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NEW ZEALAND MARINE DEPARTMENT

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MARINE DEPARTMENT ROCK OYSTER SPAT CATCHING PROGRAMME 1969-70

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SUMMARY

In December 1969 and January 1970, four hundred and two thousand rock oyster spat collectors were set out by Marine Department in various Northland harbours. A commercially useful catch was obtained over 300,000 collectors at Huawai Bay, Mahurangi Harbour and on experimental collectors at Parekura Bay, Bay of Islands and lower Oruawharo River, Kaipara Harbour. A lesser settlement was obtained on 40,000 collectors at Kawau Island. A most disappointing catch was suffered over the entire field of 60,000 at Te Kapa. Collectors assembled with a lateral separation of one inch obtained a better catch than those made up closer together. The catch on those collectors covered with hessian was lower than on uncovered collectors. Settlement of competitors on racks at low water neaps was not a problem but there was the expected increase in barnacle settlement at high levels, while at lower levels there was an increase in acidians, polyzoans, polychaete worms, golden oysters (*Anomia walteri*) and *Ostrea sp*.

INTRODUCTION

Marine Department has undertaken the development of catching areas to assist private oyster farmers to establish an industry based on the settlement of rock oyster spat on artificial collectors (Curtin 1968). The department sells collectors with attached spat to farmers at cost price. In addition the private farmer has free access to racks in the catching areas and may set out his own collectors.

The decision to set out 400,000 collectors in 1969-70 was made in response to orders placed by the private sector of the industry for this quantity.

It would perhaps have been prudent to have established major catching areas on both the East and West Coasts in Mahurangi and Kaipara Harbours. This was not possible in the short time between finance becoming available and settlement time and one major area had to be chosen. The main reasons for choosing Huawai Bay, Mahurangi Harbour (Plate 1) were:-

(1) Natural foreshores showed better signs of annual spatfall than the Kaipara area.

(2) Waterfront land was available for a depot site.

(3) Men and equipment were more readily available than in Kaipara.

(4) Sheltered catching areas at Kaipara are 10 miles down-stream from the nearest landing. Towing would have added to costs and would not have been possible in bad weather.

(5) A separate experiment was being carried out at Kaipara, the results of which could be applied the following reason (Curtin 1970).

The bulk of the operation at Mahurangi was commercially orientated. In addition experiments were carried out to determine the best lateral separation of sticks in the bundles, the effects of covering the bundles with hessian and ferro concrete collectors and standard asbestos-cement sticks were compared.

Standard bundles of collectors were set out at Bay of Islands (512 collectors, 16 bundles), Mangawai (256 collectors, 8 bundles), Te Kapa (60,000 collectors, 1,875 bundles), Kawau Island (40,000 collectors, 1,250 bundles), Kaipara (512 collectors, 16 bundles), to investigate on a small-scale the amount of settlement in each of these localities (Map 1).

METHODS

Standard Bundles

The standard bundles of collectors were made from 32 pieces of asbestos cement strip each 2 inches wide, ¼ inch thick and 48 inches long. These were assembled (Plates 2 and 3) in eight foot wide layers of four. Layers were separated by ½ inch thick timber strips. The whole bundle was supported on two pieces of 1" x 1" x 48" marine treated pine.

Catching Racks

Supporting racks were constructed from 3" x 2" posts and 3" x 1" rails of marine treated pine.

Racks in Huawai Bay were built at extreme low water neap tide level. Those at Te Kapa and Kawau were a little higher. They ranged from 6" to 2'6" above the substrate. Racks at Bay of Islands were erected at four levels from one foot below low water neap tide level to two feet above low water neap tide level.

Investigation of Optimum Lateral Separation

10,000 collectors were used in this test. They were assembled in bundles having either four (standard), five or six sticks in each foot wide layer (Plate 4). The normal ½" vertical separator was used. They were set out as shown in Table 5. All were set out on the same tide.

Hessian Covering

1,000 collectors (31 bundles) were covered with hessian and compared with 31 bundles left uncovered on the adjoining rack. All were set out on the same tide.

