

COOPERATIVE EXTENSION SERVICE

MAINE SEA GRANT PROJECT

University of Maine and U.S. Department of Agriculture Cooperating



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OYSTER CULTURE IN MAINE SPECIFICATIONS AND APPROXIMATE COSTS OF REARING EQUIPMENT**

There are many unanswered questions concerning the status of aquaculture in Maine. Many of these questions are financially oriented. It is the purpose of this article to present the cost of some of the tools currently being used to produce aquaculture products.

Start-up costs of an aquaculture venture will vary greatly in amount. The presence or absence of existing facilities such as shore property, boats, wharves, floats, moorings, lobster pounds, etc., will be an influential factor in determining the level of new investment required. Intangible factors such as mechanical aptitude, experience on the water, and knowledge of the surrounding shores and types of bottoms may exert even more influence on the outlay of dollars.

There are several alternative species which have potential for intensive culture along our coast. Finfish showing potential include: salmon, trout, and eels. Shellfish offer a broader choice including: oysters, scallops, mussels, and clams. Presently there are no commercial shellfish hatcheries in Maine offering seed for sale. When hatcheries become a reality in Maine, possibly through modification of existing unused lobster pounds, it would appear that shellfish products may be marketed at more than one stage in their development prior to the traditional adult stage. For example, oysters might be sold to an intermediate grower as small seed, then as larger spat to a final grower, and finally as an adult to the half-shell trade. The possibility of purchasing juvenile oysters south of Cape Cod during the spring for resale in Maine in summer may become another marketing possibility.

The University of Maine's Sea Grant Program entitled "Culture of Resources in a Cold Water Marine Environment", which is currently underway at the Ira C. Darling Center, Walpole and the University of Maine, Orono, is adapting known culture methods to the Maine climate. Workable culturing methods have been developed through cooperation with fishermen and other coastal residents. It is intended that this article serve as a

*Present address: Maine Coast Oyster Corporation, P.O. Box 171, Blue Hill, Maine 04614

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stimulus for the development of successful innovations, and ultimately, operating aquaculture businesses.

For convenience the analysis has been broken into three categories: 1) shellfish seed; 2) marine supplies and related hardware; and 3) descriptions of shellfish growing units.

Shellfish Seed

Two major U.S. shellfish hatcheries produce cultchless (unattached) oyster seed. This seed is available on request throughout the year with the bulk of production occurring in the spring and early summer. Orders should be placed well in advance when requesting large volumes of seed. The Maine Department of Marine Resources (State House Annex, Capitol Shopping Center, Augusta, Maine 04330) must clear the importation of this seed. To initiate clearance, application must be made in advance of the seed order.

Mr. Frank W. Wilde
Chesapeake Bay Oyster Culture
Shady Side, Maryland 20867

Type of seed offered: Crassostrea virginica
(American oyster)

1/4" seed @ \$5.00/1,000 - minimum order 10,000
3/4" seed @ \$10.00/1,000 - minimum order 1,000

Mr. William W. Budge
Pacific Mariculture, Inc.
Pigeon Point
Pescadero, California 94060

Type of seed offered: Crassostrea virginica and Ostrea edulis (European oyster). Several types of clam seed have been produced on special order. Oysters of all species are shipped in the 2-3mm size range.

<u>Quantity</u>	<u>Price</u>
3,000	\$ 60.00
5,000	80.00
10,000	100.00
20,000	150.00
50,000	200.00
100,000	330.00
100,000-1M	3.00/1,000
1M-3M	2.75/1,000
3M-5M	2.50/1,000
5M-10M	2.25/1,000
10M and over	2.00/1,000

Marine Supplies and Related Hardware

Most of the items in the following list may be found at hardware stores. The prices given are local ones at full retail level at April 1973 excluding Maine sales tax. Items not available at local stores have been identified and the address of the producer given. These listings are not an endorsement of the products herein.

