photo 1) and two stern (photo 2) anchors for vibracoring with a spread of 300 or 500m (average water depth 150m). The first captain preferred to head the vessel into the tide but the second preferred the vessel into the sea. The latter configeration was safer and drier for launching but often resulted in having the tide on the beam. Conditions at the stern end in moderate seas became very wet (photo 6) when anchoring up into the tide and not the weather. No configeration is ideal but the direction of the sea was the most critical factor. The anchoring system worked without any recurrent major delays although Offshore Marine had to work

on the rollers at almost every port call. The socket joining the wire to the anchor swivel had to be remade twice, once at sea and once in port. This was done because the wire was springing apart as individual strands broke. It was changed at sea largely during adverse weather and the 18 hr delay did not all constitute down time. On average the anchors took 33 mins to lay and 42 mins to lift. CSSU thought that the whole system was rather 'Heath Robinson' in approach and required constant attention to keep it operating. Lifting the anchors was potentially hazardous especially in the way that the wire was spooled onto the winches. On the starboard aft winch the wire was spooled using the crane and a sling to pull it across the drum. On one occasion this sling parted under the strain and came too close for comfort to I.G.S. personnel unloading the vibracorer barrel. Subsequently the barrel was extracted before the lifting of anchors commenced and the sling was strengthened.

The Pulse 8 track plotter was a great advance on the old Decca Main Chain plotter. However, when the Pulse 8 had variations of 1-200m the system became difficult to use and on occasions the attempt had to be abandoned.

The anchors themselves generally worked well with the 300m spread. Minor problems (boulders in the flukes) led to anchors dragging and the method of anchoring across the tide also caused dragging. The bottom conditions were important and dragging was worse where coarse gravel and sand was encountered on the Little Sole Bank Sheet.

iii Navigation and communications equipment Minor breakdowns occurred on the radio, autopilot, steering gear, tanhoy system and radar. Most were repaired rapidly but the radar gave intermittant trouble during the whole cruise. There was a second smaller radar in reserve. The main radio did not have the main Lands End Radio crystals although these had been ordered; this occasionally delayed link calls. In the extreme western part of the area reception was sometimes poor and traffic for the ship was missed.

iv Engines The ship averaged 10-11 knots, the brochure however suggested a maximum speed of 14.6 knots. No problems were experienced with the engines until the last leg when the port engine oil pump gears sheared and the governer broke down. This problem continued to cause slight delays until the end of the leg. On the fourth leg the rolling conditions and a technical failure caused some problems with the sanitary pumps and for a couple of spells the toilets were not operative.

3 Ships personnel The crew consisted of a captain (first G.Carruthers and then C. Hodgkinson), two mates, three engineers, six seamen, a cook and two stewards. All except the catering group worked well with the two captains and mates especially competent. The quality and degree of assistance obtained from the seamen varied considerably with individuals and they sometimes performed only the minimum necessary in the contract. This response was limited to a minority of the seamen but in general there was little unsolicitated assistance, unlike the attitude on the Emerald last year. The seamen and crew thought the work very easy compared with their usual rig supply work. Relationships between the crew and I.G.S. were generally good and most of the problems revolved around the catering staff. Some bad feeling was generated when I.G.S. requested that the cook on the first leg be taken off but this feeling was not transmitted onto the next leg. The cook on for the last three legs was lazy and the food provided often showed a lack of imagination. The captain and mates felt the same way as I.G.S. and attempted to change matters. Some of the stewards were equally useless and a certain amount of aggrevation developed between the catering group and the rest of the crew. The ship was as pleasant an atmosphere to work on as any vessel of this type could be expected to be.

4 Living Conditions I.G.S. were allocated eleven double cabins, C.S.S.U. had a maximum of seven people on at any one time and everybody had individual cabins. There were five cabins on the main deck and two down below. The main deck cabins were installed during the recent refit and were of reasonable size, clean with a wash basin. The ones on the lower deck were smaller but satisfactory by previous standards. One however suffered from water percolating periodically from an adjacent messroom. The bed linen was changed every week but towels were in short supply and the steward suspected thieving to account for the fact. The main mess was of a reasonable size and could seat ten people. The mess on the lower deck for the I.G.S. was comfortable but was not often used because it was used to store dirty laundry and rarely cleaned.

The ship had a dearth of crockery and cutlery. I.G.S. bought tea mugs in Barrow and on previous legs CSNU had used disposable plastic cups. The ship had no drinking glasses, not enough forks and in the end almost no teaspoons. These deficiences could easily be remidied during any port call but no attempt was made to do so.

The quality of the food varied with the cooks from excellant, second leg to chronic, first leg. Two cold stores were open to the I.G.S. personnel and a wide range of provisions was almost always available. Requests for food to be left out in the main mess for the night shift were quickly forgotten or ignored. During the last two legs certain food stocks ran very low.

The general cleanliness of the ship varied with the steward. After discussions with the steward or captain any problem was usually resolved but parts of the ship sometimes became filthy before I.G.S. requested and obtained some action.

It was the feeling that most of the ships crew did not appreciate that to satisfy charters one must try and help them, keep a clean ship and serve promptly a meal of reasonable standard. These points will often influence a decision to rehire a vessel when other things were equal.

5 Results

a) Introduction

The weather was generally unstable over the first four legs with fronts bringing near gale force winds every four or five days. The exposed nature of the area meant that the sea state quickly blew up and was slow to subside. The ship could anchor up and vibracore in sea state 5-6 if there was no large swell running. After a few hours of force 5-6 winds the sea state often became confused and the vibracorer could not be safely launched because of water on the aft deck and the motion of the ship. Gravity coring and or shipek grabwork was usually terminated in force 6-7 when the movement of the ship caused the grab to fire prematurely and the wind blew the ship across the sea. The BBC weather forecasts were often very misleading guides to the sea state because of the complex interplay of wind, sea and external swell.

