water in the whole country where he can rest in safety. The moment he comes in from the ocean he meets the gill nets and the pounds at the mouth of the river, the sweep seines further up, and hook everywhere, and at last on his breeding grounds, which at least ought to be sacred to him, he encounters the pitchforks of the white man and the spears of the Indian.

Let us now at the eleventh hour, take pity on our long-persecuted salmon and do him the poor and tardy justice of giving him, in our broad land that he has done so much for, one place where he can come and go unmolested and where he can rest in safety.

Allow me to add in closing that it seems to me highly appropriate that this society, which represents with such intelligence and ability all the fishing interests of every kind in this country, should take the initiative in a matter in which those interests are so closely concerned. The writer trusts that it will, and ventures to predict that, if its efforts in that direction should happily be rewarded by the creation of a national salmon park, it would become an enduring monument to the usefulness of the Society that would last as long as the Nation lasts.

Trans. Am. Fish. Soc. 21 (1892): 16 79

EARLY HISTORY OF THE FISHERIES ON THE GREAT LAKES.

By Herschel Whitaker.

Stretching away to the northward from the low Laurentian hills of New York to the trap-rock cliffs of Minnesota, for a distance of sixteen hundred miles, in a hydrographic basin embracing an area of one hundred and seventy-five thousand square miles, lie the Great Lakes of the Northwest, the largest bodies of fresh water upon the globe. Upon their bosoms float vast fleets which carry the rich products of prairie, forest and mine, while from their depths the fisherman gathers the rich bounties that nature has provided for the sustenance of man.

The vessels which constantly pass and repass are not freighted with ores from the mines of Golconda nor with spices from Far Cathay, but carry lumber from Saginaw, iron from Escanaba, copper from Hancock, grain from Duluth, provisions from Chicago, and cereals from the vast prairie lands of the Dakotas.

Since the early days of the French occupation of the Northwest, when the lilies of France waved over all the territory lying north of the St. Lawrence and Ohio and west of the Alleghanies, these lakes have been the great highway of intercommunication between the East and West. The Jesuit missionary filled with holy zeal departed from Montreal, the seat of French power in America, in his bark canoe, manned by his Indian converts, for the trackless wilds of the far West to raise the cross and establish his feeble mission among savage tribes.

Following him came the fur trader with his canoe and *courrier du bois*, who day after day traversed these lakes and their connecting rivers to reach some specially designated place where he might exchange his tawdry

gewgaws, beads and cheap merchandise with the Indian for the valuable skins of beaver and otter.

The cavalier, explorer and adventurer traveled over their trackless wastes of water, enduring hardship and fatigue, living upon the bounties of nature, pushing his way to what he hoped would be a discovery of a path to the Indies, fortune and fame. Each of these in his own way has left testimony of the bountiful way in which nature has stocked these waters with desirable food, and the belief of all concurred that there was an unfailing supply for man for all time, to be had for the taking.

The habits of the tribes bordering these lakes whose main reliance for food was upon the fishes that inhabited them, had caused them to resort to certain favorable localities upon the lakes at the proper season of the year to take fish for present wants and for future use. In time these points became their chief dwelling places for the greater portion of the year, and with the advent of the fur trader they became the principal places of barter.

Such localities as the Straits of Mackinaw, Sault Ste. Marie, Green Bay, Chequamegon, Detroit and Chicago became thus early known, and the history of these places as told by the early traveler shows that nature seemed to have lavished her bounties upon aboriginal man in the stocking of her waters with the most edible of fishes to provide for his wants.

Let us call a few of the earlier voyagers to give their testimony upon the abundance of fish in these waters.

Hennepin says in his Travels in 1675: "There is a very abundant fishery of several kinds of fish at the mouth of the Niagara River, among which is the whitefish, admirably good, with which you might supply one of the best cities of Europe.

"At Mackinaw the Griffin lay in the harbor amid one hundred and twenty canoes going and coming from

taking the whitefish, which the Indians catch in nets in from fifteen to twenty fathoms of water, and without which they could not subsist at all.

"At the Sault the Indians subsist by hunting stags, moose or elk and some beaver, and by the whitefish which is very good and is found in great abundance, but this fish is very difficult to take to all but these Indians, who are trained to it from childhood."

He says, on his return from his first voyage up the lakes, and after the loss of the Griffin: "On reaching Lake Conti (Lake Erie) near the mouth of the Detroit River, the soldiers who were in canoes killed with their swords and with their axes more than thirty sturgeons which came to spawn on the banks of the lake."

