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HISTORY

— OF THE —

CARP

— AND —

CARP CULTURIST'S GUIDE,

— BY —

VALENTINE STILABOWER,

PROPRIETOR

BAVARIAN FISHERIES,

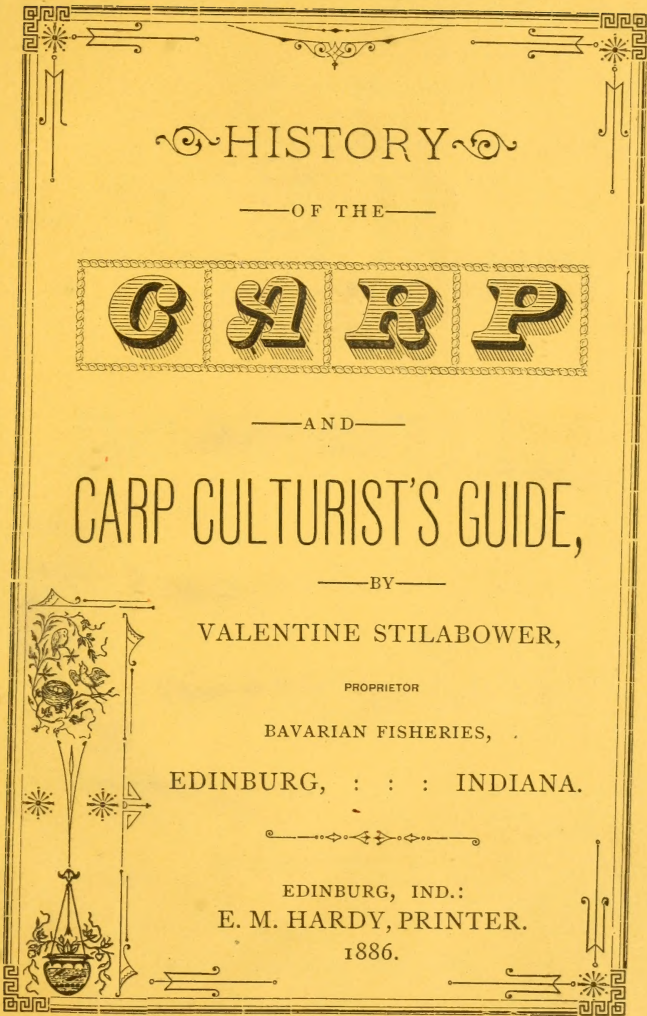
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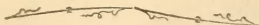
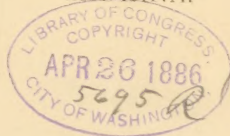
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BRIEF HISTORY OF THE GERMAN CARP.

The German Carp, (*Cyprinus Carpio*), which has been so recently introduced into the United States by the United States Fish Commission, at Washington, is not a German fish, as is generally believed, but is a native of Central China and Japan, and was introduced into Germany prior to the twelfth century.

It is supposed to have been introduced and cultivated by some Augustin Monks, in Austria, and as the various Monks in their Monasterys were ever assiduous, in nearly all new industries and privileges granted them by their superiors, we owe much to them, as during the dark ages they were ever ready to use their limited learning and knowledge that they would gain by practical experience in new industries, and impart them to the communities around them. And among these industries was Carp culture. In some parts of Europe Carp culture seems to be the leading industry, as much so as the growing of grain or live stock on the farm, in other parts.

When we consider the vast interest that is taken in Europe in Carp culture, we are astonished. Take Austria, Bohemia, Saxony, Northern. Central and Southern Germany, France, Italy, England, and even Norway and Sweeden, where hundreds and thousands of acres of artificial ponds are devoted to Carp culture, and millions of dollars are represented in this industry, and has been carried on for centuries, then the American Carp culturist has every encouragement to engage in this new enterprise.

DESCRIPTION AND SPECIES OF CARP.

The Carp has a toothless mouth, thick lips, and four barbels on the upper jaw. In place of teeth in the mouth it has a number of stout teeth on the pharyngeal bone, which are arranged in three rows, and loosing them annually at the spawning season, these teeth grow anew every year. It has one single dorsal fin, which is longer than the anal. Both of these fins have at their origin, on the interior edge, a strong ray which is serrated in a downward direction. The caudal is of semi-circular shape. The scales have an entire edge, and the body is compressed on the sides. The color of the back and sides is a dark brown, the abdomen a yellow or orange tint. However, the color depends, as with all fish, upon the age and season, and partly upon the water, soil, and upon the food of the fish.

There are three distinguished species or varieties of the Carp, viz:

The Scale Carp, (Schilb Karben) with regular, concentrically arranged scales, supposed by Rudolph Hessel to be the original species improved.

The Mirror Carp, (Speigel Karben) named so on account of its large scales which run along the sides of the body in three or four rows, the rest of the body being bare.

The Leather Carp, (Leder Karben) which has on the

back only a few scales or none at all, with soft skin, and velvety to the touch.

The two last named are somewhat shorter and stouter and more of a fleshy body than the first. By the best authority I can get, with my own observation, we cannot decide which of these three varieties is the best for the culturist, either for eating or market purposes; indeed, if we have in our ponds either of the genuine species, they will be found good enough.



CARP CULTURE IN EUROPE.

As we find in Austria, Bohemia and various other German States. Carp culture has been carried on for centuries, it is well for us to look to them for instructions, and their mode of cultivation. I shall quote Mr. Rudolph Hessel's experience, as well as my own practical and experienced knowledge, and also what I have gained by conversing with practical European Carp culturists.

In Europe we trace Carp culture in ponds prior to the twelfth century; and in 1227, the Emperor Charles IV, of Germany, favored the establishment of Carp ponds, and many of his people took up favorable localities along the various water courses, such as the Danube, Wesser, Rhine, and many other streams, wherever favorable localities could be found to build ponds, and so successful was this culture of fish in ponds carried on, that it soon spread throughout Austria, Bohemia, Saxony, Upper and Lower Bavaria, Silisia, Hussia, Hanover, Oldenburg, Mecklenburg and Holstein. the artificial ponds covering from a few to thousands of acres in water area.