The Portland area was the rough weather stand by area for the programme and was visited on two two-day periods. Retrospective analyses of the decisions to go up the Channel shows that they were correct.

b) First Leg 30 June - 12 July

The ship sailed from Barrow at 19:10 on 30 June and arrived in Cork at 20:30 on 1 July for a Pulse 8 check. It left twelve hours later and proceeded in adverse weather to shelter in Mounts Bay. Once in the Bay it was decided to sail to Lyme Bay and between 4-6 July 61 shipek and gravity core sites were occupied of which 34 yielded solid samples. With improving weather the ship sailed into the Western Approaches but had 3 hrs down time to collect new auto pilot batteries in Falmouth.

Between the 7-9 July 14 vibracores were collected but on the 10 the corer was lost at the first site of the day. 34 extra shipek sites were collected during this spell. The ship arrived in Plymouth at 08:00 hrs, 12 July after 20 hr passage.

c) Second Leg 13 - 26 July

The ship left Plymouth at 1800 hrs 13 July after a 32 hr port call. There was a slight delay because of a problem with the ship's radar and this amounted to 45 mins downtime. Between 14 - 18 July 16 vibracores were collected during variable weather with a variety of equipment problems. 9½ hrs ships downtime was lost on repairing a socket and a winch. Subsequent deterioration in the weather led to shipek grabbing on the 19-20 but three vibracores were collected on 21 July. 113 additional shipek sites were collected between 14-21 July.

On 22 July the ship ran for shelter in Helford River and on 21st headed for Lyme Bay to gravity core for the last two days of the leg. 54 sites were occupied during this time of which 33 yielded solid samples. The ship arrived in Plymouth 03:00 hrs 26 July after an 11 hour passage.

d) Third Leg 27 July - 9 August

The ship was delayed in Plymouth by bad weather and left on the 28th after 49 hours in port. The first week was plagued by bad weather and during shelter in Falmouth on 1st August the two Thailand geologists were put ashore. The rest of the cruise with only 5 I.G.S. personnel aboard ran without a night shift. Weather improved during the second week and 21 vibracores were collected in one four-day spell. On the last day the corer was damaged and bad weather drove the ship into Plymouth about 12 hrs early.

e) Fourth Leg 10-23 August

The ship left Plymouth after a 46 hr port call. The weather never settled during the leg and successful vibracoring days were followed by days with adverse conditions. The Pulse 8 receivers gave trouble during much of the leg and stopped operations on three occasions. The weather settled during the last few days and vibracoring continued with minor problems such as dragging anchors, telephone cables and premature closing of the gate.

f) Fifth Leg 24-Aug - 6 September

The ship left Plymouth after a 36 hr port call and the weather during the whole leg was excellent. A succession of minor problems primarily with ships equipment limited the number of sites averaged per day to four. At the end of the leg the ship had a 54 hr steam from the working area to Great Yarmouth.

h) Numerical Results

	Vibracore sites	Gravity Core sites	Shipek sites
Leg 1	[illegible]	56	39
Leg 2	[illegible]	54	113
Leg 3	[illegible]		13
Leg 4	[illegible]		100
Leg 5	[illegible]		136
	[illegible]	110	401

		IN PORT	OFF PASSAGE	ON PASSAGE BETWEEN W/S SITES	ANCHORS DOWN	ANCHORS UP	ON STATION ANCHORED UP	SHIFTING	GRAVITY CORING	NO. OF W/S SITES	NO. OF G/S SITES	NO. OF SHIPS ONLY SITES	DOWN TIME WEATHER	DOWN TIME SHIP	DOWN TIME I.G.S. EQUIP.	DOWN TIME DECCA F-8	DOWN TIME I.G.S. OFF WATCH	REMARKS
30/6	78	19.10hrs	04.50hrs															Steaming from Boston to Cork.
1/7	78	03.30hrs	20.30hrs															to set up Pulse 8 Receivers
2/7	78	08.30hrs	07.30hrs										03.00hrs			08.00hrs		05.30 hrs in Cork - No Night Pilot 03.00hrs in Cobh - Resetting Pulse 8
3/7	78		06.15hrs										24.00hrs					Steaming to Mounts Bay for Shelter
4/7	78	04.55hrs	15.50hrs						03.15hrs		14		20.45hrs					Anchored in Mounts Bay. Later steaming to Portland.
5/7	78		01.20hrs						22.40hrs		28	6						Gravity Coring in Portland Sheet
6/7	78		13.30hrs						07.30hrs		13		16.30hrs	03.00hrs				Steaming West Autopilot Batteries Failure
7/7	78		11.00hrs	02.15hrs	02.05hrs	02.00hrs	03.25hrs			3			11.00hrs				02.30hrs	
8/7	78			03.55hrs	02.20hrs	03.10hrs	02.22hrs	02.15hrs		5		4					06.25hrs	01.30hrs Spent Unfouling Anchors.
9/7	78			08.22hrs	03.05hrs	03.15hrs	05.23hrs	03.55hrs		6		7						
10/7	78			02.28hrs	00.45hrs	00.45hrs	06.05hrs	09.12hrs		1		9			10.55hrs			LOST VIBROCORER
11/7	78		12.20hrs					11.00hrs	00.40hrs		1	13						Steaming to Plymouth.
12/7	78	16.00hrs	08.00hrs															In Plymouth.
Tot.										15	56	39						

