

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1970 RESEARCH VESSEL PROGRAMME

(PROVISIONAL: Not to be quoted without prior reference to the author)

REPORT: T V TELLINA: CRUISE 6b

STAFF:

J P Bridger		
B C Mumford		
B Holford		
M R Vince		
J Lythgoe	16-19 June only	} University of Sussex
A Young	15 June only	
J Warton	20 June only	

DURATION:

1600 hours 14 June

0800 hours 21 June

All times are British Standard Time

LOCALITY:

Sussex coast

AIM:

To study by means of divers the effects on the ground and benthos of an 8 fm trawl, rigged as per Newhaven practice, both with and without tickler chains.

NARRATIVE:

The Lowestoft team travelled to Newhaven with the diving equipment arriving at 1555 hours 14 June. TELLINA arrived from Weymouth five minutes later but the lorry bringing the fishing gear and compressor was delayed by heavy traffic and did not arrive until 2000 hours. Consequently the gear was off loaded at 0700 hours 15 June, the gear from Cruise 6a loaded up and the lorry then returned to Lowestoft.

The gear for this cruise was then rigged viz an 8 fathom courlene trawl on 5 ft boards joined by 24 ft legs, the upper legs being of 2 in courlene rope, the lower legs of $1\frac{1}{16}$ " chain. The 3" rubber disc groundropes threaded on to $\frac{3}{16}$ " chain were 48 ft long and were loosely wrapped with 66 ft of $\frac{1}{4}$ " chain from wing tip to wing tip. Courlene quarter ropes were bent on to the brackets of the otter boards.

TELLINA sailed at 1320 hours to explore certain grounds suggested by Mr J Ennis of Newhaven. The first spot, about 1 mile south of Rottingdean proved to be of sand, shell, and a few small stones which would have been suitable but the visibility underwater was poor down to 6 ft or less. A second dive inshore between Rottingdean and Kemp Town again suffered from poor visibility but on the third dive, about 4 miles south of the western outskirts of Brighton, the underwater visibility was much better, up to 15 ft, and the bottom consisted of sand, shell and a few stones at 10-11 fms.

Here the first trawl haul was made late that afternoon with two divers riding on the headline for 20 minutes. They reported that the quarter ropes were too short and the groundrope was only just skimming the bottom. That evening the quarter ropes were lengthened and a further 42 ft of $\frac{3}{8}$ " chain wrapped tightly around the 16 ft bosom section of the groundrope.

On 16 June TELLINA sailed at 0840 hours and off Brighton shot the modified gear to which was added a 96 ft door to door tickler of $\frac{1}{4}$ " chain. Three hauls were made that day with the divers riding the headline and filming and photographing the action of the ticklers on the seabed and the reaction of the fish.

On 17 June TELLINA sailed at 0815 hours. The day was a grey one and so the only hope of successful photography was in shoal water. The first haul about 1 mile off the Palace Pier, Brighton, proved to be very stony. Only two stones were caught in the net, but the after wing was torn. After mending the net another ground off Peacehaven was tried. This was of sandy mud with a few stones at 8-9 fms. Here two dives were made, one to study the effect of a heavy $\frac{11}{16}$ " wing tickler and the other of a $\frac{1}{2}$ " chain, both being 50 ft in length.

On 18 June TELLINA sailed at 0905 hours in perfect weather and again worked off Peacehaven making three hauls with $\frac{5}{16}$ " chain legs in place of the original heavy ones. A new technique was developed. Having ridden the headline for a while, filming or taking photographs, the divers moved back to the codend. From here they dropped a weight on a length of thin line and when the line came tight they dropped a second weight and then let go of the net. When the detritus stirred up by the trawl had settled down they put a spike in the bottom alongside the line which marked the centre of the path of the gear, then fixed a tape measure to the spike and swam at right angles to the base line measuring the distance from the centre line to all the signs of disturbance. The track of the otter boards, chain legs and groundrope were clearly visible and the measurements of spread obtained in this way agreed closely with those obtained at the ship by warp divergence.