<u>Description</u>	<u>Dimension</u>	<u>Price</u>
styrofoam log	7" x 20" x 9'	\$12.95
styrofoam log	10" x 20" x 9'	17.95
fiberglass window-screen roll	36" x 100'	23.95
galv. hardware cloth, roll	1/8" mesh 36" x 100'	70.00
galv. hardware cloth, roll	1/4" mesh 36" x 100'	70.00
galv. hardware cloth, roll	1/2" mesh 36" x 100'	75.00
galv. flat-head screws, box of 100	1-1/4" x #10	2.39
galv. flat-head screws, box of 100	2" x #10	3.49
galv. eye-bolt	1/2" x 12"	2.00
galv. shackle	1/4"	.83

galv. thimble	1/2"	.23
spruce 2 x 4	2" x 4" x 12'	1.76
pine strapping	1" x 3" x 12'	.60
cement coated staples, box of 1000	9/16"	.85
nylon line, per foot	1/2"	.25
concrete, delivered	1 yd ³	20.00
steel nut	3/8"	0.015
steel washer	3/8"	0.006
steel rod with welded eye and threaded end	3/8" x 60"	2.00
PVC cold water pipe, per foot	3/4"	.29
PVC schedule 40 pipe, per foot	2"	.32

Mr. Harold E. Arndt, President
 Marcrafts Incorporated
 Freeport, Maine 04032

aluminized steel grow-out tray, vinyl dipped	1/4" mesh 3" x 2' x 4'	\$17.30
aluminized steel grow-out tray, with cover	1/4" mesh 3" x 2' x 4'	20.00
aluminized steel grow-out tray	1/2" mesh 3" x 2' x 4'	8.40
aluminized steel grow-out tray, with cover	1/2" mesh 3" x 2' x 4'	9.80
aluminized steel grow-out tray, vinyl dipped	1/2" mesh 3" x 2' x 4'	12.15
aluminized steel grow-out tray, with cover	1/2" mesh 3" x 2' x 4'	14.55
aluminized steel grow-out tray	1" mesh 3" x 2' x 4'	6.50
aluminized steel grow-out tray, with cover	1" mesh 3" x 2' x 4'	7.68
aluminized steel grow-out tray, vinyl dipped	1" mesh 3" x 2' x 4'	10.15
aluminized steel grow-out tray, with cover	1" mesh 3" x 2' x 4'	12.15

Mr. Walter O. Webber, President
 Vanguard Industries, Inc.
 Nestier Division
 10605 Chester Road
 Cincinnati, Ohio 45215

Nestier grow-out tray	2" x 2' x 2'	\$3.00
nylon mesh liner	2mm mesh	.25

Maker of grow-out trays:
 Mr. Douglas McNichol
 Bluenose Oyster Farms Ltd.
 RR 2
 River Denys
 Cape Breton, Nova Scotia, Canada

Makers of plastic, nylon and stainless steel meshes:
 Conwed Corporation
 Plastics Division
 742 29th Avenue S.E.
 Minneapolis, Minnesota 55414
 E. I. du Pont de Nemours & Co., Inc.
 Vexar Sales Division
 Yerkes Plant
 Station B Drawer L
 Buffalo, New York 14207
 Tobler, Ernst, & Traber, Inc.
 71 Murray Street
 New York, New York 10007
 Nichols Net & Twines
 Commercial Fishing Supplies
 Rural Route 3, Bend Road
 East St. Louis, Illinois 62201

Newark Wire Cloth Company
 351 Verona Avenue
 Newark, New Jersey 07104

Armco Steel Company
 7000 Roberts Street
 Kansas City, Missouri 64125

Description of Shellfish Growing Units

The following units, all of which are suspended from styrofoam flotation collars, can be produced from the list of marine supplies. The units are designed to contain the same number of shellfish. This facilitates the comparison of costs of similar meshes made from different materials. For example, although Figure 1 is much larger than Figure 2, they both have the same stocking density and the same total number of shellfish.

A word of caution is necessary regarding the combination of dissimilar, non-ferrous metals - electrolysis. This will occur quite readily, for example, by combining a galvanized material (zinc) with aluminum. Iron or steel combined with a galvanized material is non-electrolytic. Gear lube or water pump grease is effective in retarding rust underwater and allowing nuts to become more easily removable.