C.G. BRADLEY

N.P. ATKINSON

A. CROSBY

e Shore Leg 1

No.1 C.G. BRADLEY

Dayshift P WIGGINS

D BRAY

Nightshift D.R TAPPIN

Date	In Port	C/S Sounds	Anchors Down	Anchors Up	On Station Anchored	Sailing	Gravity Cores	No. of T/C Casts	No. of G/C Casts	No. of Other Casts	Down Time Weather	Down Time Ship	Down Time I.E.S. Equip.	Down Time Decca F.P.	Down Time I.E.S. Off Watch	Remarks
15/7/78	18.00hrs	06.00hrs									02.00hrs	00.45hrs				Thick Fog in dock and Radar Bricked.
16/7/78		11.00hrs	02.05hrs	01.46hrs	01.40hrs	02.57hrs	03.20hrs		3		6			02.10hrs			Vibrocorer Pot faulty.
17/7/78			04.30hrs	01.18hrs	01.35hrs	04.27hrs	06.20hrs		3		11			05.30hrs			Faults on vibrocorer switchboard and Pot Shipek winch Bricked.
18/7/78			02.07hrs	01.26hrs	01.29hrs	02.53hrs	02.00hrs		2		3	05.20hrs		08.35hrs			Shipek winch still bricked. Anchor wires tangled.
19/7/78			04.31hrs	02.48hrs	03.23hrs	04.23hrs	08.15hrs		6		15						
20/7/78			04.45hrs	00.40hrs	01.13hrs	02.17hrs	14.35hrs		2		20		04.05hrs		00.30hrs		Call from Decca at St. Juste. Socket replacement on stbd. cruchet
21/7/78							21.30hrs				23				02.30hrs		Master signal for Pulse 8 off.
22/7/78							19.15hrs				24			03.50hrs	00.55hrs		Delay on Link calls Pulse 8 problems.
23/7/78			03.45hrs	01.05hrs	01.40hrs	02.40hrs	06.35hrs		3		11				04.20hrs		Pulse 8 fluctuations too great to work, then off completely.
24/7/78		06.00hrs										18.30hrs			05.30hrs		Pulse 8 not locking in. Steaming to Helford for Shelter.
25/7/78	16.00hrs	08.00hrs										24.00hrs					Anchored in Helford River. Leave for Lyme Bay.
26/7/78		06.00hrs						16.00hrs		29						02.00hrs	Gravity coring in Portland.
27/7/78		03.25hrs						12.50hrs		25				01.45hrs		06.00hrs	Leave for Plymouth.
28/7/78	16.00hrs	08.00hrs															Plymouth.
TAL									19	54	113						

C. G. BRADLEY

N. P. ATKINSON

C. D. R. EVANS

Cape Shore Leg 2

No. 1 C. D. R. EVANS

Dayshift W. LONIE

K. HOLT

Nightshift D. CAMERON

DATE	IN PORT	ON PASSAGE	ON PASSAGE BETWEEN V/C SITES	ANCHORS DOWN	ANCHORS UP	ON STATION ANCHORED	SHELTERING	GRAVITY CORING	NO. OF V/C SITES	NO. OF G/C SITES	NO. OF OTHER SITES	DOWN TIME: WEATHER	DOWN TIME: SHIP	DOWN TIME: I.G.S. EQUIP.	DOWN TIME: DECCA P-S	DOWN TIME: I.G.S. OFF WATCH	REMARKS
27/7/78	24.00hrs																Plymouth
28/7/78	09.00hrs	15.00hrs															Depart Plymouth.
29/7/78		08.00hrs	02.00hrs	02.50hrs	04.10hrs	04.20hrs	00.40hrs		5		2						No night shift.
30/7/78		02.30hrs		01.00hr	01.40hrs	03.20hrs			3			06.15hrs	02.30hrs				Steering Problems
31/7/78		06.00hrs										24.00hrs					Running for Shelter.
1/8/78	12.00hrs	12.00hrs										24.00hrs					Arrive Falmouth.
2/8/78	15.10hrs	08.50hrs										24.00hrs					Leave Falmouth.
3/8/78		07.15hrs	01.40hrs	02.55hrs	03.20hrs	04.20hrs			6			07.15hrs				04.30hrs	No night shift
4/8/78		[illegible]	05.05hrs	02.40hrs	02.30hrs	04.30hrs			5							09.30hrs	No night shift.
5/8/78		[illegible]	05.05hrs	02.25hrs	02.40hrs	05.24hrs			5							08.23hrs	Fault on Vibrocorer cable. No night shift.
6/8/78			02.50hrs	02.30hrs	03.40hrs	05.00hrs	01.00hrs		5					00.45hrs		08.15hrs	Repairing fault on cable. No night shift.
7/8/78		05.00hrs.	00.29hrs	00.30hrs	00.30hrs	02.15hrs.	09.06hrs		1		11	06.10hrs					Vibrocorer wrecked Leave for Plymouth
8/8/78	13.00hrs	11.00hrs										24.00hrs					Arrive in Plymouth.
9/8/78																	Plymouth.
TAL									30		13						

Cape Shore Leg 3

No.1 A CROSBY

Two Thai Students: SERMSAKDI KULVANICH, PREECHA LAOCHU

Dayshift: A CROSBY, W MARTINDALE, D M HALL, P WIGGINS, D BRAY

Nightshift ....

