

19.—NOTES UPON FISH AND THE FISHERIES.

Compiled by CHAS. W. SMILEY.

[Mainly derived from the official correspondence.]

RESUSCITATING FISH.—An experiment by Mr. C. W. Scudder, of the United States Fish Commission, in using brandy to recover carp nearly on the point of expiration, which was described in Bulletin Fish Commission, 1884, page 179, having come to the notice of Mr. W. Oldham Chambers, secretary of the National Fish Culture Association, of London, the latter conducted a similar experiment in the presence of several gentlemen at South Kensington, in September, 1884, and has recorded the verification of Mr. Scudder's work as follows:

"Taking two Prussian carp from the tanks of the aquarium, he deposited them in separate dry cans, adorning one with blue ribbon to denote its enforced temperance principles and to distinguish it from the other, which was selected for the administration of spirituous liquors. After a lapse of four hours the fish were placed in water, evident signs of expiration being apparent in both cases. A small quantity of brandy and water was then given to the carp selected for the imbibition of intoxicating liquors through the medium of a feather, and no sooner was the fish replaced in water than it assumed its normal condition and seemed to be restored to vigor and strength. The carp enlisted under the banner of the 'blue-ribbon league' to all appearances died half an hour after its more fortunate associate, and was taken out of the water and thrown on the ground. About four hours later, however, the fish was picked up by Mr. Chambers, who observed it by appearance to be *in rigor mortis*. He then at once operated on the seemingly inanimate fish by opening its mouth and pouring a dose of brandy and water down its throat, and again inserting it in the water, when, to his utter astonishment, he noticed slight signs of animation. For five minutes the unfortunate object of the experiment floated helplessly on its side, when presently, to the still greater astonishment of the secretary and those who watched the experiment, it gradually asserted itself in the water, and with considerable effort made use of its fins—feebly at first, but afterwards energetically. Both the resuscitated fishes, which show no signs of their late prostration, now swim about with their *confrères* in the tanks as usual.

"The instantaneous reanimation produced to the carp in the first instance was indeed remarkable; but what can be said of the latter, which recovered after remaining out of water for eight hours? Surely

this discovery will prove of the greatest utility and value in restoring fish that would otherwise perish, and be the means of securing greater longevity amongst them.

“Experiments in relation to brandy as a means of restoring suspended animation with quick-dying fish resulted equally as satisfactory. It was highly interesting to see the plucky manner in which a trout (*S. ferax*) battled with his fainting condition and came out the conqueror. Strange to say, the salmon (*S. salar*) did not once attempt to rouse himself after being dosed, the consequences being fatal to him; this was the only fish that succumbed under the treatment. The dace (*Leuciscus vulgaris*) was out of water three times of five minutes each. He was exceedingly faint and almost dead; but immediately after the brandy was given, he pulled himself together, and in the course of a few minutes not only recovered, but darted round the can with a rapidity positively amazing.”

It is suggested that a judicious administration of brandy to a dace prior to being used for bait will not only restore an inanimate bait, but also increase its strength and vigor, thus proving of much service to the angling fraternity.

Upon the publication of the above Mr. Henry Lee immediately published in *Land and Water* (November 1, 1884, page 437) the history of previous experiments in this direction, as follows:

“It seems to have been assumed that the administration of brandy as a restorative to a fish is a novelty. It was, however, practiced long ago by the Dutch, and the recipe for this treatment was probably of ancient origin. Mention of it may be found in the works of many authors, one of the most generally accessible being the article on Ichthyology in the seventh edition of the *Encyclopædia Britannica*, which was written by James Wilson, F. R. S. E., in 1838. He says: ‘Carp can be preserved alive for a considerable time out of water, especially if care be taken to moisten them occasionally when dry. Advantage is often taken of this circumstance to transport them alive by packing them among damp herbage or wet linen, and the operation is said to be unattended with any risk to the animal, especially if the precaution be taken to put a piece of bread steeped with brandy in its mouth. In a similar way the Dutch preserve carp by suspending them from the roof of a damp apartment in a bag-net filled with moss, which is continually kept moist, and they are fed with vegetables and bread steeped in milk, a mode of treatment by which they are not only kept alive but actually thrive and fatten.’

“C. Millet, also, in his book *La Culture des Eaux*, writes that if carp thus suspended in wet moss or grass be fed on bread steeped in wine for some days before they are killed and cooked they acquire a superior flavor. I am inclined to believe, however, that the retention of life by a carp after swallowing brandy is rather an additional demonstration of

the strong vitality of this exceptionally hardy fish, and of its power of surviving maltreatment, than a proof that alcohol is really beneficial to it."

ACCOUNT OF A TRIP MADE BY FISH COMMISSION CAR NO. 3. IN NOVEMBER AND DECEMBER, 1884.—Mr. J. Frank Ellis, messenger in charge, has made a report, from which the following extracts are made, to illustrate the work of his car.