Ferro Concrete : Asbestos Cement Comparison

Two bundles were made from 2" x ½" x 48" ferro concrete and these were set out with two standard bundles on the same tide in Huawai Bay.

Tarred Timber Sticks

A quantity of Australian hardwood sticks were nailed up and coated with the tar normally used by the oyster farming industry in N.S.W. These were set out at Kawau Island but were lost in bad weather.

Counting

Before counting, all collectors were lightly brushed clean. The count was made in the field with the naked eye. All visible live rock oysters on the total surface of each collector were counted. In the main commercial area at Huawai Bay the racks were divided into thirds, seaward, middle and landward. Four bundles were taken from each third of each of the 13 racks. Random bundles were taken at Kawau and Te Kapa.

All sticks were counted at Bay of Islands and Mangawai. In all, some 8,000 sticks were counted. All sticks were set out between 1.12.69 and 31.1.70. The count was made in July 1970.

RESULTS

A. HUAWAI BAY

(a) The best settlement was obtained on the seaward third of the racks followed by the near-shore third with least settlement on the middle third (Table 1). On all racks there was a definite pattern of settlement on the individual layers of each undle. Settlement increased from the top layer down to the seventh with a decreased catch on the lowest of the eight layers (Table 2). Settlement was predominantly on the undersurface.

(b) Lateral Separation

The lateral separation of 1" proved most effective. Collectors assembled closer together obtained a lesser catch (Table 5).

(c) Hessian Covering

Less settlement occurred on the covered collectors. Covering considerably reduced silting which made handling easier but this did not compensate for reduced settlement (Table 6).

(d) Ferro-concrete

These collectors caught 60% more spat than the asbestos cement control. Ferro-concrete did not show a reduction in catch on the bottom layer as did asbestos cement (Table 6).

(e) Tarred Timber

These showed no oyster settlement when first inspected in March. All were later lost due to bad weather.

B. OTHER AREAS

(a) Kawau Island

Standard bundles showed an average catch of 45 per stick. Settlement differed from Huawai Bay in that it increased from the top layer in each bundle down to the heaviest catch on the lowest layer (Table 3).

(b) Te Kapa

Average settlement per collector was only 23 oysters. There was no definite pattern over the field (Table 3).

(c) Mangawai

The trial racks here were further upstream than would seem desirable. Average catch was only 33 per collector (Table 3).

(d) Kaipara

The trial sticks set out in Lower Oruawharo River received a very heavy settlement ranging from 20 dozen to some 200 dozen per collector. Those set out in Hargreaves Basin, further upstream, showed an average catch of 4 dozen.

(e) Bay of Islands

Of the four levels tested the best results (57 spat/collector) were obtained on racks erected at extreme low water neaps (Table 4). There was a slight reduction in settlement on collectors set out 12 inches higher. The highest and lowest levels tested had substantially lower settlement. The bottom layer of sticks in each bundle at all four levels did not show even a single visible oyster at time of counting.

DISCUSSION

(a) Time of setting out

Collectors were set out in the Huawai Bay field over December-January. There was no pattern of settlement relative to time of setting out. The pattern established was related to the position in the field and layer in the bundle. A considerable quantity of collectors set out at Kawau Island on departmental racks by a private farmer in February, did not attract a settlement. Similarly, collectors set out at Kaipara during mid-January also failed to catch. In both instances adjacent collectors set out a month earlier caught well.

It was quite noticeable at the time of counting that the collectors set out earlier bore a higher proportion of larger sized oysters. Spat were not measured accurately but their length ranged from 2 to 30 mm. Increased ascidian attachment was obvious on collectors set out in early December in Huawai Bay.

With a large scale operation it is impossible to set out other than over a period of some weeks. Results this season showed that it would be desirable to have collectors out one month earlier on the West Coast (see also Greenway 1969) with all collectors in place by the end of January.

(b) Levels

The choice of level is all important. The level of extreme low water neaps which approximately corresponds with the bottom of the natural oyster band appears to be the best practical level in areas tested so far. Below this there is an increasing settlement of competitors, principally Microcosmus kura, Waltersipora curcullata, Anomia walteri, Ostrea sp. and polychaetes.