Figure 5 depicts a possible mooring configuration. There are 4 moorings and lines, 1 from each corner eye on the bottom of a tray module. Due to space, only one corner and one mooring are shown.

Table 1
 Richmond Grow-Out Tray Module (see Figures 1 and 1A)
 A 6-Tray Module with Fiberglass Window-Screen Mesh
 Capacity: 15,000 1/8" Oysters

<u>Quantity</u>	<u>Description</u>	<u>Price</u>
4	3/8" steel nuts	\$.060
8	3/8" steel washers	.048
4	3/8" x 60" steel rods with welded eye	8.000
8	1/2" galv. thimbles	1.840
8	1/4" galv. shackles	6.640
100 ft.	1/2" braided nylon line	25.000
4	1/2" x 12" eye-boits	8.000
4	ft ³ cement moorings	2.988
4	3/4" x 6" PVC pipe spacer	.580
1	1' x 2' x 10" float	4.880
6	1' x 2' x 6" trays	12.276
1	1' x 2' x 1 1/4" cover	.930
TOTAL		\$71.24

Table 2
 Nestier Grow-Out Tray Module (see Figure 2)
 A 4-Tray Module with 2 mm Plastic Mesh Liner
 Capacity: 15,000 1/8" Oysters

<u>Quantity</u>	<u>Description</u>	<u>Price</u>
4	3/8" steel nuts	.060
8	3/8" steel washers	.048
4	3/8" x 30" steel rods with welded eye	8.000
8	1/2" galv. shackles	6.640
8	1/2" galv. thimbles	1.840
100 ft.	1/2" braided nylon line	25.000

4	1/2" x 12" eye-bolts	8.000
4	ft ³ cement moorings	2.988
4	2" x 6" PVC pipe spacer	.640
1	28" x 28" x 10" float	8.133
4	2' x 2' x 2" trays	12.000
6	2mm plastic mesh liners	1.500
1	28" x 28" x 1 1/2" base	<u>1.767</u>

TOTAL \$76.62

Table 3

Richmond Grow-Out Tray Module (see Figure 1)
A 6-Tray Module with 1/8" or 1/4" Galvanized Hardware Cloth
Capacity: 6,000 1/4" - 1/2" Oysters

<u>Quantity</u>	<u>Description</u>	<u>Price</u>
4	3/8" steel nuts	.060
8	3/8" steel washers	.048
4	3/8" x 60" steel rods with welded eye	8.000
8	1/2" galv. thimbles	1.840
8	1/4" galv. shackles	6.640
100 ft.	1/2" braided nylon line	25.000
4	1/2" x 12" eye-bolts	8.000
4	ft ³ cement moorings	2.988
4	3/4" x 6" PVC pipe spacer	.580
1	2' x 4' x 10" float	10.950
6	2' x 4' x 6" trays	34.680
1	2" x 4" x 1 1/2" cover	<u>3.250</u>

TOTAL \$102.04

Table 4

Arndt Grow-Out Tray Module (see Figure 3)
A 6-Tray Module with 1/4" Vinyl-Coated Mesh
Capacity: 6,000 1/2" Oysters

<u>Quantity</u>	<u>Description</u>	<u>Price</u>
4	3/8" steel nuts	.060
8	3/8" steel washers	.048
4	3/8" x 40" steel rods with welded eye	8.000
8	1/2" galv. thimbles	1,840
8	1/4" galv. shackles	6.640
100 ft.	1/2" braided nylon line	25.000
4	1/2" x 12" eye-bolts	8.000
4	ft ³ cement moorings	2.988
4	2" x 6" PVC pipe spacer	.640
1	28" x 52" x 13" float	14.221
6	2' x 4' x 3" trays	103.800
1	2' x 4' cover	2.700
1	28" x 52" x 1 1/2" base	<u>2.338</u>