There are various celebrated Carp ponds in different parts of Europe. In Austria there are celebrated Carp fisheries, which can be traced back to the twelfth century,

and brought into existence by the Lords of Rosenberg. These establishments are so grand and extensive that they are the wonder and admiration of all visitors. These fisheries came into possession in 1670 to the Princes of Swarzenberg, their present owners. The extent to which Carp culture has been carried on in these princely domains will be seen from the circumstances that their artificial ponds comprise an area of no less than 20,000 acres. The proceeds amount to about 10,000,000 pounds of Carp per annum. These ponds are probably the most extensive on the globe, but there are many large artificial ponds met with wherever natural facilities abound. These ponds are usually situated in some undulating lowland, where small valleys have been closed in by gigantic dams, for the purpose of forming reservoirs. We meet with these ponds in every well-to-do community.

Take part of Austria, Hanover, Oldenberg, Mecklenburg and Holstein, for instance, and we find almost every community or large farm possessing one or more ponds, containing from a few to several hundred acres. These ponds are all so arranged that they can be drained to the last drop of water, when the Carp are taken out, and the bottom of the ponds are cultivated in some kind of grain for two or three years. Some culturists sow turnips, or some other root crop, and let them mature, before they re-stock the pond with water and Carp; these roots are fine food for the fish, which they will eat with avidity, and grow rapidly. This cultivation of the soil in the ponds is deemed very beneficial both for the health of the fish and also for grain. Some

culturists draw only a part of the water off and sow the margin of the pond in wheat, barley or rye, and let this water on and cover the young growth for the benefit of the Carp. In Germany, then we find agriculture and Carp culture go hand in hand.



NATURE AND HABIT OF THE CARP.

The Carp is partial to stagnant water, or such as have not too swift a current, with a muddy or loamy bottom, well covered with vegetation; it is therefore an advantage to the culturist, as the Carp can live in water where no other fish can well exist. Take for instance natural ponds, or sloughs, bogs or any stagnant waters, wherein they seem to be at home; though it is not to be inferred that the above mentioned places are the best for their culture. They thrive and do well in any kind of water, (except mineral) even salt water or sea water not excepted. However, if the water in the pond contains too much humic acid or receives the drainage from barn and stable lots, or through oak woods, or fed on impure food, the flesh of the fish will be found to taste mouldy, and just in proportion to the foulness of the water or the food it has received.

Therefore it is important that the culturist provide his ponds with pure water and good pure food. As the Carp is a vegetable feeder the culturist can always have an abundance of food at hand through the season that they need to be fed. They will eat all kinds of our cereals, as well as vegetables, after being cooked or crushed to a fine mass, for be it remembered that they have no teeth for masticating hard or solid food; it also feeds largely upon aquatic plants, larvae, worms, and

insects which it turns up from the mud with its head, and will not refuse the offal of our kitchen, barns, mills, breweries, or even the excrement of cattle, sheep or swine. So we see that they are easily satisfied.

The Carp takes no food, or but very little during winter or cold weather. As soon as winter approaches they seek deep water and there form themselves in circles of one hundred or more, with their mouths in the mud, and in a dormant state, or a kind of sleep, until warm weather again begins, in the spring, when they come out again and seek for food.

It is therefore well and essential that all Carp ponds should have some deep water about, from six to ten feet, for the fish to hybernate during the winter. In this latitude (Central Indiana) the Carp usually seeks its winter retreat as soon as cold weather sets in, about December 1st. I think, however, that in the South, where there is scarcely any winter or cold weather, that they would not hybernate, but would continue to eat and grow the whole year; and then if we go farther North where the cold sets in earlier, the fish would go into their winter quarters much earlier, and consequently would not grow as much as in a more congenial climate.

The Carp will sometimes cross with other species of fish, such as the goldfish and sunfish of our streams, or some other species that spawn at the same time in their season. The culturist then should have none of our native fish in his ponds, not only to prevent the crossing of the fish, but also to prevent the native fish from eating the eggs and young Carp. The Carp does not eat its own eggs or young unless starved to it, which

the culturist should never permit. It is not a game fish, therefore will not eat or prey on other fish; neither will it eat any kind of meat when it has plenty of vegetable food, but will not refuse it when driven by hunger. Some culturists say that they will not bite at or take a fish hook, but it can be taken very readily by a small hook when baited with dough. I have taken numbers of them from my ponds by taking a small fish-hook and filing off the barbs and bait with dough, mixed in the following manner: Take flour and water and mix, and add enough of common cotton to make it more adhesive, then form this dough into pills, the size of a common grain of corn. Carp taken in this manner can again be placed in ponds, and the operation does not seem to hurt them.



THE CULTURE OF CARP AND GROWTH.

The culture of Carp has been so recently introduced into the United States that we have received but little practical knowledge by experienced culturists. What I shall say in regard to the culture and growth of the Carp will be my own practice and experience. I hope the culturist will find what I say to be correct.

The Carp if well cared for, and has had an abundance of food, will usually commence spawning at two years of age; it should then weigh from two to three pounds. It must be remembered that the Carp only grows in warm weather, so it will be seen that it gains this weight in from eight to ten months growth; they can even be made to weigh more by proper care and extra feeding.

The female Carp weighing three pounds or more is estimated by Mr. R. Hessel, to contain from 300,000 to 500,000 eggs, and some writers make this estimate still greater. The abundance of eggs easily explains for the extraordinary increase of the Carp, when it is well cared for. About March, in this latitude, (Central Indiana) the female will be found ripe, and if the weather becomes warm the fish will come from their winter retreat, and if the weather and water continues to keep warm, they will commence spawning in the months of April and May. However the time of spawning will differ as we go North; the farther North the later in the

season, and Southward it would be earlier.

Spawning of the individual fish does not take place all at once, but at intervals; days and weeks will pass before the last egg is left to the care of nature. Sometimes when it turns cold, or cold rains set in during the spawning season, it will be interrupted, but commenced again as soon as warm weather sets in.