Catches were poor on the bottom layer of sticks at Huawai Bay and no oysters occurred on the bottom layer at Bay of Islands. However, at Kawau and Kaipara the reverse was the case with the heaviest catch on the lowest layer. The use of ferro-concrete sticks may preclude non-settlement on bottom layers. If so, this would offset their higher cost.

(c) Areas

Increased settlement would probably be obtained by having shorter racks spread over a longer area of foreshore. The racks at Huawai Bay are at maximum density because of shortage of space. This year's catch on the three acre site is of some 18,000,000 oysters.

There is no doubt that catching areas will have to be developed in other harbours to enable the industry to develop.

(d) Separation

It may be possible to increase settlement by making the lateral separation between collectors 1½ inches (this is normal practice with major growers on some New South Wales rivers). This would mean a considerable increase in the rack space required for a large operation. It will be tried experimentally next season.

CONCLUSION

The results have shown that the amount of spat caught varies with position along the rack, height of the rack in relation to tide level and position of the collector in the bundle.

Settlement was better on collectors separated by 1" lateral spacing than on those with ½" or so lateral space.

Covering bundles with hessian decreased spat catch.

Ferro-concrete collectors have some advantage over asbestos-cement collectors.

Two pressing needs are evident. The development of a durable collector to replace the fragile asbestos cement and the establishment of a major catching area at Kaipara.

At the time of writing this report the Marine Department is developing an area near Snapper Point on the Kaipara, for the next season.

Work is underway on the assembling of identical bundles of collectors made from timber, ferro-concrete, aluminium, various plastics and cement coated pine. Results should give an indication of the best type of collector to be developed.

REFERENCES

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GREENWAY, J.P.C. 1969 — The monitoring of rock oyster spat at Mahurangi 1968-69. N.Z. Marine Dept. Fisheries Technical Report 48.

TABLE 1: HUAWAI BAY

Mean number of spat per bundle of collectors in each third of each rack. Four bundles in each third of each rack. The area covered by the racks is 3 acres measuring 175 yds by 85 yds.

Seaward

2496	3650	3260	1958	1734	2400	1740	2370	1640	2144	2626	2360	1376	1768	1608	2115	1928	1892

Average : 2170

2241	2490	2146	1896	1190	1670	1160	896	1475	1410	1349	1536	970	936	1445	1123	1348	1220

Average : 1407

1800	2020	2390	1794	1930	1860	1412	1607	1802	1607	2048	1798	1449	1792	895	1670	1890	1449

Average : 1790

Landward

TABLE 2

Average number of spat per collector in relation to layer in bundle and position on racks, Huawai Bay.

Layer in Bundle	Position on racks			
	Seaward	Middle	Landward	Mean
Top	45	24	39	38
2	53	38	42	42
3	58	47	50	52
4	75	48	54	59
5	80	50	67	66
6	87	59	73	73
7	93	70	89	84
Bottom	53	31	32	39
Mean	68	46	56	57

TABLE 3

Details of settlement on standard bundles at Kawau, Mangawai, Te Kapa in relation to layer in bundle.

Bundles counted (sticks)	Kawau 32 (1024)	Mangawai 8 (256)	Te Kapa 32 (1024)
Top	27	42	20
2	30	32	17
3	33	38	17
4	37	27	24
5	42	37	25
6	47	30	28
7	60	33	34
Bottom	87	23	19
Average	45	33	23

TABLE 4

Parekura Bay, Bay of Islands. Average number of spat on each collector in each layer of bundles at different levels above low water. Four bundles counted at each level.

Level		5'0"	4'0"	3'0"	2'0"
Layer	Top	36	64	57	29
	2	45	56	73	48
	3	46	69	65	52
	4	48	54	77	44
	5	41	56	67	57
	6	48	56	79	51
	7	62	77	38	73
	Bottom	0	0	0	0
Average		41	54	57	44