TOTAL \$176.28

Table 5

Richmond Grow-Out Tray Module (see Figure 1)
 A 6-Tray Module with $\frac{1}{2}$ " Galvanized Hardware Cloth
 Capacity: 1,800 Market-size Oysters

<u>Quantity</u>	<u>Description</u>	<u>Price</u>
4	3/8" steel nuts	.060
8	3/8" steel washers	.048
4	3/8" x 60" steel rods with welded eye	8.000
8	1/2" galv. thimbles	1.840
8	1/4" galv. shackles	6.640
100 ft.	1/2" braided nylon line	25.000
4	1/2" x 12" eye-bolts	8.000
4	ft ³ cement moorings	2.988
4	3/4" x 6" PVC pipe spacer	.580
1	2' x 4' x 13" float	13.166
6	2' x 4' x 6" trays	36.121
1	2' x 4' x 1 $\frac{1}{2}$ " cover	3.410
TOTAL		\$105.85

Table 6

Arndt Grow-Out Tray Module (see Figure 3)
 A 6-Tray Module with $\frac{1}{2}$ " Aluminized Steel Mesh
 Capacity: 1,800 Market-size Oysters

<u>Quantity</u>	<u>Description</u>	<u>Price</u>
4	3/8" steel nuts	.060
8	3/8" steel washers	.048
4	3/8" x 40" steel rods with welded eye	8.000
8	1/2" galv. thimbles	1.840
8	1/4" galv. shackles	6.640
100 ft.	1/2" braided nylon line	25.000
4	1/2" x 12" eye-bolts	8.000
4	ft ³ cement moorings	2.988
4	2" x 6" PVC pipe spacer	.640
1	28" x 52" x 13" float	14.221
6	2' x 4' x 3" trays	50.400
1	2' x 4' cover	1.400
1	28" x 52" x 1 $\frac{1}{2}$ " base	2.338
TOTAL		\$121.58

Table 7

Arndt Grow-Out Tray Module (see Figure 3)
 A 6-Tray Module with $\frac{1}{2}$ " Vinyl-Coated Mesh
 Capacity: 1,800 Market-size Oysters

<u>Quantity</u>	<u>Description</u>	<u>Price</u>
4	3/8" steel nuts	.060
8	3/8" steel washers	.048
4	3/8" x 40" steel rods with welded eye	8.000
8	1/2" galv. thimbles	1.840
8	1/4" galv. shackles	6.640
100 ft.	1/2" braided nylon line	25.000

4	1/2" x 12" eye-bolts	8.000
4	ft ³ cement moorings	2.988
4	2" x 6" PVC pipe spacer	.640
1	28" x 52" x 13" float	14.221
6	2' x 4' x 3" trays	72.900
1	2' x 4' cover	2.400
1	28" x 52" x 1½" base	<u>2.338</u>

TOTAL \$145.07

Table 8

Arndt Grow-Out Tray Module (see Figure 3)
A 6-Tray Module with 1" Aluminized Steel Mesh
Capacity: 1,800 Market-size Oysters

<u>Quantity</u>	<u>Description</u>	<u>Price</u>
4	3/8" steel nuts	.060
8	3/8" steel washers	.048
4	3/8" x 40" steel rods with welded eye	8.000
8	1/2" galv. thimbles	1.840
8	1/4" galv. shackles	6.640
100 ft.	1/2" braided nylon line	25.000
4	1/2" x 12" eye-bolts	8.000
4	ft ³ cement moorings	2.988
4	2" x 6" PVC pipe spacer	.640
1	28" x 52" x 13" float	14.221
6	2' x 4' x 3" trays	39.000
1	2' x 4' cover	1.180
1	28" x 52" x 1½" base	<u>2.334</u>

TOTAL \$109.96

Table 9

Arndt Grow-Out Tray Module (see Figure 3)
A 6-Tray Module with 1" Vinyl-Coated Mesh
Capacity: 1,800 Market-size Oysters