DATE	IN PORT	ON PASSAGE	ON PASSAGE ARRIVED T/C SITES	ANCHORS DOWN	ANCHORS UP	ON STATION ANCHORED UP	SEISMIC	GRAVITY CORING	NO. OF T/C SITES	NO. OF G/C SITES	NO. OF SITES ONLY	DOWN TIME WEATHER	DOWN TIME SHIP	DOWN TIME I.G.S. SHIP	DOWN TIME DECCA P-8	DOWN TIME I.G.S. OFF WATCH	REMARKS
10/8/78	09.40hrs	14.20hrs															Leaving Plymouth.
11/8/78		06.40hrs		00.25hrs	00.40hrs	02.00hrs	01.05hrs				3	11.55hrs		01.15hrs			Problems with Vibrecore cable - no sample
12/8/78			02.45hrs	01.50hrs	03.20hrs	07.10hrs	01.25hrs		4		3			06.30hrs			Waterlogged cable on first site
13/8/78			07.08hrs	02.02hrs	02.45hrs	04.55hrs	07.10hrs		6		15						
14/8/78	00.15hrs	10.00hrs					05.15hrs				7	10.15hrs			04.50hrs		Pulse 8 off Steaming to Mounts Bay for Shelter.
15/8/78	24.00hrs											24.00hrs					1 Pulse Receiver Broken. Anchored in Mounts Bay.
16/8/78	06.20hrs	17.40hrs										24.00hrs					Steaming to West.
17/8/78		06.35hrs	02.25hrs	02.26hrs	03.55hrs	06.05hrs	02.25hrs		5		4	06.35hrs					One site Reanchored.
18/8/78			01.25hrs	00.20hrs	00.35hrs	00.55hrs			1		18	06.15hrs			04.35hrs		Pulse 8 master signal off twice
19/8/78							16.40hrs				22	07.20hrs					
20/8/78			05.30hrs	03.45hrs	03.05hrs	05.55hrs	05.45hrs		4		11						Anchors dragging - Rock caught in Hoke twice Telephone cable caught once.
21/8/78			03.52hrs	03.10hrs	02.25hrs	05.25hrs	07.25hrs		5		17				01.00hrs		Pulse 8 off. Anchors dragging on one site.
22/8/78		15.45hrs	01.05hrs	00.40hrs	00.25hrs	00.50hrs	0		1						05.15hrs		Pulse 8 still off. Steaming to Plymouth.
23/8/78	17.30hrs	06.30hrs															Plymouth.
TOTAL									26		100						

D.R. TAPPIN

C.D.R. EVANS N.P. ATKINSON

Cape Shore Leg 4 No. 1 C.D.R. EVANS Dayshift W. LONIE Nightshift D. CAMERON

D. BRAY

DATE	IN PORT	AT SEA	ON STATION INCLUDED IN AT SEA	ANCHORED DO & N	ANCHORED UF	ON STATION ANCHORED	SEISMICS	GRAVITY CORING	NO. OF T/C SITES	NO. OF G/C SITES	NO. OF SEISMIC LINES	DOWN TIME WEATHER	DOWN TIME S.U.F.	DOWN TIME I.G.S. EQUIP.	DOWN TIME DECCA F-8	DOWN TIME I.G.S. OFF WATCH	REMARKS
24/8/78	19.30hrs	04.30hrs											02.30hrs				'A' Frame Fault. Leave Plymouth.
25/8/78		17.55hrs	01.15hrs	01.35hrs	00.30hrs	01.00hrs	01.45hrs		1		4						Anchors Dragging when anchoring up.
26/8/78			04.00hrs	04.35hrs	01.55hrs	04.09hrs	07.10hrs		3		8		00.40hrs		01.30hrs		Numerous Problems.
27/8/78			02.35hrs	03.35hrs	03.10hrs	04.05hrs	09.15hrs		4		12		01.00hrs		00.20hrs		Anchors dragging on one site. Port engine + 1 hydraulic pump broken down
28/8/78			05.00hrs	02.35hrs	03.35hrs	04.41hrs	07.29hrs		4		5			00.20hrs			Repair to vibrocorer pot.
29/8/78			03.50hrs	02.11hrs	04.14hrs	04.25hrs	09.18hrs		4		17						Port anchor fouled round itself on one site
30/8/78			02.50hrs	02.13hrs	03.40hrs	05.12hrs	09.05hrs		4		19			1.00hrs			Shipek winch broke down. Wire from sea bed caught on anchor
31/8/78			03.28hrs	02.23hrs	04.07hrs	04.54hrs	09.05hrs		5		18						
1/9/78			03.37hrs	02.13hrs	04.56hrs	04.19hrs	08.55hrs		5		18						Port fairlead roller cut through by anchor wire
2/9/78			04.37hrs	01.29hrs	03.31hrs	03.38hrs	09.00hrs		4		13				1.45hrs		Wires dragged off sea bed by anchor. Pulse 8 off 3 times.
3/9/78			04.53hrs	01.45hrs	03.05hrs	06.34hrs	07.40hrs		4		17	03.40hrs					Tidal currents too strong on last site - No sample taken.
4/9/78		19.55hrs					04.05hrs				7						Steaming for Yarmouth.
5/9/78		24.00hrs															Steaming for Yarmouth.
6/9/78	14.00hrs	10.00hrs															Yarmouth.
Total									38		136						

Cape Shore Leg 5

No.1 C G BRADLEY

Dayshift C.G. BRADLEY, N.P. ATKINSON, P WIGGINS, K HOLT, D McPHATER

Nightshift G. K. LOTT, D M HALL

6 Comparison with other ships chartered by I.G.S.

The most obvious ship for comparison is Emerald which was charted for similar work in the same area in 1977. The configeration and size of ships prior to 1977 was generally unlike Emerald and Cape Shore. D. Evans CSNU has written a report comparing the two ships and concludes that "For work in exposed areas ..... Emerald would be the better ship" CSSU agree with this conclusion. Operations on Emerald were slightly quicker and CSSU achieved eight vibracore sites a day compared with a maximum of six on Cape Shore. However, other considerations, water depth, distance between sites and time left to vibrate can modify this figure. Emerald was safer for using the gravity corer and shipek grab in adverse weather. For work in the Western Approaches either would be suitable but the minor problems which beset Cape Shore did not occur as frequently on Emerald. The quality of assistance on deck, on the bridge and by the catering staff was consistently better on Emerald. CSSU would prefer to work on Emerald rather than Cape Shore.