During the spawning season a perceptible change takes place in the Carp; both become more lively. Large protuberances like warts, appearing on the head of the male and again disappearing, when the spawning season is over. The female will rise from the depth and approach into the shallow water, and followed by the males. They will dart swiftly from place to place; this is called running spawning. The females prefer spots that are overgrown with aquatic plants and grasses, such as nymphæa, alisma, and other plants. The males follow close by the side of the females, lashing the water in a lively way, twitching their body, and darting through the water with short, tremulous movements of the fins; they do so in groups of two or three males to one female. This is the moment when the female drops the eggs, which are immediately impregnated by the milt; the amount of eggs will hatch just in proportion as they are impregnated by the milt, probably not more than one in five. My observation is about that amount. As the process of spawning is repeated several times, the female drops only from 400 to 500 eggs at a time. So it will require days and weeks before it has given up the last egg.

The eggs of the Carp are adhesive, and adhere in lumps

of from six to twelve or more to the objects on which they have fallen. As soon as the egg has left the body of the fish it swells up a little, and the mucus that surrounds it, serves to fasten it on whatever object it touches, be it aquatic plant, brush or stone. Every egg not so attached is lost.

Therefore all ponds should be provided with various plants, brush or anything else for the eggs to adhere to. However I will further on in this work speak of the various plants best suited for ponds. The eggs will develop quickly if assisted by warm weather; about the fifth or sixth day the first traces of dusky spots, the eyes, will be visible, and about the tenth or twelfth day the little fish will break through its covering. This rapid development takes place only when the water is shallow and thoroughly warmed up by the sun or in hatching ponds expressly constructed for that purpose. In deep water where it would be colder, or if the water is cold by change in the weather, then it would require eighteen or twenty, or more days, before the hatching would be complete.

In a few days the young fish will have absorbed the yolk, we find attached to it when it first leaves its envelope, and begins then to seek its food. Now if the pond is productive in abundance of natural food for so many young fish they develop and grow very rapidly. If the pond is over-stocked with young fish, they should be fed. I usually feed middlings and shorts I get from the mills, which I find excellent food for the fry; they are also very fond of any kind of bread, crackers, or any kind of scraps from our table, but I do not approve

of feeding them any kind of food containing salt or any kind of mineral, as this affects the health of the fish. It requires very fine ground food for the young fish, as the throat of the Carp is very small in proportion to its size. The young Carp that will hatch out in May and find food in abundance, and if the summer and autumn are favorable to its growth, will be found six inches or more in length, and in good condition to be placed in the breeding ponds. The Carp does not grow in winter, and therefore will gain nothing until the following summer, and by autumn will have gained the weight of two to three pounds, and measure from twelve to eighteen inches in length. After the second summer it will grow very rapidly and it will sometimes gain the weight of six to eight pounds by the fall of the third year. I have a few Mirror Carp, six years old, weighing over twenty pounds each. They will keep on growing until they have gained the weight of fifty to one hundred pounds and measuring three to four feet in length. After they arrive to be twenty-five or thirty years old, they will, however, gain in weight by laying on more fat for some time after this age. The oldest Carp I have any account of was one hundred and forty years old and still living at that time in some Austrian pond.

Let me remark that there are many fish sold for Carp that are crossed with some of our native fish, and so perfect is the cross that it is hard for the student or culturist to distinguish them from the genuine Carp. Therefore we sometimes hear the Carp denounced by some who are ignorant of these facts, about Carp being bony and unfit to eat. Many individuals have been

engaged in cultivating our native fish before the German Carp was introduced into this country by the Fish Commission, at Washington, and when the Carp was distributed to the applicants, many of them (having ponds already stocked with native fish, and among them the common sunfish of our streams, and ignorant of the Carp crossing), would place them into their ponds and form hybrids, and of which it would be hard to distinguish from the genuine Carp.

The culturist should be very careful in stocking his ponds. If the pond does not produce sufficient natural food, then artificial feeding must be resorted to, or if the culturist allows too many fish in his pond, more than would supply his fish with oxygen from the water, they will either die or do no good. Therefore the culturist must have the means at hand to supply his pond with fresh water frequently or take out the surplus fish. The culturist had better give away or let out some of his fish in some open water, as to have too many fish in his pond.

The number of Carp placed in a pond of one acre of water area, would be hard to advise, as the culturist must consider the kind of bottom he has in his pond, whether it is a loamy, muddy bottom, or a sandy, gravelly or rocky bottom. If the pond contains a muddy, loamy bottom, and the water not too deep, it will produce more aquatic plants, worms, larvæ, insects, and more abundant natural food in general, than when the bottom is sandy or rocky, and consequently would be poor. Therefore the pond first described would sustain many more fish than the last. My first large pond I built contains four and a half acres, and is very productive in

natural food. I placed in the fall of 1884 Carp three months old, averaging three inches in length, at the rate of two thousand per acre. I took no more notice of them until the following May when I placed food along the margin of the pond; the fish did not disturb this food until June, when they first began to eat the food I placed in the pond. They came regularly to feed thereafter when hungry. I kept feeding until autumn 1885. I bought all the food I fed, consisting of stale bread, at the bakeries, and shorts and bran from the mills, costing in all ten dollars and fifty cents for the season. In October 1885, I weighed some of them and found them weighing one and a half to two pounds each. I call this a good growth for the one summer. This will give the beginner some idea what Carp culture will do. Say nine thousand Carp gaining one and a half pounds each would make thirteen thousand five hundred pounds of Carp to four and a half acres of water, and at eight cents per pound, would amount to \$1,080. Now by leaving these fish in the pond the following year they will require to be fed more abundantly as they grow larger, and if fed all they will eat, they will weigh from four to six pounds the following autumn. If the pond is poor, with sandy and rocky bottom, and furnishes but little natural food, probably only one-half the number of Carp I have mentioned would be enough in order to do well. I find that the greatest difficulty with beginners in Carp culture is that they keep too many fish in their pond to make the business a success. Some culturists recommend more Carp per acre, for this country, while some European culturists recommend less. The culturist will, however, find the rules I have adopted a good one to pursue.

BUILDING PONDS.