<u>Quantity</u>	<u>Description</u>	<u>Price</u>
4	3/8" steel nuts	.060
8	3/8" steel washers	.048
4	3/8" x 40" steel rods with welded eye	8.000
8	1/2" galv. thimbles	1.840
8	1/4" galv. shackles	6.640
100 ft.	1/2" braided nylon line	25.000
4	1/2" x 12" eye-bolts	8.000
4	ft ³ cement moorings	2.988
4	2" x 6" PVC pipe spacer	.640
1	28" x 52" x 13" float	14.221
6	2' x 4' x 3" trays	60.900
1	2' x 4' cover	1.850
1	28" x 52" x 1½" base	<u>2.338</u>

TOTAL \$132.53

Table 10
 Nestier Grow-Out Tray Module (see Figure 4)
 A 19-Tray Module with 3/8" Mesh
 Capacity: 1,800 Market-size Oysters

Quantity	Description	Price
4	3/8" steel nuts	.060
8	3/8" steel washers	.048
4	3/8" x 61" steel rods with welded eye	8.000
8	1/2" galv. thimbles	1.840
8	1/2" galv. shackles	6.640
100 ft.	1/2" braided nylon line	25.000
4	1/2" x 12" eye-bolts	8.000
4	ft ³ cement moorings	2.988
4	2" x 6" PVC pipe spacer	.640
1	28" x 48" x 13" float	13.753
19	2' x 2' x 2" trays	57.000
1	28" x 28" x 1 1/2" base	1.767

TOTAL \$125.736

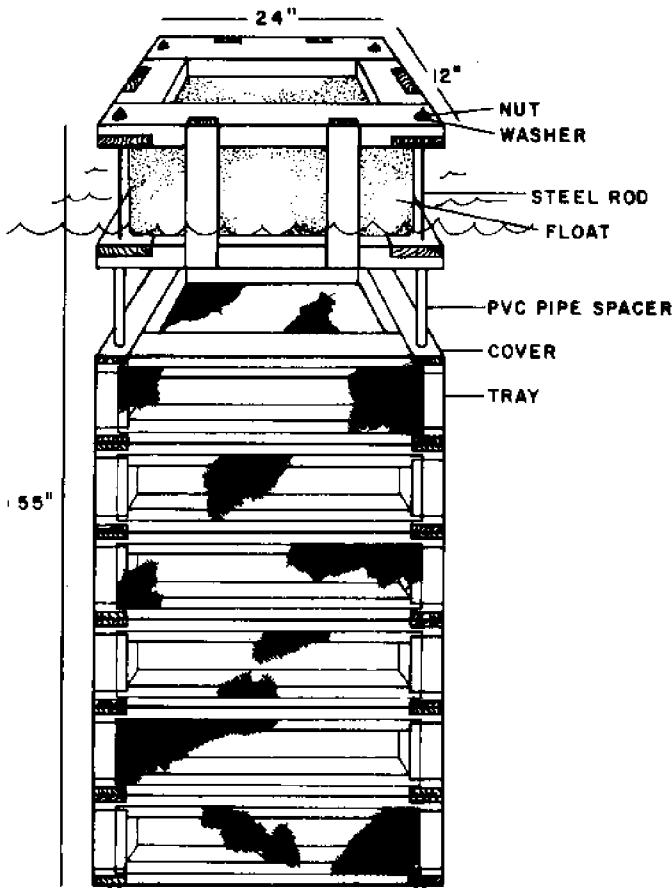
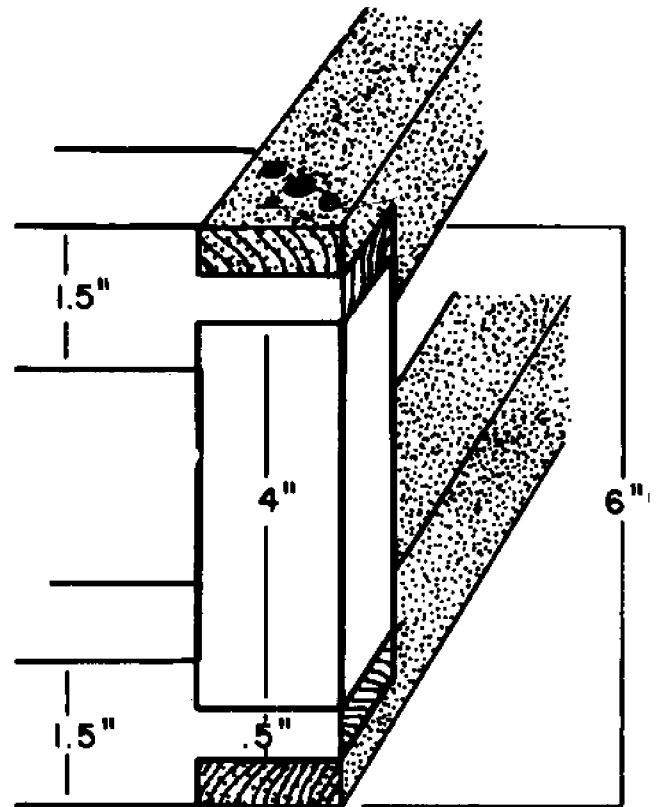