7) Pulse 8 Track charts and explanation

The three track charts are included to show the range of fluctuations encountered using the Pulse 8 Navigation system with the mini computer and track plotter. The first and second show the variation in the system during daylight hours and the third shows the variation on the system due to 'night effect'

The first track plot was drawn with a 500 m anchor spread and the intended anchor positions are shown as B (Bow), ST (StarboardStern) and PT (Port Stern) on the faint circle. As can be seen from the chart ST and PT were dropped close to the intended site but B was dropped 200 m short of its intended position. The quality of the track chart is good and external fluctuations probably account for a variation of ± 40 m. This compares with fluctuations on the second chart which are approximately ± 150 m. The wandering signal of this magnitude makes anchoring more difficult though the anchors appear to have been dropped as accurately as when the navigation system was more stable. A drawback when the signal wanders is the difficulty of picking up any drift on the vessel when at anchor. A change in the lead of the anchor wires usually signals such an event but the track plotter is also useful to confirm the drift.

The third track plot was taken during the night when the ship was on a steady 3 knot westerly course. The track plotter showed the vessel wandering up to ± 300 m and on occasions it was seen to vary up to 2 km in about 20 seconds. Naturally position fixing during these conditions is of limited accuracy.

The fluctuations in the system were normally along a NE-SW direction whether it be for the major variations during the night or the smaller scale acceptable variations during the day. Occasionally at night however the ship appeared to 'loop the loop' when it was on a steady course.

LSB W VE 36

SCALE 1/10000.

GOOD VIBROCORER TRACK PLOT

DATE - 27/8/98

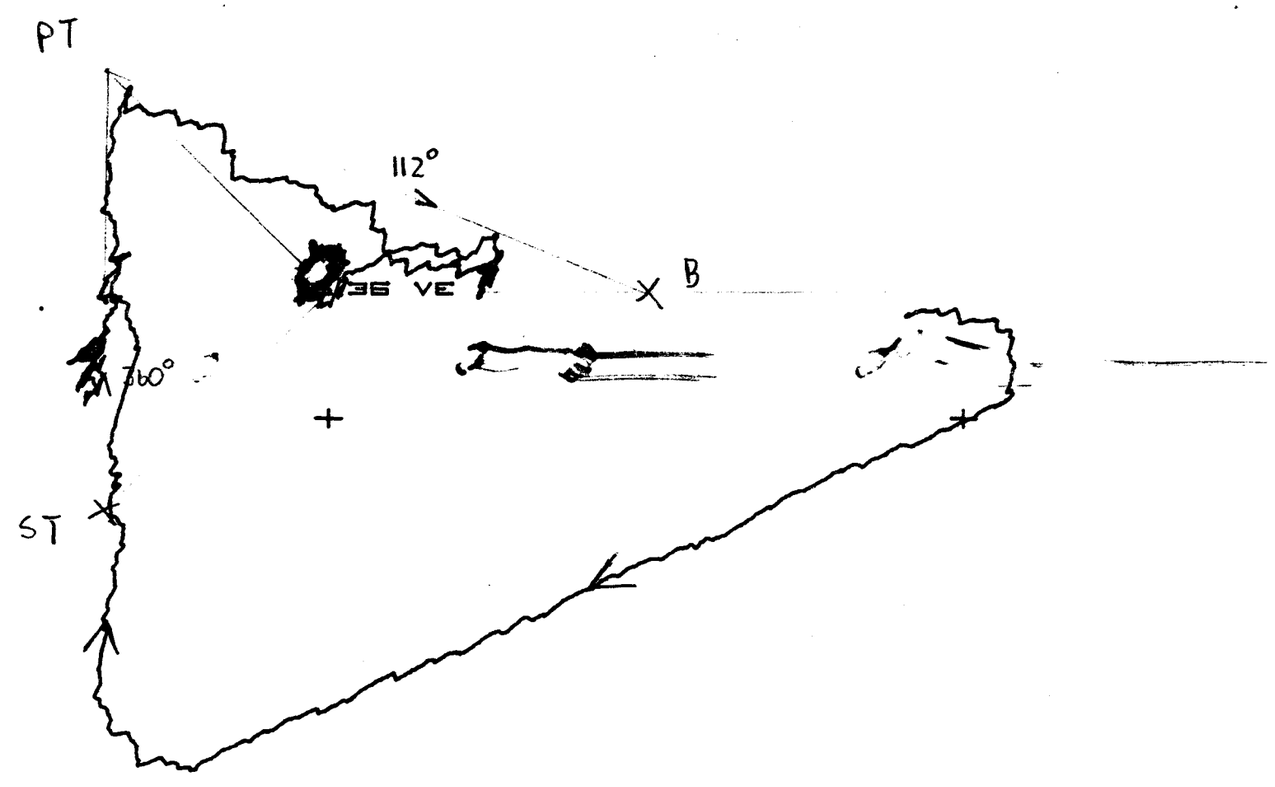
TIME 17.00Hrs - DAYLIGHT HOURS

POSITION +48°.55'N -09°.22'W

ANCHORING UP ON A 500M SPREAD

~~ARMING CABLE SPEED~~

1/



5418620.

4703750.

HEWLETT-PACKARD
9280-0160
FOR USE ON HEWLETT-PACKARD RECORDERS

FOLD

FOLD

Cockburn Bank NE 1% VE

SCALE 1/10000.

