

finer set of smelts. There was no loss of flavour nor of quality'. The late Sir James Gibson Maitland successfully tried the same experiment and said 'either the fresh water smelt of America or our own *Osmerus eperlanus*, which I have successfully hatched, and am now rearing in fresh water, if introduced into a Highland loch, for instance, 'John Tay, would enable it to carry a very heavy crop of some of the inland species, for instance land-locked salmon, &c.' (Culture of Salmonidae, Lond. Int. Fish Exhibit. 183.)

In New Brunswick, Dr. Philip Cox has described a land-locked smelt—indeed they abound in Loch Lomond, near St. John, N.B., and in the Chamcook waters in the same province. These land locked varieties, Dr. Jordan, the eminent ichthyologist, regards as forming at least two species, or rather subspecies, distinguishable from the sea-run smelt. One form, the Wilton smelt (*Osmerus mordax spectrum*) is land locked. Wilton Pond in Maine, and the other form, the Cobassicontic smelt (*Osmerus mordax abbotti*) is found in the neighbouring waters of Cobassicontic Lake, in Maine. In some instances there are narrow outlets to the sea. But the smelt having acquired the habit of remaining permanently in fresh water, shows no tendency to migrate to salt water. The land locked smelt in Lake Onawa, Maine, cannot descend to the sea and they abound in the lake.\* The true smelt belongs to the family salmonide and is therefore allied to the trout, salmon and whitefish: but the so-called sand smelt, often termed the Atherine (*Atherina*), of which six species occur in more southerly waters on the Atlantic shores of this continent, is more nearly related to the mullets (*Mugilidae*) and the sand-rollers (*Percopidae*). The atherine to the untrained eye might be readily regarded as a smelt, and like the smelt it has been acclimatized to fresh water, indeed the Guernsey experiment demonstrated this, as the atherine in Mr. Arnold's pond were amongst the most successful species. The mullets are essentially sea fish yet instances are numerous of the retention of these fish in fresh water inclosures. In the Guernsey pond the mullet survived, but did not breed or become properly acclimatized, but in a fresh water pond in Tampa Bay, Florida, mullet are found in great numbers along with sheepshead (*Sparus* or *Archomargus*), red fish (*Pagrus*), &c. A correspondent in the *American Angler*, April, 1898, describes this lake, which is named 'Salt Lake,' as 1½ miles long by 1½ miles broad, having two small fresh water streams pouring into it, and one small outlet through low marshy woodland, connecting it with Tampa Bay at high water. Twenty five years ago this arm of the bay was salt, and peopled by salt water fish, but during a violent storm a bank was heaped up cutting off the lake, and inclosing some schools of marine fish. Some sharks and sting rays were imprisoned, but seemed unable to survive the winter (1885). The water became a little brackish: but, says the writer referred to, 'it is now perfectly sweet and fresh, and has a slight current towards the small outlet where the water drains off'. Red fish are caught in the lake weighing 38 lbs. and of much richer red colour, and of finer and more delicate flavour than those taken in the sea outside. This last remark applies to mullets and many sea fish when acclimatized in fresh water. Thus Dr. J. C. Mitchell, an authority on the fishes of Egypt, tells us that three species of mullet frequent brackish water there, and when retained in fresh water ponds attain a greater size and a more excellent flavour. He describes Lake Menzaleh, which communicates with the sea by an ancient mouth of the Nile. It is brackish, but varies in salinity at different seasons. Near the fresh water inlets it is comparatively fresh, but near the sea entrance it is more salt, and while there is a preponderance of marine species in the salter portions, the influx of flood water from the Nile affects the salinity of the whole lake, and many species, wanderers from the sea, succumb to the changed conditions. Dr. Mitchell states that all the mullets spawn in the sea and they as a family are essentially shore fishes; but they have a preference for the mouths of rivers, and cut-off lakes where the water is brackish, while not unfrequently they are found to enter rivers, indeed *Mugil cephalus* and *Mugil capito* have been caught more than 600 miles up the Nile, as far south that is to say as Assouan. 'When kept in fresh water

\*Land locked salmon frequently occur in lakes inhabited by land locked smelt, and the latter may account for the loss of the migratory instinct in the former as the salmon are found to mainly feed upon the smelt.