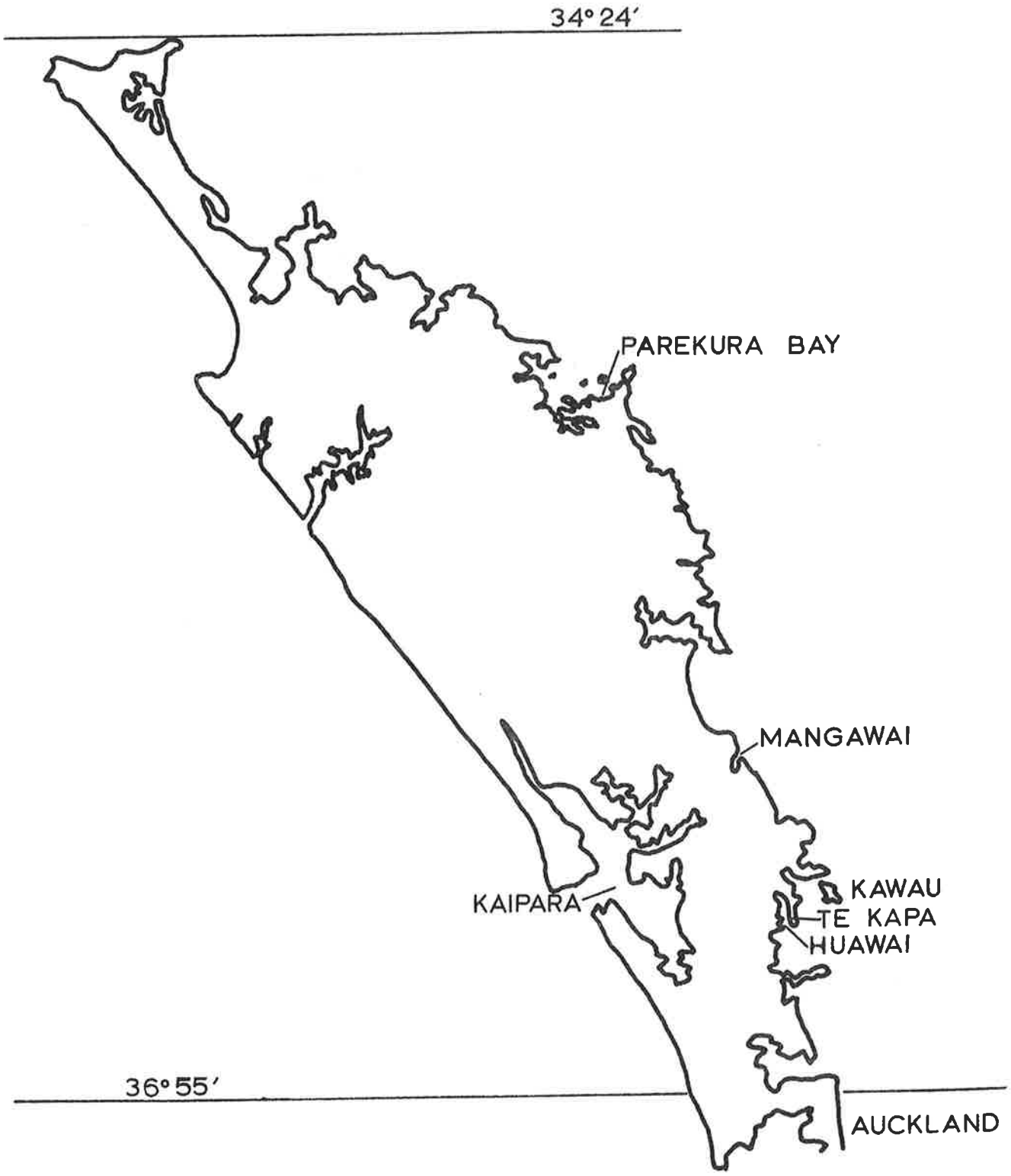

Figure 1. Locality Map

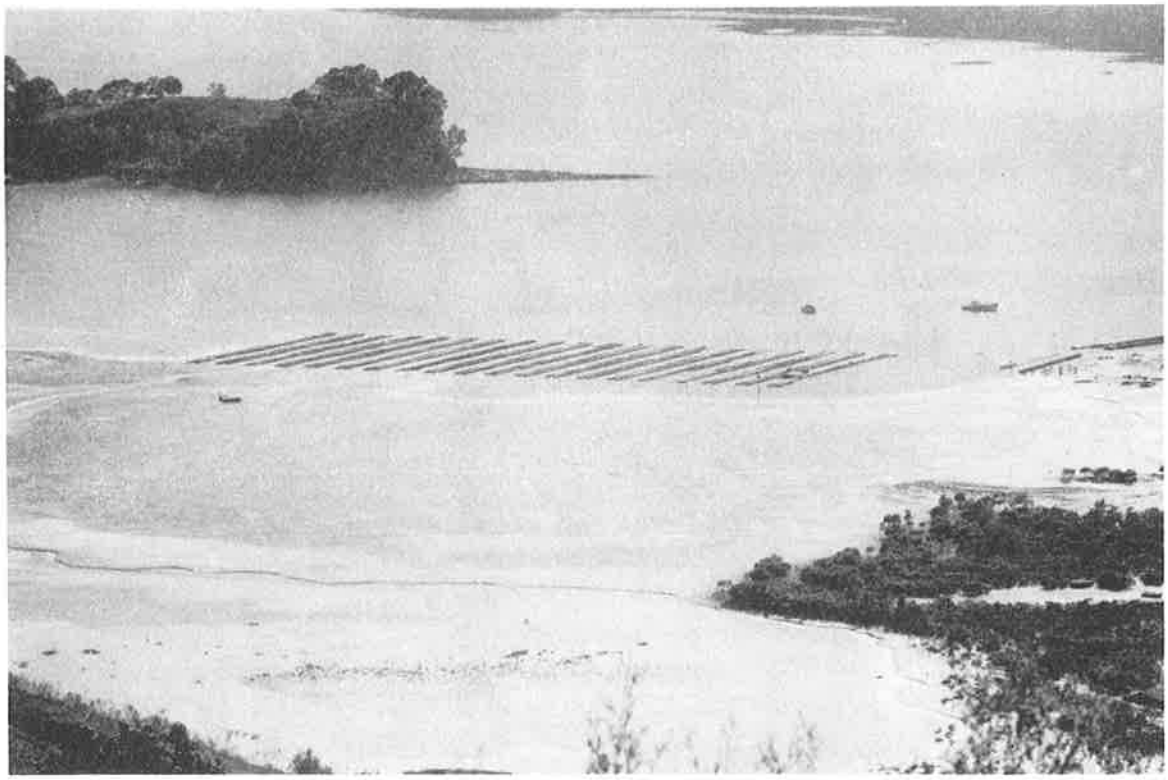