The same techniques were used on 19 June when a further 3 hauls were made on that day. The groundrope was progressively lightened and finally lifted off the bottom leaving only a $\frac{1}{2}$ " tickler and the otter boards in contact with the sea bed. When the ship returned to Newhaven at 1630 hours, 19 June, having made 13 hauls on 3 different types of sea bed and having used gear ranging from heavy legs and a heavy ticker to no ticklers and a floated groundrope, all the work planned for the cruise had been completed. This was due to quite phenomenal diving conditions; light offshore winds, no strong winds for 3 weeks prior to the cruise, bright sunshine and neap tides.

On 20 June the ship sailed at 0845 hours this time using two ticklers, a 90 ft door chain and a 50 ft wing chain. More pictures were obtained. The wind was southwest force 2-3 when the ship sailed but freshened during the morning and a short choppy sea and groundswell built up. Diving was abandoned at 1230 hours, the ship berthing at 1315 hours.

The scientific staff then left the ship and returned to the laboratory with the photographic equipment. The ship sailed for Lowestoft docking at 0800 hours, 21 June.

RESULTS

Until some 500 ft of cine film and over 100 underwater photographs have been developed and studied it would be unwise to draw firm conclusions as to the effect of tickler chains on the sea bed. However, judging from the divers' reports the following points emerge:

1. The sea bed in the areas worked consisted of sand, sandy mud and silt, fairly randomly dotted with stones. Most of the stones were of flint but some broken lumps of chalk also occurred. Most of the stones were from orange to grapefruit in size with occasional pieces the size of a football. Some of these stones were almost buried, some about half buried while some lay on the surface. Many of the latter had clearly been turned over fairly recently since they had no marine growth on their upper surfaces while their lower surfaces were coated with life.
2. Tickler chains do not dig deeply into the sea bed. Even a chain of 1 1/16" diameter disturbs no more than 2" of sandy mud.
3. Any stone with a smooth top and which is more than half-buried remains unmoved by the gear. If, however, it stands proud of the bottom by half its depth or more, especially if it has a rough or irregular top, when it will be pulled out and carried along for 1-3 ft by a tickler chain.
4. Tickler chains are, however, not the sole cause of stones being pulled out of their sockets. Heavy chain legs and heavy wrapping chain on the groundrope will also do it.
5. The path of the gear is very clearly marked. Otter boards, chain legs, groundropes, even the little bunch of chain on the codend leave definite and distinct marks.
6. The only way to ensure that no stones are pulled out is to use only light chain legs, no ticklers and no wrapping chain so that the gear barely touches the bottom. The catch of flatfish will then, of course, be considerably reduced and the sole catch reduced to almost nil.
7. The catches were never large, seldom exceeding half a basket per 40 minute tow. They consisted of a mixture of plaice and dabs with a few soles, rays and pouts. The sole catch seemed to be increased by the use of tickler chains as was the quantity of starfish, cuttlefish eggs and other benthos.
8. Fish reaction changed markedly from haul to haul and this was not always due to changes in the rig of the gear. It may well be related to the state of the tide or the towing speed. Fourteen of the 15 hauls were made wither down tide or at slack water. Normally fish swam along in front of the gear keeping just ahead of the tickler or groundrope for some time before falling back into the net. On at least one occasion, however, fish were flipped up by the tickler and then either swam or floated straight into the net.
9. Spread measurements were made over a range of speeds with most of the rigs used. Heavy ticklers reduced spread considerably unless extra speed was used to compensate.
10. Despite the fact that many hundreds of stones were encountered by the gear all but two passed under the rubber groundrope even when it was well chained down.

ACKNOWLEDGEMENTS

Our grateful thanks are due to the three divers from the University of Sussex, to Mr H Boniface for acting as our shore base, and to the Commanding Officer, Warrant Officers, NCOs and men of 1107 Marine Craft Unit for their help and the facilities made available to us.

J P Bridger
29 June 1970

SEEN IN DRAFT: W B (Master)

INITIALLED: A J L

DISTRIBUTION:

Basic List

Mr Bridger
Mr Mumford
Mr Holford
Mr Vince
Dr Lythgoe
Dr Young
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