Charlevoix, in his voyage to North America, 1721, in speaking of Lake St. Clair, the smallest lake of the chain which lies between Lake Erie and Lake Huron: "The islands in the river seemed placed on purpose for the pleasure of the prospect, and the river and the lake abound in fish. Were it not for the Hurons at Detroit the other tribes of Indians would starve. This is in the flat lands thereabout which would furnish them sufficient subsistence though it were cultivated ever so little, but they can subsist upon the fish of the river which are plentiful. We entered the Lake Huron where we soon had the pleasure of fishing for sturgeon."

Speaking of Lake Superior, he said: "The Indians from gratitude for the plentiful fish with which this lake supplies them, and from the respect which its vast extent inspires, have made a sort of divinity of it." Speaking of Michillimackinas, he says: "The Indians live entirely by fishing, and there is perhaps no place in the world where they are in greater plenty. The most common sort of fish in the three lakes which discharge themselves into these straights are the herring, the carp, the goldfish, the pike, the sturgeon, the attikumaig or whitefish, and especially the trout. There are three sorts of these

taken, among which is one of monstrous size, and in so great quantities that the Indian with his spear will strike to the number of fifty sometimes in the space of three hours, but the most famous of all is the whitefish, and nothing of the fish kind can exceed it."

In speaking of his trip from Mackinaw to Green Bay, he says: "We coasted the north shore of the Straits of Mackinaw and finally came to the Manistique River, which is a beautiful stream abounding in fish, especially the sturgeon."

Captain John Carver, of the Provincial troops of America, in his three years' travels throughout the interior parts of North America, says: "Lake Superior abounds with a variety of fish. The principal and best are the trout and sturgeon, which may be caught at all times in the season in the greatest abundance. The trout in general weigh about twelve pounds, but some are caught that exceed fifty. Besides this a species of whitefish is taken in great quantities here that resemble a shad in their shape, but they are rather thicker and less bony. They are about four pounds each in weight and are of a delicious taste. The best way of catching this fish is with a net, but the trout might be taken at all times with the hook. There are likewise many sorts of smaller fish in great plenty here, and which may be taken with ease. Among these is a sort resembling the herring that are generally made use of as a bait for the trout."

Speaking of the falls of Ste. Marie, he says: "Nature has formed a most commodious station for catching the fish which are to be found here in immense quantities. Persons standing on the rocks that are adjacent to it may take with dipping nets about the months of September and October, the whitefish before mentioned at that season, together with several other species. They crowd up to this spot in such amazing shoals that enough may be taken to supply, when properly cured, those inhabitants

throughout the year. The fish of Lake Huron are much the same as those in Lake Superior."

Carver arrived at Mackinaw at the beginning of November, 1767, after having been to the Mississippi River and up that stream as far as the Falls of St. Anthony. He says: "We passed the winter very pleasantly at the Straits of Mackinaw. One of their amusements at this time was to fish through the ice for trout. Though the Straits were covered with ice we found means to make holes through it, and letting down a strong line fifteen yards in length to which we fixed three or four hooks baited with the small fish before described, we frequently caught two at a time of forty pounds weight each, but the common size is from ten to twenty pounds. The method of preserving them during the three months the winter generally lasts, is by hanging them up in the air, and in one night they will be frozen so hard that they will keep as well as though they were cured by salt."

This may properly be considered as the first authentic notice of preserving fish by the freezing process, and while it is crude it still was as effective as the work now done by the immense freezers found in almost every important town on the lakes.

George Heriot, Deputy Postmaster General of British North America, in his book of travels, published in 1807, says of Mackinaw that the Indians of that locality "catch herring, whitefish and trout, the trout being from four to five feet in length, some of which are seventy pounds in weight. This fish is bred in Lake Michigan and is known by the name of Mackinaw trout, and affords a most delicious food." Of Green Bay he says: "There is a village composed of natives at the mouth of this river who employ themselves in fishing."

At the Sault Ste. Marie, "At the bottom of the rapids and among their billows which foam with ceaseless impetuosity, innumerable quantities of excellent fish may be taken from the spring until winter. The species

which is found in great abundance is denominated by the savages attikumaig or whitefish. The Mackinaw trout and pickerel are likewise caught here. These afford a principal means of subsistence to a number of the native tribes."