Account of trip with car No. 3, from Washington to Saint Louis, Topeka, Denver, Ogden, and Omaha, and return. The crew consisted of Messrs. Johnson, Tunc, and Goldsmith.—On November 19 received from J. E. Brown 8³/₄ pails, said to contain 17,000 carp, 200 tench, and 200 gold fish. Car left Washington on the 7.40 p. m. train, Pennsylvania Railroad, Wednesday, November 19, arrived at Saint Louis Friday morning, November 21. Shipped from this place the fish for Arkansas, Missouri, and 6 pails for Illinois. Gave to the Pacific Express Company 55 pails, and to Adams Express Company 94 pails. Sent out the notices to applicants in Kansas. Saturday, November 22, saw Mr. Hoxie, and made arrangements to go to Kansas City on to-night's train free. Got to Kansas City Sunday morning, November 23. Commissioner Giles, of Kansas, met me at the depot. Went to the Atchison, Topeka and Santa Fé Railroad office, but, it being Sunday, could find no one there, so made arrangements to go to Topeka via Union Pacific Railroad.

The pipes under our car got frozen to-day. Commissioner Giles added a great many names to our list. He wished me to do all the shipping. Left Kansas City on a fast-freight train, and got to Topeka at 11 o'clock p. m.

Monday, November 24, we had great trouble in getting the water from the car, as the pipes were frozen. Changed the water on the fish, and shipped by the Pacific Express Company 140 pails, and by Wells, Fargo Company 143 pails. Most of the applicants at Topeka called at the car for their fish. Commissioner Giles gave out a great many from his 1,000 extra carp. Only 10 dead fish thus far. Sent out the notices to applicants in Colorado. Fish to be shipped the 26th instant. Commissioner Giles wished his tench, also his extra carp, left at Brookville, on the Union Pacific Railroad, so made arrangements to go via that line to Denver. Left Topeka at noon on the 25th instant. Put off the tench, &c., for Commissioner Giles at Brookville at 6 o'clock p. m.

Arrived at Denver Wednesday morning. Shipped by the Pacific Express Company 9 pails, and Wells, Fargo Express 23 pails. Could not find all the applicants at Denver to-day. Delivered the balance of the carp for Colorado on Thursday, the 27th instant. Made arrangements to go to Ogden to-morrow. Sent out the notices to applicants in Utah, California, &c. Fish to be shipped next Monday. Left Denver for Ogden at 1.20 p. m., Friday, November 28. Arrived at Cheyenne at 6

o'clock p. m. Was delayed here nearly two days by the burning of the Dale Creek bridge, near Sherman.

Delivered 1,000 carp to Otto Gramm, commissioner of Wyoming, at Laramie City, on Sunday, the 30th instant. Arrived at Ogden at 11 o'clock, Monday, December 1. Was met at depot by about twenty applicants. Delivered the fish immediately, and also gave the fish to express company this noon. Gave the Pacific Express 22 pails, and Wells, Fargo Express 26 pails.

Mr. Musser, commissioner of Utah, called at 5.30 p. m., and made arrangements for car to go to Salt Lake. Left Ogden at 6.30 p. m., and arrived at Salt Lake at 7.30 p. m., Tuesday, December 2. Delivered quite a lot of fish to-day. Mr. Musser had about twenty new applicants, indorsed by Mr. Caine. These I filled for him. Mr. Musser made arrangements for car to go south to Juab to-morrow morning. Left Salt Lake on the 7.30 a. m. train, Wednesday morning, December 3. Supplied all applicants on the Utah Central Railroad *en route*. Mr. Musser accompanied us. Met Mr. Crockwell at Deseret. Gave him 14 pails of fish. Thursday, December 4, arrived at Millford this morning, and delivered 43 pails to one man who will take them over the mountains 100 miles. The Utah Central furnished us a special engine to take us back to Juab, 121 miles. Arrived at Salt Lake this evening.

Left Salt Lake City for Omaha, Friday, December 5, and arrived at Omaha at 7.50 Monday morning, December 8. Delivered to Pacific Express Company 10 pails of carp, and to Wells, Fargo Express 26 pails. Commissioner Kennedy was at the depot. Gave him 1,460 carp, and 20 gold-fish. This ended the distribution for this trip. We lost only 130 carp in all. Tuesday, December 9, made arrangements with Mr. A. A. Talmage, of the Wabash Railroad, to go to Fort Wayne free on to-night's train. Left Council Bluffs at 4.30 p. m., Tuesday, and arrived at Fort Wayne at 11.30 p. m., Wednesday. The last 20 miles of the run they furnished us with a special engine. Left Fort Wayne immediately, and arrived at Pittsburgh at noon, Thursday, and at Washington 9 o'clock Friday morning. Reported at office at 10.30 a. m.

Number of miles run on this trip	5, 456
Number miles car run free	1, 458
Number carp lost on trip	130

WASHINGTON, D. C., December 12, 1884.