POOR VIBROCORER TRACK PLOT

Date. 12/8/78

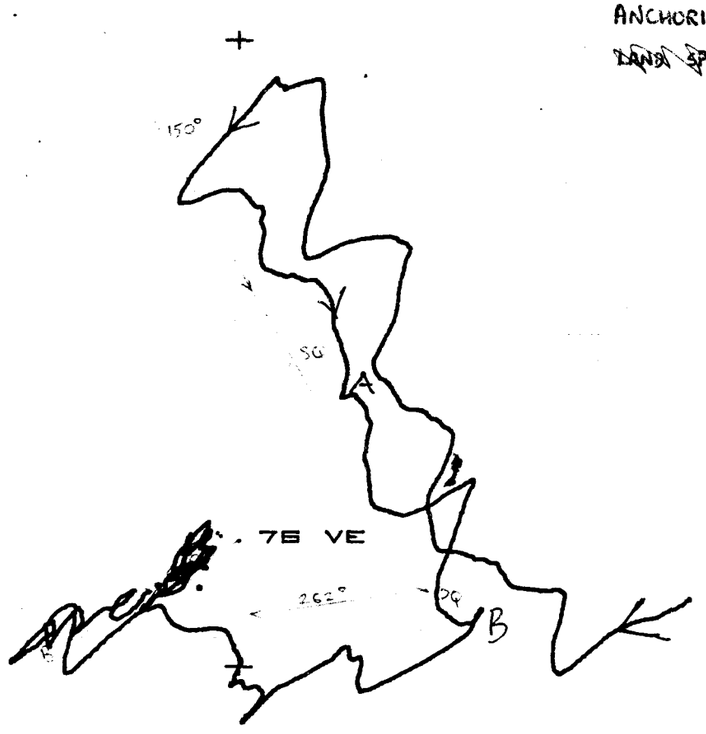
TIME 19.00hrs. - DAYLIGHT HOURS

POSITION +49°40' N -08°22' W

ANCHORING UP ON A 300M SPREAD

~~LAND SPEEDS~~ VARYING

2/



500m

528200.

5485050.

SCALE 1/10000.

TP 1.

NIGHT EFFECTS

268°

DATE 17/8/78

TIME 00.08 hrs to 00.30 hrs.

3/

Fixes Taken at 30 second intervals and indicated by L

Course - A straight line on 268° or almost E.W

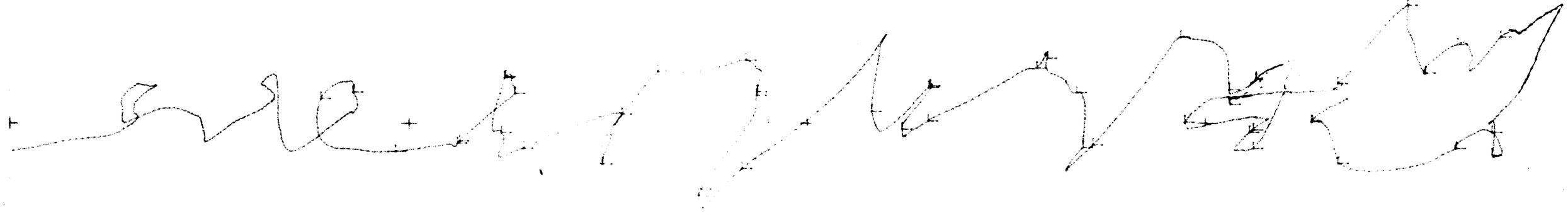
Land Speed - About 3 knots or 5-55 km/h.

Visibility - Good - scattered cloud.

Wind + Sea state - Force 3 or 4, moderate swell.

93m ACTUAL DISTANCE TRAVELLED IN ONE MINUTE

POSITION 49°23' N -08° 20' W



500m

SCALE 1/10000.

8 Conclusions

In a ten week spell CSSU collected 122 vibracore samples, 110 gravity core stations and 401 shipek stations. One vibracorer was wrecked and one damaged during this period. The ship worked as well as CSSU expected although the number of stations occupied was less than expected because of unsettled weather on the first four legs.

It is recommended that next year

a) Vibracorer pots are run up before being put on the ship

b) A greater reserve of suitable electrical cable is held at the start of the contract

c) A plastic piston be designed to reduce stopping of the sediment down the tube during recovery

d) The contract is modified to include provision for the ships crew to assist I.G.S. with handling the vibracores barrel

e) Equipment such as spare Shipek grabs are inspected before being put aboard

f) We hire Decca Pulse 8 earlier to ensure Mark 4 receivers in the South West Approaches

g) Emerald is a preferable ship to Cape Shore and if other things are equal we hire Emerald.

h) If we have Cape Shore we ensure - by including a clause in the contract - adequate crockery, glasses and cutlery

9) Photographs

1) Cape Shore in Millbay Docks Plymouth. A frame inboard.

2) Cape Shore stern in Millbay Docks Plymouth. Vibracorer sitting on the stern.

3) Carrying the vibracorer loaded barrel to the work bench. Note wet deck, ropes and wires across the deck.