Plate 1. Huawai Bay, Mahurangi

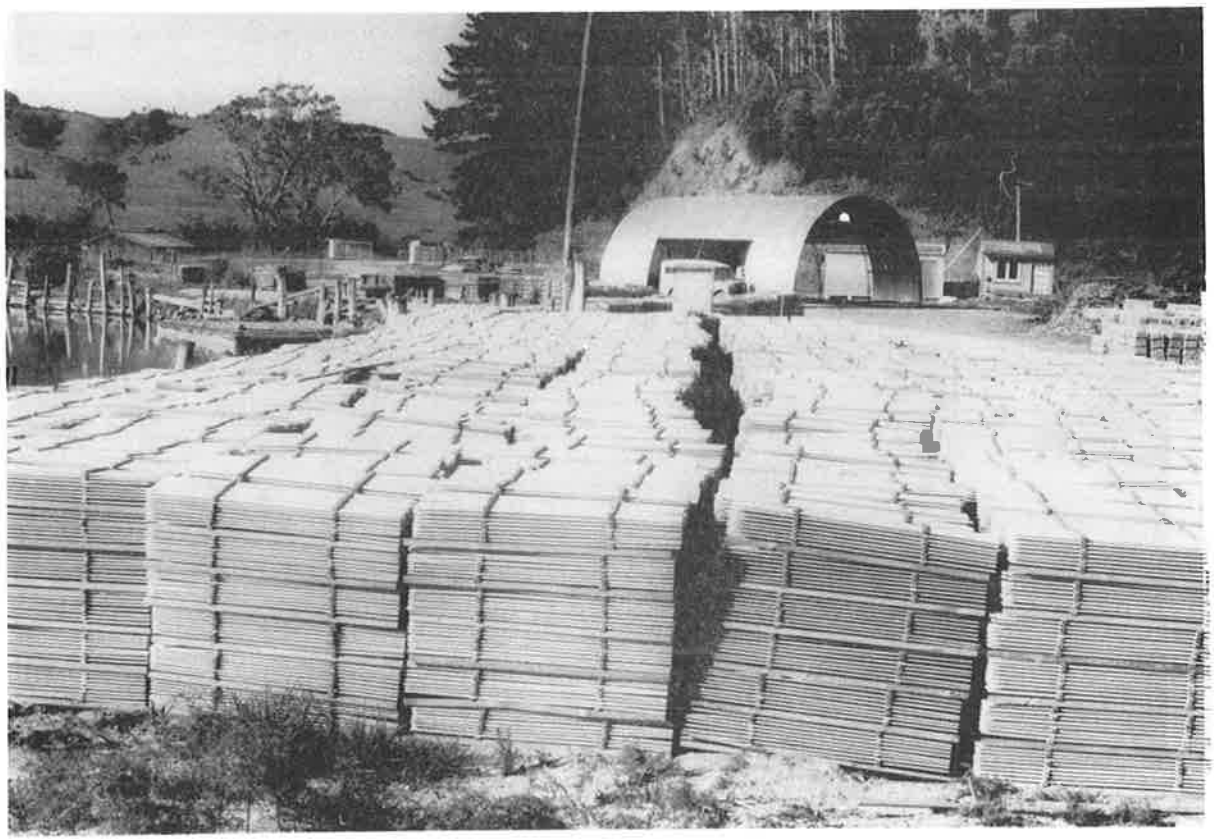

Plate 2. Assembly Depot