In building ponds we should consider first the locality in which we wish to construct our ponds; second, is there sufficient water at hand for all purposes, for summer and winter; third, is the ground, water and soil favorable for Carp culture. The beginner should be careful, as it is very important to examine the land closely in order to find what are the components of the soil, for every kind of soil is not suitable for Carp culture. Neither should the water from mineral springs be used, as it is not good for Carp culture. The culturist should also consider the extent he wishes to engage in: whether he wishes to cultivate only for his family use and his own pleasure, or enter more extensively for cultivating fish for wholesale purposes, and supplying the general trade. If the locality is selected where he wishes to build his pond, the ground must be examined to see that the water collected does not penetrate or absorb through dam or bottom. We must be sure that the soil is impermeable and to withstand the pressure of the water and not permit it from oozing through, and to prevent the pond in consequence from drying up. Sandy, gravelly or rocky ground is not very good for a Carp pond, without a considerable mixture of clay, loam and humus. I speak here of large and extensive ponds. Small ponds can be improved by

supplying them with the loam, clay and humus. A loam mixed with a small per cent. of sand and a large per cent. of clay, is suitable for Carp ponds. If that kind of ground contains marl and humus to a small amount, it will be found of an advantage to the Carp pond.

When this humus I speak of is dissolved in water it gives it a yellow, muddy color, and the ingredients of this kind of water supports large numbers of microscopic beings which forms the support of larger creatures, and helps to increase the food in the pond, and of which the Carp depends largely for its food.

However, too much humus or peat or water standing or running through bogs is injurious, and water running through oak woods contains too much tannin and is therefore not good. Water from mineral springs should be avoided, as all these will give the fish a mouldy and bad flavor, when it comes to be cooked and eaten.

Water flowing through fertile fields and meadows should be collected and led into Carp ponds, as these waters carry large quantities of food in the ponds. The rainfalls from such fields will carry large quantities of vegetable matter, as well as worms and insects, all of which is good food for the Carp. Such located ponds are more valuable, and if the pond is fed by springs direct from the ground the water should be led to flow from fifty to one hundred yards in a shallow ditch, that it may be warmed up as well as receive nourishing compounds from the earth and air. If a tract of land is found with not too much fall so as to require too high embankment, such sites should be preferred. A

low undulating country, with slight elevated hills, where the valley are easy closed up with dams for the purpose of forming reservoirs, could be easily converted into ponds: these dams can be built with but little expense.

I will now describe to the reader my own ponds, how they are located and built, so that you may draw some idea when you wish to build a pond.

As I sit at my writing table and before my window in my room and glance out occasionally, I take in view my entire fisheries. My house is built on a small elevation, about the center of a valley. This valley runs northeast one hundred and sixty rods from the house and one hundred and eighty rods southeast, and is from thirty to sixty rods in width. The springs that supply my ponds are located in the center of this valley, and the water from them runs or divides both ways. The valley from this elevated center has a fall of ten feet to every forty rod of descent, and the soil is all that could be desired for Carp culture. This valley has elevated hills on each side from twenty to fifty feet high, and are well set in blue-grass pasture. I permit all the rainfall from these hills to flow through my ponds.

BUILDING MY FIRST FISH POND.

My first fish pond is located at the northeast end of the valley just described. In the first place I drove down two stakes parallel with the valley and by placing on them a carpenter's level to find when the tops of my stakes were level and by sighting across these stakes I could find the exact elevation of the ground, and found that the elevation was ten feet for every forty rods distance up the valley. I had to know this in order to give my dam the proper width in the bottom in order to reach the proper height when done. I found too that I had to commence with a base of fifty feet in width, to give my dam the proper width on top when done. I now commenced plowing on the inside of my dam and worked the earth outward on the base of the dam. This plowing and scooping I carried on until I had a space of two feet deep, sixty feet wide, and the length of my dam. This was all the earth I desired to take from the pond; the rest I took from the elevations on the sides of the valley. The excavation I made in the pond and near the dam is called the collector, where the fish collects when the water is drawn from the pond. Let me here remark that before I moved any earth on the dam, I took 2x16 inch oak plank and sixteen feet long and spiked four of them together to form the bottom sluice-way, when I wished

to draw the water from the pond. It took three of these sixteen foot troughs placed end to end to reach across the bottom of the dam. At the inside of this sluice or outlet I cut one and a half inch grooves on each side and bottom plank to fit a slide or head gate in, to be raised when I wish to drain my pond. Some culturists recommends a tight plank frame-work around this sluice-way to prevent the water from washing the earth away and thereby saving the dam. I think it unnecessary in so wide a dam, but I think it would be beneficial in a narrow dam of only ten to twenty feet wide. After the dam was as high as I wanted the water in the pond, I was at a loss how to arrange the outlet for the overflow, as I had a great amount of rainfall to contend with, from at least two hundred acres of land. I at first thought I would cut ditches on both sides of the valley and let the surplus water off. But that would carry off a great amount of food from my fish, that would wash in from the blue-grass pasture surrounding my pond. I took another plan and a better one. I built the outlet from the overflow on the east end of the dam on solid ground, fourteen feet wide and three feet high, and put a fine wire screen over it to prevent the fish from going through, and in front of the screen I put a frame work of 1x2 slats to prevent trash from stopping up the screen; I also made my dam as high as this frame work, which makes the top of the dam higher by three feet than the water in the pond, besides this outlet I have left the ground on the end from twelve to fifteen inches lower than the dam, so if the outlet should be

insufficient to carry off surplus water fast enough it will raise and flow over and around the east end of the outlet, where the ground has been left lower. I used wood work for all of my outlets, but I would recommend for a good, permanent dam, solid masonry for the upper outlet, and sewer piping, such as is used by different individuals for road crossings, for the bottom or lower sluice-way. The joints of this piping should be cemented at every joint, as far as it reaches through the dam. On the inside of this pipe we put an elbow and add joint to joint until the height we desire the water in the pond is reached, then put a screen on top to prevent the fish from going through. This sewer piping I think 'the best for the lower sluice-way, as it will answer for the overflow, as well as it is handy when the culturist wishes to draw the water from his pond, as he can take off one joint at a time, and by degrees draw off the water. Where the culturist has but a small amount of water to contend with in his pond, this lower sluice-way would, in all probability, be sufficient to answer the overflow and outlet at the same time.

As I have described my first pond, for the purpose of giving the beginner some idea how to pursue in building ponds, I will now proceed with my second pond.

This second pond I built is in every way like the first, and just along and across the upper margin of the water in the lower or first pond. I have thus a series of ponds, four in number, on the northeast end of the valley heretofore described. These ponds are so arranged as to let the water from one into the other.