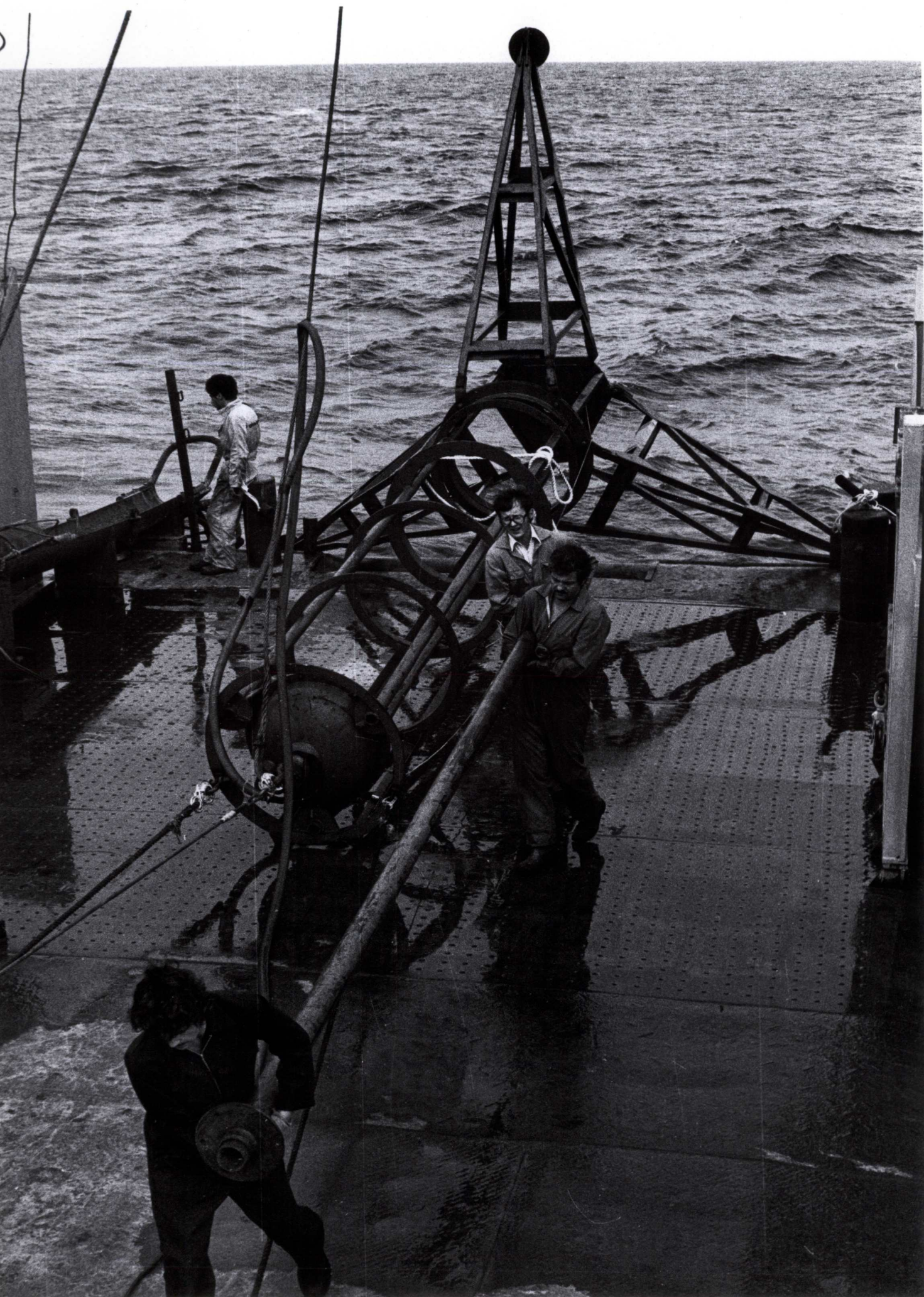
4) Attaching the bowsing line onto the gravity corer. Position very exposed when sea washes across the stern and the ship is rolling.

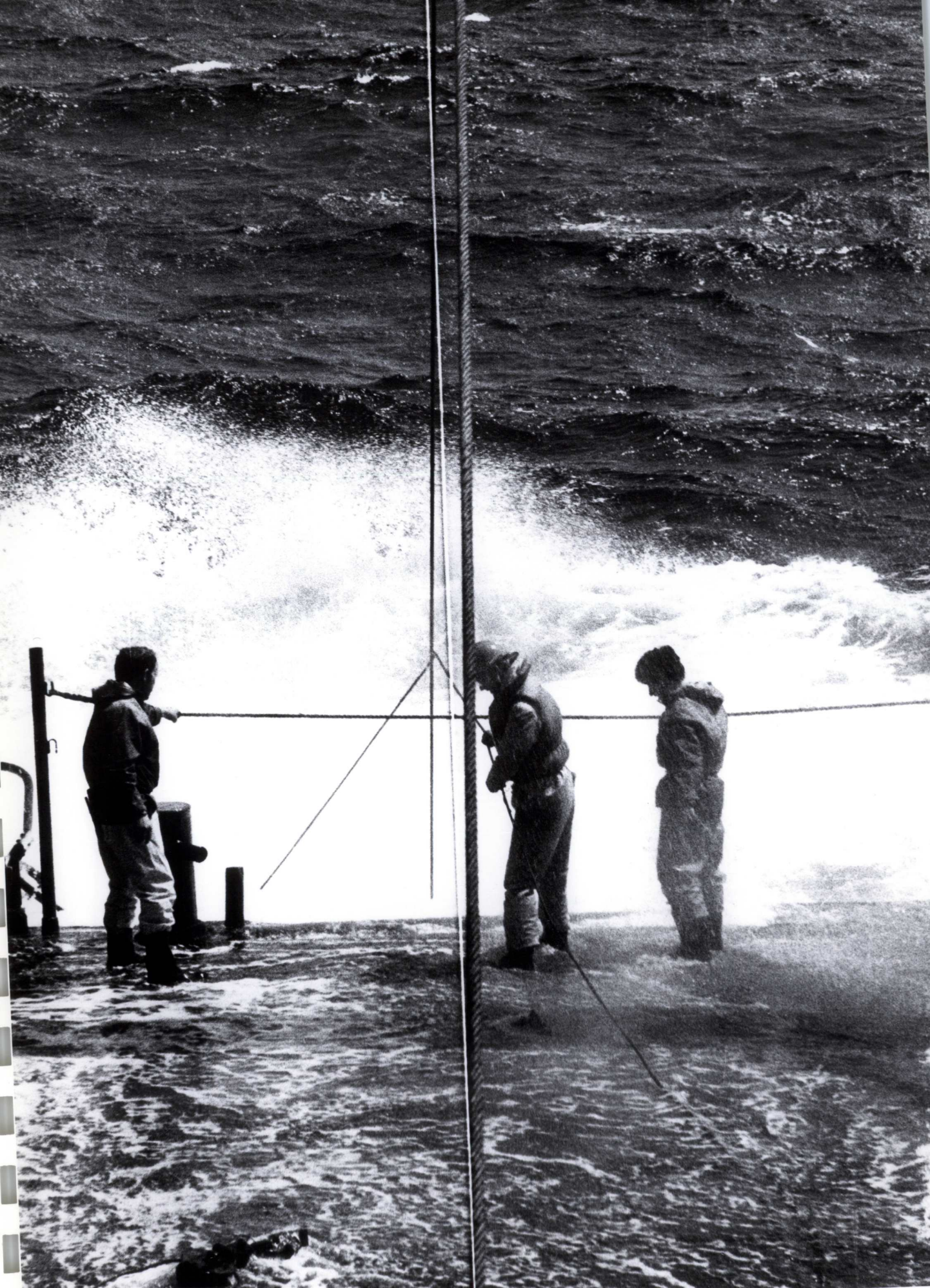
5) View of operator on Sykes winch bringing in gravity corer. Main vibracorer electric cable in front of Sykes winch.