He also speaks of the method of taking the whitefish at this place in the rapids at the foot of the falls, which, singularly enough, is followed by the Indians to this day, and from its peculiarity deserves special mention. I give his own words:

"No small degree of address as well as strength is employed by these savages in catching these fish. They stand in an erect attitude in a birch canoe, and even amid the billows they push with force to the bottom of the waters a long pole, at the end of which is fixed a hoop with a net in the form of a bag, into which the fish is constrained to enter. They watch it with the eye when it glides among the rocks, quickly ensnaring it and dragging it into the canoe. In conducting this fishing much practice is required, as an inexperienced person may, by the efforts which he is obliged to make, overset the canoe and inevitably perish. The convenience of having fish in such abundance attracts to this situation during the summer several neighboring tribes, who are all of an erratic disposition and too indolent for the toils of husbandry. They therefore support themselves by the chase in winter and by fishing in the summer.

"The Otter Nation inhabit the rocky caverns on Lake Huron, where they are sheltered by a labyrinth of islands and capes. They subsist on Indian corn and fish and the proceeds of the chase. While the women and children collect berries the men are occupied in darting sturgeon."

Mr. Henry R. Schoolcraft from the time of the establishment of the military post at Sault Ste. Marie, was the United States Indian Agent at this point. He was a man of culture and literary ability, and one of the most pro-

lific contributors to the literature concerning the habits, characteristics and language of the North American Indians. He says of the whitefishing at the Sault in 1820:

"No place in America has been so justly celebrated as a locality for taking this really fine and delicate fish as St. Marie's Falls. This fish resorts here in great numbers, and is in season after the autumnal equinox, and continued so until the ice begins to run. It is worthy the attention of ichthyologists. It is a remarkable but not singular fact in its natural history, that it is perpetually found in the attitude of ascending at these falls. It is taken only in the swift water at the foot of the last leap or descent. Into this swift water the Indians push their canoes. It requires great skill and dexterity for this. The fishing canoe is of small size and is steered by the man in the stern. The fisherman takes his stand in the bow, sometimes bestriding the vessel, having a scap net in his hand. This net is made of strong twine, open at the top like an entomologist's. When the canoe has been run into the uppermost rapids and a school of fish is seen below or alongside, he dextrously puts down his net and having swooped upon a number of fish, instantly reverses it in the water, whips it up and discharges its contents into the conoe. This he repeats until the canoe is loaded, when he shoots out of the tail of the rapids and makes for the shore. The fish will average three pounds, but individuals are sometimes taken two or three times that weight. It is a great resource of the Indians and of the French, and of the poor generally at these falls who eat it with never-ceasing appetite. It is also a standing dish with all."

Listen to his tribute to the edible character of the whitefish:

All friends to good living by tureen or dish,
Concur in exalting this prince of a fish,
So fine in a platter, so tempting a fry,
So rich in a gridiron, so sweet in a pie,
That even before it the salmon must fail,
And that luscious *bonne bouche* of the land beaver's tail.

* * * * *

'Tis a morsel alike for the gourmand or faster,
While white as a tablet of pure alabaster,
Its beauty or flavor no person can doubt
When seen in the water or tasted without,
And all the dispute that opinion ere makes,
Of this king of lake fishes, this "deer of the lakes,"
Regard not its choiceness to ponder or sup,
But the best mode of dressing and serving it up.

Sheldon, Disturnell, Strickland, Kohl, Hubbard and others all unite in saying that nature here seems to have lavished her bounties with no niggardly hand, so profusely are these lakes stocked with fish.

From the time of the discovery of the lakes down to the time of the establishment of the Hudson Bay Fur Company, these inexhaustible supplies were drawn upon only for the subsistence of the Indian tribes and the voyagers, but gradually they became, to a small extent, an article of commerce, the surplus being salted and sold in somewhat inconsiderate quantities. During all this time the northwestern territory was looked upon as a source from which valuable furs could be obtained, and but little attention was paid to the fisheries of the Great Lakes beyond what the immediate wants of those who lived upon them or near them demanded.

Little is known at the early time of which I speak with reference to the fisheries of Lake Erie, because of its situation it was but little frequented by the early explorers and fur-traders. Good reason existed for this condition of affairs. The blood-thirsty and cruel Iroquois, the most adventurous and warlike Indian tribe which ever inhabited the continent, held undisputed possession of all that wilderness lying about Lakes Ontario and Erie and adjacent to the Niagara River, which was a key of approach to the latter lake.