It must be remembered that I took only enough earth out of the inside of the ponds to form the collector. This collector is two feet deep and forty to sixty feet wide and the length of the dam; this collector is also two feet deeper than the lower sluice-way.

It will readily be seen that when the water is drawn from the ponds that the fish will all collect near the dam in shallow water, where they can be readily taken out with nets or seines.

The bottom of these ponds had been an old pasture field for a number of years, and were left as they were, in sod, except the earth I took out to form the collector. As this sod and vegetation produced a great many worms and insects for the Carp, I found it a good plan to leave it untouched.

There is also an outer collector. This should be two feet deeper than the surrounding ground and made around the lower sluice. The earth that is taken from this collector should be placed around so as to form a levy to hold the water and permit it to pass through a wire screen. This collector need not be more than ten to fifteen feet across, and this keeps back all the fish that by chance may get through the sluice-way.

The Carp culturist should bear in mind when he builds a pond not to have too much deep water in his pond, not more than enough for the fish to hibernate in during winter, and rest in during warm days in summer. Eight or ten feet is deep enough, and this should be near the lower sluice and collector, the rest of the pond should be from three feet in depth to a few inches. The culturist will find the shallow ponds will warm up

earlier in the spring and will be found to breed more worms, larvae and insects, and vegetation will grow more abundantly, and thereby produce more food for the Carp.

In building the dam care must be taken to examine the nature of the soil closely, and if found too porous or danger of water oozing through, then there must be an excavation made deep enough to reach a solid and firm subsoil, and about four feet wide, and the full length of the intended dam. This excavation is then filled with a layer of clay and well tamped down, and then another layer, and so on until the desired height of the dam is reached. The sides of this tamped down clay may be filled with the soil near at hand. Care must be taken to build the dam with good water-proof material, that will withstand the pressure of the water and keep it from oozing out. It is also important that the culturist take no risk in so constructing his dam as to wash out and take chances of loosing his fish.

If the pond is to be fed by springs, the water should be conducted a short distance in a shallow ditch that it may become warmed and receive nourishing components from the air as well as the earth. And if no other water enters the pond, then the lower sluice-way I have described above, will be sufficient for all surplus water, and no outlet for the overflow needed. If the pond is fed by a brook the brook should never be permitted to flow into the pond direct, but should be led by a ditch around the pond, and the water from the brook pass through an inlet. This inlet must be well constructed of good material, to prevent its overflow, and should

be protected with grating to keep foreign fish from getting into the pond. This inlet should also be arranged so that the water can be regulated that flows into the pond.

It is highly necessary to have the water in the pond on the same level summer and winter, if possible. It is very beneficial to the fish for the water will keep a more even temperature.

It is an indispensable condition for Carp ponds, according to rules, that they be constructed so as to allow them to be thoroughly drained, so that the fish may be taken out without any difficulty, and their enemies destroyed. In Europe, ponds of from ten to one hundred or two hundred acres, which are frequently to be found, after having been used for Carp culture a few years, are then dried up, and oats, wheat or some other cereal crop is cultivated on the ground. And some culturists sow some kind of root crop, turnips or beets for the last crop, and when they become matured they restock the pond with water and Carp, and leave the roots; this cultivation improves the soil and benefits Carp culture as well as agriculture. When this is done in Europe we can expect to do the same in this country. In Europe we find Carp culture and agriculture go hand in hand.

As I have been describing the mode of constructing ponds of large size, that of several acres, I will now proceed to describe how to build small ponds containing only from a few rods to one acre.

As I have already said in this work, the Carp is partial to still water, or that which has not too swift

a current, and will live where almost no other fish could live. If you have no living spring, brook or stream to receive a supply of water from, you may have a low vale which might be dammed up, and sufficient rain water collected for the purpose of supplying a pond. Or the culturist might get a supply from a well, where the water could be raised by wind or hydraulic power, for when once the pond is full of water and no absorbing or oozing out takes place, then the supply of water would not need be great. If a small pond is being built where the bottom is sandy and too much absorption takes place, it should be cemented; a few barrels of hydraulic cement would do for a small pond, and after the bottom is cemented there should be a few loads of clay placed in the bottom, as it is very important to have the clay for the health of the fish. These small ponds must have every feature in their construction as the larger ponds; that is the outlets and collectors, the inflow and outflow to be under control the same as I described for large ponds. And if well water be used it should stand in reservoirs or tanks until it becomes warm and aerated before it is permitted to enter the pond.

Small ponds that have no constant flow of water through the inlet and outlet, through the winter, when ice forms over the pond, and where there is no circulation of water through the pond the fish will die from want of oxygen. This can be supplied in the following manner: A small pond containing one-half acre or less, take as soon as ice forms on the pond a pole and sharpen one end, then cut a hole through the

ice, over the deepest part of the pond, then drive the pole down so that it will stand firmly; fasten around this pole a sheave of rye straw, or corn fodder will do; be sure to have the lower end of the sheave below the formation of ice, and the upper end to be above the level of the ice, and let your ice freeze ever so hard, your fish will come out all right. I should here say the larger the sheave of straw or fodder the better; this gives free circulation of oxygen from the outer air to the water below the ice. If the pond contains more than one-half an acre then two or more poles should be so arranged.



STOCKING PONDS AND CARE OF FISH.

To make Carp culture successful, the culturist should possess several ponds, according to various purposes they are to be used; first, the hatching pond, which we may call the smallest, and in which we place a number of males and females, usually two or sometimes three males to two females, but I usually find one of each about the best. To stock a pond of one acre in water area some culturists place from five to eight pair of milers and spawners to the acre, and where the female drops the eggs during the spawning season on some aquatic plants, where they are impregnated by the milers. Now if the season is favorable, and not too many enemies of the eggs and fry in the pond, the culturist can reasonably expect to have about thirty thousand young Carp from one pair of spawners. The culturist can therefore expect two hundred and forty thousand young from eight pair of spawners and milers to one acre of pond. Now if the water in the pond is rich in natural food the young fish will then develop very rapidly; if the water is not rich in food, then artificial feeding must be resorted to. I find middlings, shorts, or fine corn meal excellent food for the young fry. Feeding, however, should be carefully done, for if there is too much food given them, more than they will eat up clean, and the pond be small, then the