FIG. 1



CORNER OF RICHMOND
 GROW-OUT TRAY

FIG. 1A

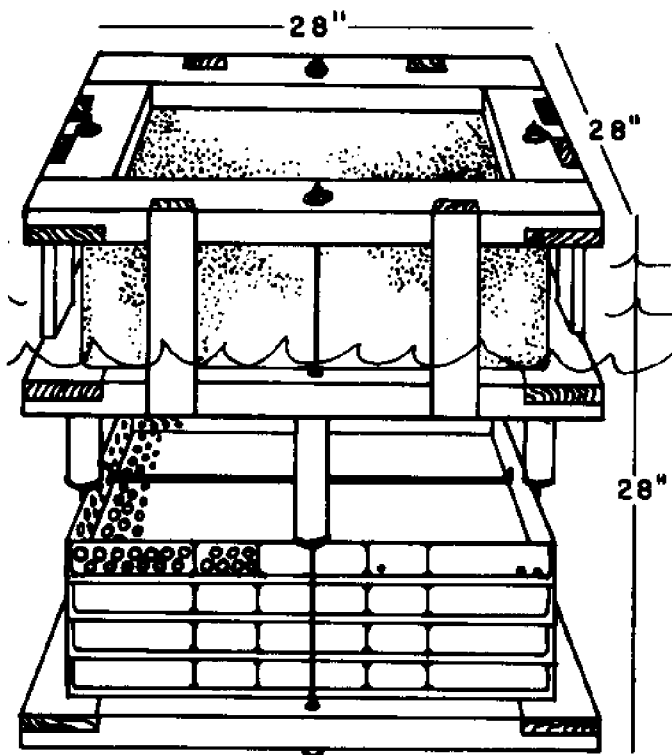


FIG. 2

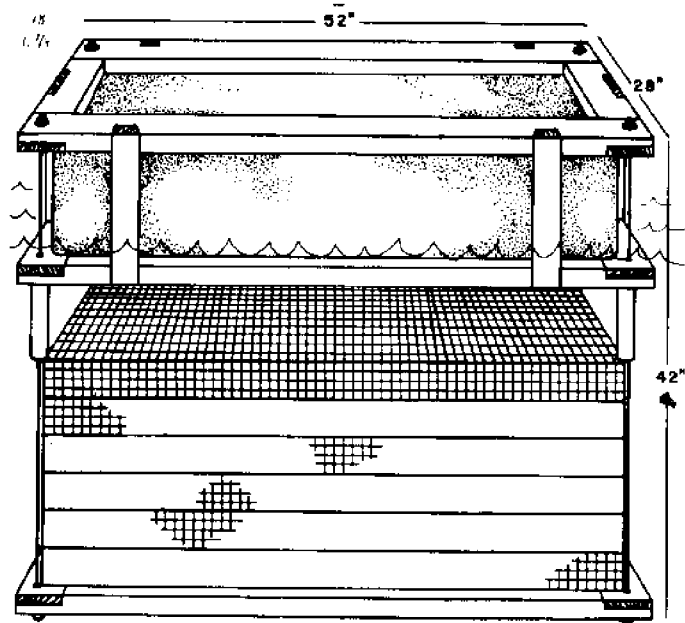