The rivalry between the Dutch fur-traders of New York and those of the French was exceedingly intense in their attempts to control the fur trade of the Northwest. The Iroquois were incited by the Dutch to throw every obstacle possible in the way of encroaching advances by the French traders and colonists. For many years the Iroquois, who by reason of their situation acted as intermediaries between the further western tribes of Indians, controlling in their own interests the fur trade between the Dutch and these tribes, fiercely resented all attempts at interference in this trade by the French. As a result of their attitude the great waterway communication between Montreal, the seat of the French fur trade, and the Great Northwestern lakes was closed by the Iroquois, and communication with the upper lakes was made by way of the Ottawa and the French Rivers into Georgian Bay and from thence into lakes Huron, Michigan and Superior.

Meagre, however, as the information is that we have concerning the condition of the fisheries on Lake Erie at this early period, such information as we have shows beyond question that fish were exceedingly plentiful, especially at the Put-in-Bay Islands and Sandusky Bay. Dr. McCallum of Dunville, Ontario, at a meeting of the International Fish Conference, held at Hamilton last winter, exhibited to the meeting two crude shellfish hooks which were found on Point au Pelee, in the Province of Ontario on the North Shore of Lake Erie. These hooks were presumably made from the shell of the fresh-water mussel. In appearance they resemble the rude hooks employed for taking fish by the Esquimaux and other aboriginal types. The shank and the point were in two separate pieces, having holes drilled through them by which they could be attached to each other with thongs, the hook itself being barbless. Their form and construction indicated plainly that if the aboriginal man was compelled to sustain life by means of fish taken

with such an implement, the fish must have been exceedingly plentiful in this lake. Facts at hand would seem to indicate that Lake Erie was in these early days bountifully stocked with fish, and although it has been fished constantly for a very long period, it still yields immense quantities of valuable commercial fish.

Blois, speaking of the condition of the fisheries as early as 1835, in his "Gazeteer of Michigan," says: "Their quantities are surprising, and apparently so inexhaustible as to warrant the belief that were a population of millions to inhabit the lake shores they would furnish ample supplies of this article of food without any sensible diminution."

Looking at the matter from that period of time the writer was unquestionably warranted in his assumption. But Blois could not have apprehended at that time that the census of 1890 would show that in the six States surrounding the Great Lakes there was a population constituting more than one-sixth of the entire population of the country. Neither could he anticipate that the methods of preserving fish would, within thirty years from the date of this writing, make it not only possible but profitable for fishermen to follow their calling almost continuously during the entire year.

Michigan statistics show that in 1830 the quantity of fish marketed in the State amounted to 8,000 barrels valued at $40,000.

In 1836 the whole number of barrels taken amounted to 11,400.

In 1837, to 13,500 barrels of the value of $125,800. Of this quantity one-fourth was consumed in the State and the rest was shipped to Ohio, New York and Pennsylvania.

It will be observed that the reports of the catch and value of the commercial fish upon the Great Lakes are somewhat meagre and desultory. The report of the Detroit Board of Trade for 1857 shows that there

were between 80,000 and 100,000 barrels of fish taken in that year, valued at $640,000.

In 1885 the reports gathered by the Michigan State Board of Fish Commissioners show that the value of the commercial fish taken in the State was in value about $1,500,000 at wholesale price.

In considering such statistics as we have, we must take into account the uncertainty and unreliability that must necessarily prevail in their collection because of the want of thoroughness and completeness with which the work was done in the earlier years. So, too, we must consider in comparing one year with another the varying conditions of seasons, which is a potent factor. Severe storms may prevail one year, while the next year may be an exceedingly favorable one, and, therefore, their reliability is much impaired and the basis upon which we must make comparisons is at best unsatisfactory.

Causes of Decay.

Until about the year 1852 the fishing industry on the lakes was prosecuted almost entirely with gill-nets. Since then the gill-net fishing has continually increased until now the length of the gill-nets fished in Michigan waters alone, according to the last reliable statistics within our reach, amounts to 1,725 miles.

About the year 1850 the pound or trap-net was introduced into the Great Lakes. Its use conclusively shows that it has been one of the most destructive of fishing devices, and is responsible for the great decay of the fisheries which has been observable during the last twenty years.

Concerning the introduction of the pound-net into the Great Lakes, I am indebted to Mr. L. Anthony of Sandusky, O., for the following facts:

Pound-net fishing was first introduced by Messrs. Spencer and Courtland, two Connecticut men, at Sandusky, O., in the year 1850. The fishing with these nets

was at first done in shoal water in the bays and rivers in a depth of about 10 or 12 feet.