surplus food would decompose and cause poisonous gasses to arise and injure or kill the young fish. I usually place a shallow trough a few inches under water, along a walk way of plank, and place the food in the trough, and by so doing I can regulate the amount of food. It is a good rule to feed the spawners during the hatching season and thereby prevent them from eating their own eggs, as they sometimes do when driven by hunger. Some culturists move the spawner from the hatching ponds during the hatching season, and thereby save more young fish, than by leaving them in the pond. If too many young fish are kept in the pond, they must be well fed and cared for; if they are neglected and permitted to shift for themselves, they will not grow much, and when the young Carp is starved and becomes stunted it never will amount to much, and will not be larger at two years old than it should be at one. The culturist had better sacrifice and let a number of his young fish out in some open water, river or lake than to have too many in his pond. New beginners are very apt to keep too many young fish in their ponds and think it too great a sacrifice to let so many young fish go, but later on they regret their parsimony, by having a weak and not a well developed fish.

If the culturist has a series of ponds he will want to take the young Carp out of his hatching pond, and place them in his breeding pond, or if he wants some of them ready to sell to other culturists for stocking ponds, he may place them in small basins or tanks, built for this purpose, about twenty by thirty or forty

feet, where he can take them out any time during the fall, winter or spring. I think the autumn the best for transferring the Carp, and as early as they can be safely moved. About October in this latitude is a suitable time. They will then have plenty of time to become reconciled in their new quarters and be ready to find their winter retreat when cold weather should set in.

The number of young fish should not exceed three thousand in number, per acre, for the first year in the breeding pond, and if the pond be poor in natural food, then less than the above number would be better. If these fish are fed and properly cared for, they will by the following autumn, weigh from one and a half to two pounds, and from fifteen to eighteen months old, and only of eight or ten months growth, for it must be remembered that they grow only during the months of May, June, July, August and a part of September and do not grow any during the latter part of fall and winter. They will only grow and thrive in warm weather, and gain more in weight in the months of June, July and August than the rest of the whole year.

After the Carp has been kept in the breeding pond one summer, and has attained the weight of one and a half to two pounds, it is then transferred to the regular Carp pond or finishing pond. This pond should receive no more than from twelve hundred to fifteen hundred of the one and a half to two pound Carp per acre. If the pond is very productive of food, the Carp will gain and weigh from four to five pounds by fall, without feeding, and by feeding carefully they frequently weigh six to eight pounds, and are then ready to be taken

out of the pond and ready for market.

Taking the Carp from this pond is indeed an interesting and beautiful sight and is well worth to go miles to see. If the pond is built as I have heretofore described, with lower sluice-way, collectors and where the water can be drawn off by degrees, the fish will all collect near the sluice-way in the collector and huddle together like flocks of sheep, and with their backs protruding out of the water. They are taken then with a sein or net and weighed out in lots of one hundred or more and sent to market direct, or placed in the so called merchantable ponds and are ready to be taken out to supply the demand. These merchantable ponds are small and generally built about some springs where the water keeps cool in summer and does not freeze very much in winter and only large enough to hold about one thousand Carp each.

The culturist should at all times know the number of fish in his breeding and stock ponds, so that he may know how much to feed them if food is needed.

When the fishing out takes place from the hatching pond, the water should be drawn off very slowly, and the young fish gently driven in as the water recedes, and care must be taken not to alarm the young fish, for if they become alarmed they will bury themselves in the mud and thus die before water can again be let into the pond. Numbers of Carp thus perish before the culturist becomes aware of it. After the water is drawn off and the fish collect near the lower sluice-way, they can be taken out with a small sein and placed in tubs, and with a small landing net dip out, a few at a time,

and can easily be counted into buckets, and transferred to the breeding ponds. The spawners are usually placed back in the hatching pond and left over, and to be ready for the following spring's hatching. If the ponds are arranged as I have described, the culturist has no need of counting the fish he takes from the breeding pond to the regular stock pond, as he can by drawing the water from the breeding pond let fish and water through; at the same time he has them already counted. However, he should add a few extra fish for losses that may have occurred by the enemies of the Carp.

The hatching pond should be made shallow, only enough of deep water in the collector for the spawners to winter in. The rest of the pond should be made shallow, and not more than two feet deep, and two to five inches around the outside and low water margin; this shallow water should cover the largest part of the pond. Different water plants should be encouraged to grow, such as festucies, or water grass, the white and yellow water-lily, and tuscarora rice, or water oats. These different plants seem to be preferred for the spawners to deposit the eggs on, and the seeds of these plants are excellent food for fish. If the hatching pond is not well supplied with these plants, then the culturist should place numbers of brush (hemlock brush are best when they can be had) in the pond where the spawners can deposit their eggs, for all eggs not attached to some floating substance are invariably lost; eggs that fall on the bottom will not hatch. For an experiment I constructed a small

pond in the spring of 1885, of about ten rods square, and deep enough to cover cedar boughs. I placed these boughs in the hatching pond and when well covered with eggs, I transferred them to the small pond to hatch. By carefully removing the eggs from these boughs and wrapped in damp moss, they could be shipped any distance that would not keep them out of water over forty-eight hours, and when placed again in water would hatch as well as if they had been placed there by the mother fish. The experimental pond gave ample opportunities to watch the process of hatching or development of the eggs until hatched. On the fifteenth day of May I found on a certain bough, that I watched from day to day, fifty or more eggs; this bough I transferred to my experimental pond, so that I could examine it at pleasure. I found no apparent change until the fourth day after the transfer; this was a coloring of a dusky hue. The next day, the twentieth of May, I could see a dark spot, the eyes, and from day to day I could watch the transformation that took place until the twenty-eighth, when I found the covering of most of them empty. I took ten of those that were not yet hatched, and put them in a small basin of water that I dipped out of the pond, and by the next day I found four of the ten eggs hatched. These four little fish I watched from day to day until the fifth day after they left their covering, when they had exhausted the yolk that was attached in a tiny bag to them, and the perfect little fish was found ready to seek for food, and were then set free in the pond.

TAKING THE FISH FROM THE POND.

