

1. *In an Oyster-bay.*—If the culturist is operating in a bay more or less naturally seeded with native oysters the beginning is already made for him. The oysters there have been perpetuated in successive generations for unknown time, and an examination will show that the existing individuals can be classified into several generations. From the largest and oldest adults it is an easy matter to select sizes descending to those smaller and younger ones which the oystermen might call "seed," and continue to the still smaller and younger stages which they would call "spat." If close inspection is made there may be found specimens so small as to be almost invisible to the unaided eye—the spat of the zoologist.

*Spat on Natural Marine Objects.*—It is not only possible to find spat on adult and seed oysters, but to find them on other shells, such as clams, cockles, mussels, whelks, even on gravel, stones, rocks, and other natural bodies.

*Natural Cultch.*—Since all such hard bodies offer anchoring-points that are seized upon by larvae to save themselves from sinking into the mud or from drifting away by currents, they long ago came to be known to fishermen as "cultch" (clutch). Empty shells of dead animals are just as good or even better for the purpose than the shells of living molluscs; in fact, the greater part of naturally occurring cultch is composed of the empty shells of oysters that have lived on the surface and of clams that have burrowed into the bottom but whose shells have come to be washed bare after death.

*Artificially Supplied Cultch.*—Of the spat that becomes fixed to natural cultch comparatively few grow up to maturity, so that the natural accumulation of cultch is slow. The deficiency may be made good by the culturist who can gather oyster, clam, or other shells wherever they are to be procured and scatter them on his bed among the living oysters. The spat collected by either the naturally occurring or the artificially supplied cultch can be used as seed for transplantation.

2. *In an Oysterless Bay.*—If there are no native oysters in the bay and the culturist has good reason to believe that they could live and propagate there, he has to begin by procuring native oysters from some other bay (preferably of the same region) and planting them out on his own beds. Any stage of spat or seed or grown oyster will do, but the younger they are the longer it will take them to grow to maturity and become breeding oysters. The present object is not to grow planted seed to oysters for the market, but to grow to breeding oysters with a view to developing a stock. For this purpose the full-grown oysters are best, since they will be ready to spawn in the first season and will produce the greatest amount of spawn. Such oysters are what practical oystermen call "spawners." They are also seed-oysters in the sense that they are the starting elements of production in a fresh area. If there are young oysters and spat mixed with them it will not be objectionable, since these will grow up to increase the spawn as well as to increase the cultch. This last is a very important point. Next after having oysters in a bay the culturist must see to it that there is cultch.

Where there is no cultch there can be no naturally occurring or artificially propagated oysters because there can be no naturally deposited spat from which oysters can grow up. In every bay or in some part of every bay there is almost sure to be something in the form of cultch even if it is only an isolated stone or clam-shell. But it takes a long time for nature to build up an oyster-bed from such a start. This is one reason why our oyster-bays are so thinly seeded with oysters. Another reason is that so few eggs are successful in developing to the spatting stage. Before spat can be deposited there must be these two conditions present at the same time and place—viz., the presence of the young of the oyster at the spatting stage and the presence of cultch on which to set. The greater the number of the young the greater is the chance for each piece of cultch to receive one or more spat; the greater the number of pieces of cultch the greater is the chance for each of the young to find one of them. These two conditions operate together—each a correlative and a necessity for the other. A stone or a clam-shell may catch a spat which may grow and sooner or later become adult and give origin to numerous young. Several of these may be deposited on the original piece of cultch or on the parent shell, and by their number as well as by their growth increase the surface of the cultch, or by breaking apart increase the number of pieces of cultch. In such a way a bed may be originated and extended. Under the best conditions it is a slow process, for each generation requires time to develop to maturity before it can take part in the process of reproduction. Moreover, the increase is not so fast nor so sure as the mathematical calculation might lead to suppose, for the spat and oysters are subject to many and powerful agents of destruction which keep reducing their numbers.