In 1852 Mr. L. Anthony of Sandusky, in the fall of that year began fishing with small bay nets, which was the first attempt. This fishing was done at Locust Point, between Toledo, O., and Port Clinton, Ottawa County, in the same State, in a depth of 9 feet of water. The fish were plentiful and the catch was remarkably large. He salted fifteen hundred half barrels of whitefish during this season, besides selling large quantities to the farmers, who came to the fisheries from long distances.

In the fall of 1854, Mr. Spencer, the gentleman formerly alluded to, together with other parties, including Mr. Anthony, conceived the idea that this plan of fishing could be successfully done in the deeper waters of the lakes. The first attempts was made by Mr. Anthony of deep water pound-net fishing, in the spring of 1855, at Kelly's Island and Put-in-Bay, in Lake Erie, Ohio, with marked success.

In the year 1854 he did his first pound-net fishing in Lake Huron at North Thunder Bay, fishing in 33 feet of water; fish were caught here in large quantities. There has also been some small fishing done near Lexington, Mich., which was not successful.

In the year 1856 Charles Ruggles and Capt. James Bennett fished with deep water pound-nets in Hammond's Bay, on the south shore of Lake Huron, and also on the north shore of Lake Michigan. At that time this was the largest and most successful fishery in the whole country. At the Thunder Bay fishery, on Lake Huron, Mr. Anthony caught in one net in twenty-four hours, four hundred of half barrels of whitefish. There were not one hundred pounds of other varieties caught on this occasion.

In 1865 he commenced fishing with deep water pound-nets at the Apostle Island, Madeline Island, Presque-Isle, and Sand Island in Ashland Bay, off Bayfied Point,

in Lake Superior, and these fisheries resulted in a profitable investment.

From this date on the pound-net fishing increased beyond all conception. It is not infrequently the case that pound-nets are set in gangs reaching out from the shore a distance of three or or four or more miles, and the destruction of fish by this method of fishing is immense. Unquestionably the fish so taken are superior to fish taken by the gill-nets because they are preserved alive until the nets are raised, but it takes everything, great and small.

No fishculturist should condemn the taking of fish if the fishing were done with judgment and with a due regard for the future.

The iniquitous feature of the business is that the cupidity of the fisherman overcomes his better judgment, and he takes from the water large numbers of small and immature fish that are of little or no value as merchantable fish. The result of this system of fishing is most destructive, tons upon tons of fish being thus taken which have never spawned, whereas if they were permitted to remain in the water to reproduce their kind, artificial methods would be greatly aided.

About the year 1868, Mr. William Davis of Detroit, patented a freezing apparatus for the preservation of fish. In that year about sixty tons were frozen in Detroit, and seventy-five tons in Toledo. This method of preserving fish was not very kindly received at first, but gradually grew in favor. Previous to this time, during favorable seasons, large quantities of fish were taken over and above the needs of present consumption, and the only means of preserving them was by the salting process, which considerably reduced their value. Gradually the freezing process grew in favor, and it was found by experience that fish might be frozen and held in that condition for any length of time. The result has been that in almost every important town upon the lakes

which is the seat of a fishing industry, there are to-day one or more freezers with varying capacities, most of which are exceedingly large. Their erection has given a great impetus to the fishing industry. While formerly the lake fishing was prosecuted mainly in the spawning season, the methods of fishing have so changed by reason of the opportunity afforded by the freezer system of holding the fish for any length of time that now and for a number of years past fishing has been carried on in nearly every month of the year, and is only interfered with by the rigor of the season when nature closes the waters for perhaps a month or so.

Reliable statistics furnished show that the following quantities of fish were frozen from 1869 to 1884: In 1869, 400 tons; 1871, 600 tons; in 1872, 600 tons; in 1873, 700 tons; in 1874, 600 tons; in 1875, 800 tons; in 1876, 1,100 tons; in 1877, 1,200 tons; in 1878, 900 tons; in 1879, 1,100 tons; in 1880, 700 tons; in 1881, 1,100 tons; in 1882, 1,300 tons; in 1883, 1,450 tons; in 1884, 1,600 tons.

No information is at hand for the seven years from 1884 to 1892, during which years it is fair to be presumed from the general knowledge we have on the subject, these amounts were very largely increased.