Taking the fish from the pond should be carefully done. The water must be drawn off slowly, requiring sometimes several days, and some very large ponds would require a longer time. The fish must be driven in slowly and carefully from the outer margin of the pond and driven toward the collector near the lower sluice-way. The fish must not be alarmed by unusual noise, or they will bury themselves in the mud and remain there while the water recedes, and thus perish.

Thousands are sometimes lost in this manner, unless there is an abundance of water near at hand, to fill up the pond with, and cover the fish.

There is no more beautiful sight in nature than to see a large pond that contains thousands of the beautiful Carp weighing from four to six pounds collected together in a small space and in shallow water where they are huddled together as close as a flock of sheep and their backs protruding from the water.

After the fish are thus collected the fishing out takes place, usually early next morning, and weighed in lots of one hundred and sent to market or placed in the marketable ponds; these ponds are small, built purposely to keep the matured fish in waiting for the markets. If these ponds could be built close to a spring where the water would be of an even temperature of about fifty or

sixty degrees, and the Carp placed in them early in the season, their flesh would remain solid during the summer and be in good condition, for the flesh of the Carp, like all other fish, becomes soft during the spawning season, and remains so during warm weather in summer. The Carp kept in a cold pond in hot weather would sell for more in market, and thus increase the profit to the culturist.

I have spoken thus far of Carp culture where it is conducted in a series of ponds, that is hatching, breeding and stock, or finishing ponds, but there is another mode, where the culturist wishes to cultivate in a single pond, and mix Carp culture; where fish of all ages, from the young, just hatched, to one or more years old. This method, however, is not so convenient and profitable as the class pond culture. The single pond must contain all the characteristics of the class pond; must have shallow places, and these well overgrown with aquatic plants for the spawner and young fish, and also places from six to eight feet deep for the large fish. This pond should be so arranged that the last drop of water can be drawn off, so that the culturist can get at his fish, and enable him to destroy the enemies of the Carp. There should be shallow places made at the sides of the pond, and overgrown with vegetation for the spawners to deposit their eggs. If the so-called spawning beds could be so arranged as to permit the culturist to enclose them with a net-work during the spawning season until the young fish would be able to take care of themselves, he would save many more fish. Again the culturist should not have more than one variety of the Carp in his pond.

If he does he will have crosses between the varieties he has in his pond and in a few years he will have neither pure, Scale, Mirror, or Leather Carp, and none of these crosses are as pretty as the genuine. However, it does not seem to injure the eating quality or flavor of the fish by crossing.



THE BEST FOOD FOR THE CARP.

The appetite of the Carp as has already been said in this work, is easily satisfied, as it will eat largely of aquatic plants, seeds, worms, larvae and insects, as well as any of our cereal grain, such as barley, wheat, buckwheat, oats, corn, etc. These grains should be cooked or put to soak until soft, or ground fine, for as I have already stated, the Carp has no teeth for masticating solid grain. The Carp will eat any of our vegetables, such as lettuce, potatoes, cabbage, turnips, pumpkins, etc. They will not refuse the offals from slaughter houses, or even the excrements of cattle, sheep or swine.

As the Carp is not a game fish it will not attack or eat any other fish, and will not bite at a common fish hook baited with any kind of meats, as is the case with our native fish, unless the Carp is nearly starved; yet it can readily be taken with a small hook baited with dough.

MODE OF FEEDING THE CARP.

Feeding should only be resorted to when the pond is very poor in natural food, or overstocked with fish. When the bottom of the pond is sandy and rocky it would produce but few aquatic plants and also insect life, on which the Carp largely depends; in such ponds then feeding should be resorted to. I will now give my plan for feeding and which I find both convenient and pleasant for a feeding place.

I make a walkway by driving down posts in the pond six feet apart, in a straight line and as far as I want my walk. I drive two such posts side by side, two feet apart in rows, and across these posts I nail one and one-half by three inch strips, and lay one inch plank along the top of these strips and posts. Then my walk is done. Some of the strips I nail across the post I leave two feet longer than the width of my walk, for the purpose of fastening the trough, which I make in the following manner: I take eighteen inch wide plank and nail to each side four inch strips to form a shallow trough, I then nail four upright pieces one by two inches, two at each end, then I sink the trough about six inches under the water and nail the upright pieces fast to the strips across the posts of the walk-way. This I find convenient and gives me the pleasure of seeing them eat, and when they have enough food. It gives the culturist

great pleasure to have the Carp to come and eat out of these troughs. They look like so many well fed and fat pigs. They will also soon learn to eat out of one's hands and permit themselves to be taken out of the water. The Carp can be trained to come for their food at call. I have my fish come to their food by sounding a tin horn. Thousands of them come when the horn is sounded, and so eager are they for their food that they push each other out of the water.

Where the culturist has a small pond from one-fourth to one-half acre near the house, he can keep his fish with the offals from his kitchen and barn.



CAN FISH HEAR?

If science was not teaching that fish have no ears or sense of hearing I would say they do hear, for whenever the fish in my pond hear the familiar sound of a horn they will come to it; now whether the sound of the horn or the vibration over the water brings them up, is yet an unsettled question in my mind. I know this fact, that the Carp can be learned to come by call, the same as the domestic animals on the farm. This calling and feeding the Carp is a great source of pleasure to our young folks on the farm, and they pass many happy hours in thus being engaged.

ENEMIES OF THE CARP.

The enemies of the Carp are legion, so many at times that the Carp is exterminated from the pond. Frogs, snakes, turtles, rats, mink and otter, and all of our native fish are enemies and feed on the Carp and its eggs. All aquatic birds and water fowls, such as the kingfisher, fish-hawk, cranes, bittern, heron and wild ducks, all of which understand catching fish better than the average culturist.

The trap, gun, hook and net must be used constantly in large fisheries, to keep the upper hand of these enemies. Where the establishment is small, containing only a few acres it can be enclosed with a tight board fence about three feet high and boarded up and down; the ends of the boards should be let in the ground six or eight inches, to prevent mink, rats, etc., from digging under. This will not, however, keep birds out; they must be shot, or many must be trapped with a common steel trap, such as trappers use for small fur animals. I put my stakes six feet high close to the water in the pond, and set my traps on them, without any bait. The kingfisher, fish-hawk, etc., can easily be taken; ducks and other birds must be shot. The snapping turtle, the most voracious enemy of the Carp, can be taken with a stout hook baited with fresh meats; indeed the culturist should have hooks constantly set for turtles from early spring until late in autumn.