FIG. 3

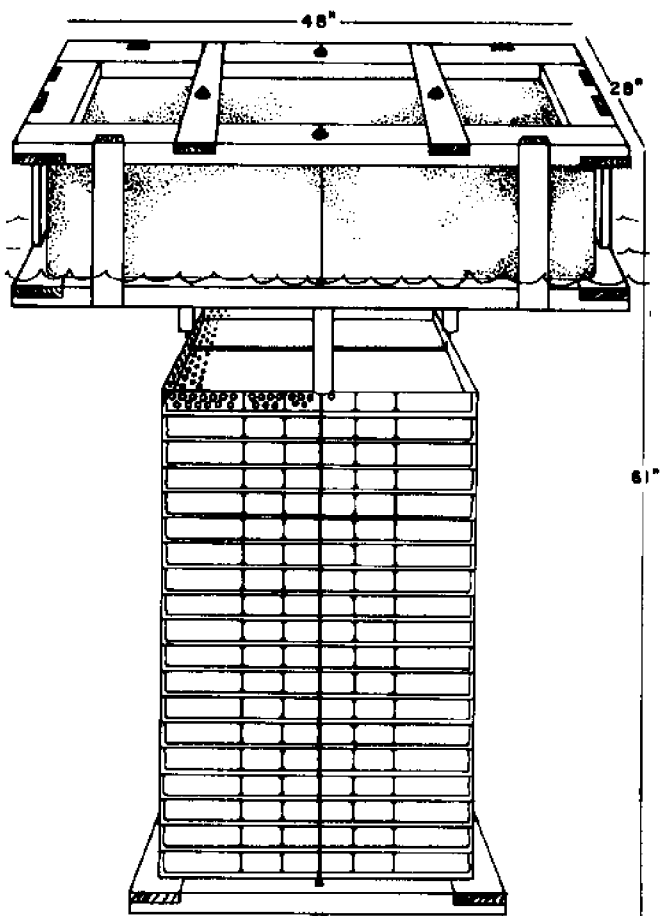


FIG. 4

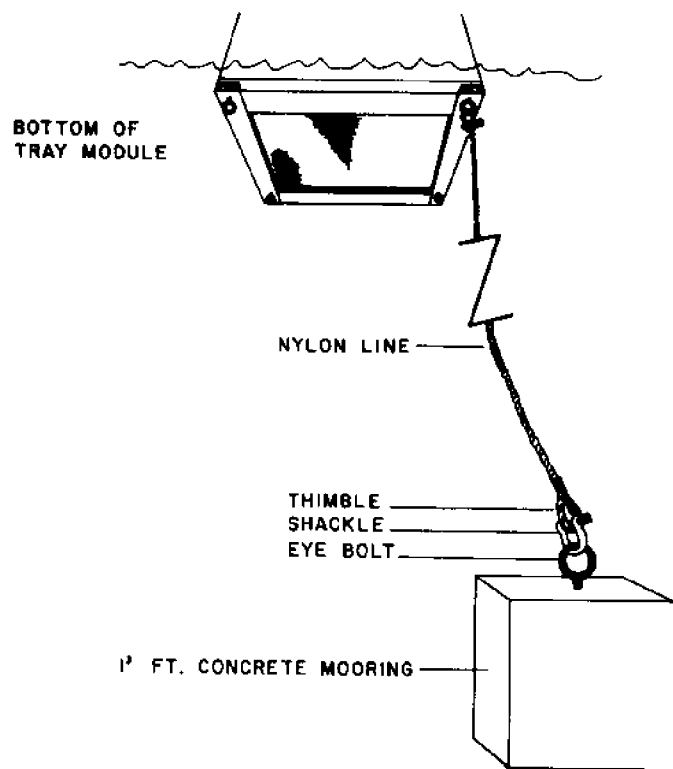


FIG. 5