The average number of tons per year for the fifteen years amounts to 1,000 tons. Averaging these fish at 2½ pounds weight apiece, the number of fish caught on an average for each year and frozen would be 800,000, and for the entire period of fifteen years it would amount to 12,000,000 fish. This takes into consideration only the fish that were frozen, and my opinion is, that if there is any error in the above figures, they are much below the actual amount. But by far the greater quantity of fish taken are sent to market, iced, fresh, but not frozen. I believe it is within reason to say that the frozen fish will not represent more than one-fifth of the total quantity taken.

When we consider this large number of fish which are being constantly taken from these lakes, we can better appreciate the serious inroads which are being made upon the supply; and when we add to this the wanton destruction of millions of small and immature fish taken that are never given an opportunity to spawn, and when we further consider the large number of gravid females, the roe of which is lost by this capture, we can begin to appreciate the problem that is set before fishculturists to restore this great loss.

Means of Arrest of Waste and Restoration.

If the wealth of the waters of the Great Lakes is to be maintained, nothing can be clearer than that this great waste, which has been going on for more than a hundred years and is increasing, must be arrested. There are two methods by which this may be effected:

1. By a liberal and lavish stocking of the waters.
2. By the enforcement of just protective laws preventing the taking and marketing of unmerchantable, young and immature fish.

As to the first point each State must act for itself in protecting its own interests in the fisheries. Weak and erratic efforts made now and then to make good the loss by the planting of a few million fish will not do. With the means at hand and with the information we now have as to fishculture, and with the small outlay of money necessary to carry on the work of artificial propagation, each State should see for itself that every female fish taken during the spawning season in its waters shall have her eggs taken from her, fecundated and after being hatched, properly planted; there is no good reason why this should not be done, and if the States whose interests are involved will take immediate steps to carry out this line of policy, they will have taken a step in the proper direction for the maintenance of their fisheries.

As to protective laws, let me say this: No laws should

be passed which should rob the fishermen of the right to follow his calling within legitimate means. If our work means anything it means that we are engaged in an undertaking which, if properly conducted, will result in a direct benefit to the fishermen and incidentally in great benefit to the people at large in the maintenance of a cheap and wholesome food. With this understanding of the conditions, fishermen should be willing to submit to such just and necessary laws as may be required to prevent destruction of young fish which are of no special value for their purposes, and the destruction of which means the ultimate decadence and extinction of their means of livelihood. So far as uniformity in laws can be secured regulating the fishing in the different States, they should be made uniform, but experience seems to indicate that the fault lies not in the number or effectiveness of statutes, but in the inadequacy of the means which have been used to enforce them.

Most of these laws are inherently defective because of the attempt to build up a warden system by counties, allowing the compensation of wardens to be fixed by the boards of supervisors, who, as a rule, will grant no compensation, or one which is grossly inadequate, which results in making the warden system of no effect. New York has without doubt the best warden law of any State in the Union, because the pay of her wardens is sure and fixed.

The ideal law would be one giving authority to the Board of Commissioners of each State to appoint a chief warden with such deputies as he might require for a proper enforcement of the laws, whose compensation should be sufficient to secure the services of good men who should be paid by the State. The State might be districted, but in that event each warden could exercise the functions of his office in some district other than the one in which he resides, thereby removing from local influence in the administration of his duty.

The States should make and enforce their own laws. No other power can do it so effectually and well. Their legislatures are familiar with the necessities of their States, are quick to respond to the wants of different localities, and by frequent contact with their constituencies know their wants.

If a general awakening of the lake States can be had as to the necessity of proper action to maintain their fisheries as above suggested, there is no reason why the great food supply furnished by these waters may not be maintained at least in their present value, with a hope of future increase.

IMPREGNATING EGGS OF THE RAINBOW TROUT.

By Wm. F. Page.

The object of this paper is to bring to the notice of this Society, and through it to the notice of fishculturists in general, a subject which has not received that degree of attention its importance would warrant; the wish is to arouse interest sufficient to lead to a correct and, if possible, a practical solution of the difficulty of impregnating the eggs of the rainbow trout.

On page 819 of the report of the U. S. Commission of Fish and Fisheries for 1882, under the report of Mr. Frank N. Clark, is the earliest record of a peculiar incident occurring in the work of impregnating the eggs of the rainbow trout. This peculiarity can not be better described than by quoting Mr. Clark's report;

"Our facilities being first-class and having been uni-
"formly successful in the propagation of trout, not ex-
"cepting the preliminary experiments with rainbow trout
"for four seasons, I had confidently expected to embry-
"onize from one to two hundred thousand eggs from the
"stock of *irideus* hatched and grown at this station, but
"we succeeded in getting only 45,000 eggs (many of the