TABLE QUALITY OF THE CARP.

If we take under consideration the extent of Carp culture in Europe where thousands of acres of artificial ponds are to be found, and thousands of tons of fish taken from them annually, and placed upon the markets of the principal cities, such as Paris, Berlin or Vienna, and in spite of these markets being well supplied with salt and fresh water fish, with the Carp selling from two to three times more in price than any other fish, except the Trout or Salmon, and that there is no fish in Europe that is superior to the Carp and very few their equal, these facts will then give every encouragement to Carp culture in the United States, and if the culturists will give the same attention in cultivating the Carp that the culturists do in Europe, then the American public will want no better fish.

The United States Fish Commission, after inquiring as to the eating quality of the Carp from two hundred and forty-three applicants and culturists received the following report: Nineteen criticized as to softness or muddy taste; seventeen reported uncomplimentary; aside from softness and muddy taste, there were two hundred and six highly complimentary reports, and only thirty-six uncomplimentary reports. These last thirty-six can easily be explained; some by cooking, others by eating the fish during the spawning season, and again

others in being bred in a muddy and filthy pond.

Wherever my Carp have been used for the table they have given universal satisfaction, and all of my patrons have given them their highest praise as to the edible quality of my Carp. I think when Carp culture is better understood among the American people, then every farmer will have his Carp pond, and however remote from market he will be enabled to supply his table with the best of fresh fish. I think the time will come when Carp ponds will be as abundant among our agriculturists as the pig pen or poultry yard.



OBJECTIONS TO CARP.

We find now and then objections made by some one who undoubtedly is unacquainted with the true history of the Carp, and denounce them as being a bony fish and not fit to eat; some say they taste muddy, etc. The genuine Carp has no such objections in Europe. If they are genuine and pure bred it should be free from tie or bunch bones, which are so objectionable to the Sucker family of fish. The Carp has no more bones than the common river Bass, that is the ribs, back bone and fin bones, and if any individual seeks for a fish with less bones than the Carp contains, he will be disappointed.

If the epicure finds more bones in the Carp than I have described above, then the Carp must be crossed with some of our native fish and not a pure Carp. Some object to them on account of their softness and muddy flavor and taste. To such I will say that they have eaten the fish during the season that no fish is very good. No fish should be used during the spawning season, as their flesh will be found soft, and not so good as at the rest of the season; that is the latter part of summer, fall and winter. The muddy and mouldy taste of the Carp is derived from a stagnated and foul pond of water, and fed with foul and decomposed food. I am sorry to say that there are some culturists met with, who

cultivate the Carp in nothing better than a cesspool, and feed them with the most unhealthy food that they can find, such as the manure from their stables and other decayed garbage they find around their premises. Some culturists close to some large towns haul manure from the town stables in their Carp ponds for food for their fish. No wonder then that with the above treatment the Carp receives that there are some objections. The culturist will find no such objection as the above where the Carp has been bred in a pond of pure water, and receives sound and healthy food. If we make the inquiry of the Frenchman or German, who is acquainted with the true Carp of his Fatherland, and ask him about the eating quality of the Carp, his answer will be there is no fish their superior and but few their equal. We also find in China and Japan, the native land and origin of the Carp, the Carp always preferred to any other fish. When General Grant made his tour around the world, and was feasted by the crowned heads of China and Japan, the Carp was always found at the head of the bill of fare.

If the Carp culturist will take the same pains with his fish and ponds that the culturist takes in Europe, he will then make it a paying industry, and always find a ready market for his fish and a profitable employment.

DOES CARP CULTURE PAY?

The first question asked by the American people when any new enterprise springs up, is, will it pay? I can only answer the above inquiry by my own experience and observation, and will say, that so far the few culturists engaged in the United States have met with good encouragement, financially, as nearly all the Carp they propagate found a ready market for stocking new ponds that are being built all over the country: these fish so disposed of have brought the culturist a good income, and as long as he can dispose of his surplus fish for the above purpose, he will make more money than to raise them large enough for eating purposes. But let us make a little calculation what the culturist can expect to do raising Carp for the open markets alone. As I have already said in this little work, that one acre of pond rich in natural food, will produce 2,500 pounds of Carp per annum, without feeding, and that these figures can be doubled by feeding. Then we can see whether it will pay. The 2,500 pounds at eight cents per pound, wholesale, would bring \$200 per acre, or double that amount by feeding the fish. This result can only be gained by careful feeding and ever watchful over the pond and fish. I think I am right in the above figures, and do not wish to mislead new beginners, in giving too

flattering a statement, as is the case with some unprincipled persons who are making new beginners believe more than they afterwards find to be correct, for the purpose of getting to sell them Carp at high figures to stock their ponds. To all those that engage in Carp culture, I would advise to not expect too much without labor, for there is no rule or law laid down in the universe where man can expect to eat bread without the sweat of his brow.



COOKING THE CARP.

A Carp weighing three pounds and upwards is the proper size for cooking, as it will then be found that the meat will easily flake off from the bones. The scale Carp can be dressed like any of our native fish, by scraping the scales off, and then split open and fried in lard or butter; or they may be boiled the same as any other fish, or baked whole, with dressing, the same as a fowl. The Mirror or Leather Carp can be skinned like a Cat-fish, but I have a better way, as follows, by wrapping the fish in new ashes for a minute or two, then the few scales and outer skin can easily be removed; then the fish will make a better appearance when cooked than if it was skinned. Large Carp weighing ten pounds or more can be cut or sliced up and cooked according to the fancy of the owner.

CONCLUDING REMARKS.

In conclusion I would encourage every farmer that can possibly have a Carp pond to engage in Carp culture as soon as possible, as there is nothing that would beautify the scenery of his farm, and give more pleasure to himself and family than a well-stocked Carp pond, and then feed and caress the most beautiful of fish, which are as tame and gentle as any of our pets upon the farm. The scenery of our country homes would be beautified, and our sons and daughters would find more pleasure and attraction on the farm, for there is none of our domestic animals that give us more pleasure in petting than the Carp, and which will permit themselves to be taken with the hand, and will answer the call of any familiar voice.



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