6) Lowering the vibracorer when ship moored into tide and sea coming in over the stern.


CAPE SHORE

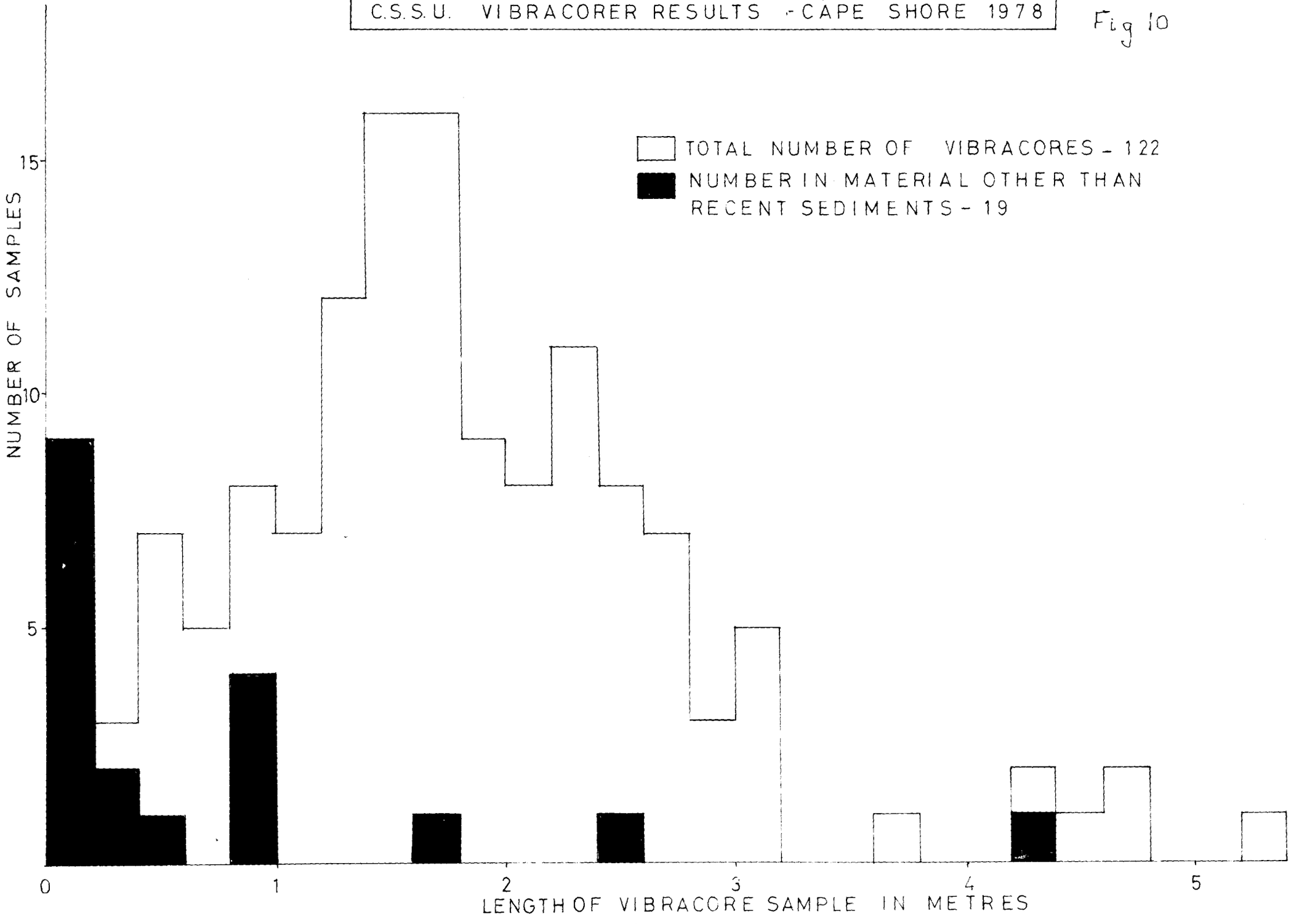

ESSO





C.S.S.U. VIBRACORER RESULTS - CAPE SHORE 1978

Fig 10



C.S.S.U. SAMPLE STATIONS CAPE SHORE 1978

10°00'W 9°00'W 8°00'W 7°00'W

50°00'N

49°00'

• = VIBROCORE

△ = SHIPEK GRAB

⊙ = VIBROCORE WITH MATERIAL OTHER THAN RECENT SEDIMENTS.

Labadie Bank

Cockburn Bank

Scilly

Parson's Bank

Auskell Spur.

200m

Little Sole Bank

10°00'W 9°00'W 8°00'W 7°00'W