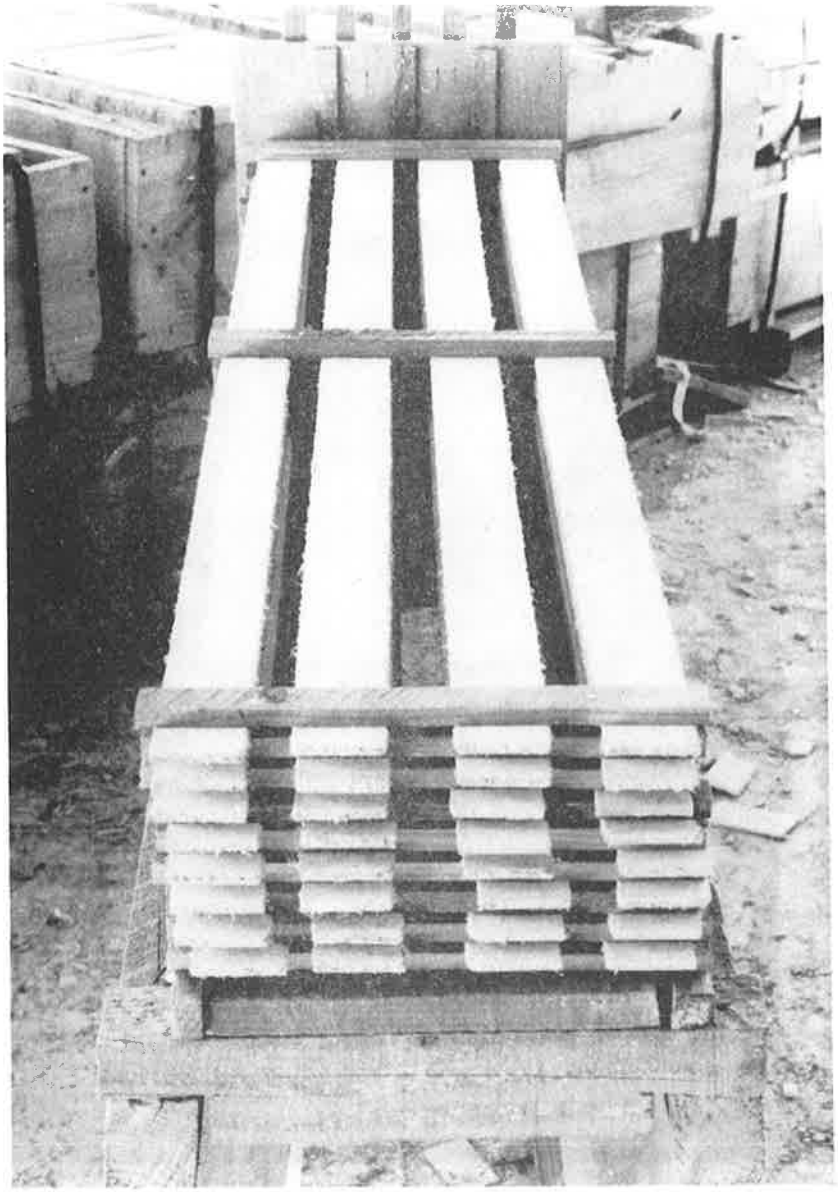

Plate 3. Standard Bundle of 32 collectors

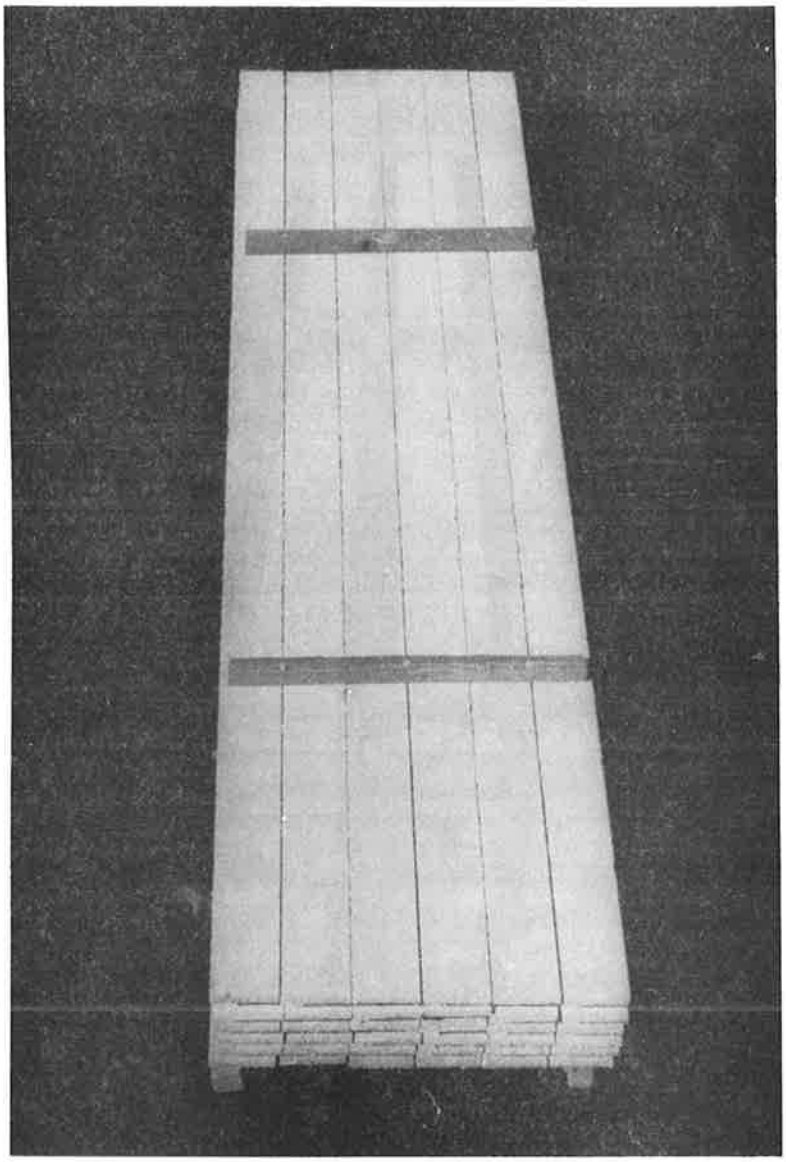

Plate 4. Experimental Bundle with no lateral separation

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