DEPOSITS FROM SEAWATER IN WOOD'S HOLL HARBOR.—Under date of December 8, 1884, Mr. John A. Ryder reports:

"The sediment or so-called rust deposited from sea-water sent by Chester from Wood's Holl contains an abundance of a number of species of Diatoms, amongst which I have noticed *Arachnodiscus* (?), *Navi-cula*, *Bacillaria*, and others. Fragments of the Spicules of *Microciona*: very fine filaments of *Oscillatoria*; fragments of Algæ; joints of Sertularians; particles of sand; tests of *Tintinnus*. Besides fragments of

chitin from crustaceans, very young plants of *Fucus*, besides many other objects which might be identified. So that the organic matter is abundant. The Diatoms are most plentiful and constitute possibly one-tenth of the whole amount of the substance. Dr. Kidder has made some preliminary chemical tests upon which he will doubtless report."

NOTES UPON FISH AND OTHER OBJECTS ON CAPE COD.—Under date of October 31, 1884, Mr. Vinal N. Edwards, who had just made a tour along the shore, reports the traps of North Truro, Mass., full of herring, constituting the largest run for many years. Some tautog, kingfish, butterfish, and pollock were also taken. There were also some small mackerel, but very few large ones taken. Most every day one or more puffing-pigs were taken and tried for oil. One man has had over a hundred of the common kind this fall.

At Nausett light there is a shell fish* coming ashore quite plentifully. A keeper says he has taken up at one time a bucketful of live ones immediately after a gale. Some samples will be sent to Washington.

From Nausett Harbor to Truro, and even further north, a kind of moss,† which the people call "ooze," has been coming ashore. It extends about 200 yards into the ocean. In May the water begins to grow red with this ooze, which grows thicker and thicker until the middle of November, when it disappears altogether. The color when it comes ashore is scarlet, and when dry on beach its color is green. When put in alcohol it becomes colored like the sand dollar.

THE PROPER MODEL FOR FISHING VESSELS.—Captain Collins has for some time been urging a change of the model of American fishing vessels. The most important feature is indicated in his note in the Cape Ann Advertiser of May 19, 1882, as follows:

"All evidence goes to prove that in the open ocean, especially where strong winds and rough seas are to be encountered, deep-bodied vessels are much more rapid than shallow ones. Nor does this depend so much on the vessel carrying a great amount of sail as it does on her ability to keep on her course and make headway under short canvas when one of less depth, though of broader beam, must heave to and drift to leeward."

These statements have been verified in a very interesting way the past summer by the Gloucester vessels sent to Iceland on halibut voyages, where they came in contact with English smacks. Capt. George W. Pendleton, master of schooner Alice M. Williams, which is one of the best Gloucester vessels, reported that on the day he sailed from Iceland he encountered a gale and was obliged to heave to under double-reefed foresail when some 40 miles off land. Soon after he heaved to he was

* Identified as *Ceronia arotata* (Con.) H. and A. Adams. Gould, Inv. Mass., II, p. 80, 1870. Verrill, Inv. V. S., p. 679, 1874. Rathbun, Proc. N. M., III, 1880, p. 128.

† Identified by Prof. W. G. Farlow as the sea-weed *Ectocarpus*, and probably of the species *siliculosus* which is common on the Massachusetts coast.

passed by an English smack, carrying a single-reefed mainsail and whole foresails. He thought the English vessel was making 11 knots an hour. Everything was dry and comfortable, the men appearing on deck without oiled clothes. On other occasions he was obliged to reef down snugly while the English smacks went along comfortably under all plain sail. The Alice M. Williams was deep in water, as she had a full cargo of fish on board; and yet was compelled to lay to while another vessel no larger was moving comfortably under crowded canvas.

September 25, 1884.

LOSS OF WEIGHT IN FISHES AFTER CAPTURE.—In view of the general belief that fishes diminish in weight after capture, Dr. J. H. Kidder, U. S. Navy, has made some observations at the request of the Commissioner, Professor Baird. The supposed loss of weight is not verified by his report of November 3, 1884, which is tabulated as follows:

Date.	Kind of fish.	Weight when caught.		Weight after an interval.		Loss of weight.
		Ounces.	Hours.	Ounces.	Ounces.	
1884.						
Sept. 29	Bluefish.....	84	2½	84	0	
29	do.....	96	2½	96	0	
29	do.....	144	2	144	0	
29	Sea bass.....	48	1½	48	0	
Oct. 3	Flounder.....	64	3	64	0	
3	Flounder (same).....	64	23	62	2	

The flounder weighed October 3 showed no loss after three hours had elapsed, and the loss of 2 ounces sustained after twenty-three hours had elapsed is probably explained by the fact that the fish had become externally quite dry and stiff.

FISH-CULTURE IN CANADA.—Under date of Ottawa, May 28, 1883, Mr. W. F. Whitcher gives the following summary:

Canada has eleven Government hatcheries now in operation, eight of which are occupied in hatching salmon eggs only, besides two private ones, which also hatch the true salmon. Two are employed in hatching salmon, whitefish, and trout eggs, and one hatches whitefish and pike perch. The earliest of these hatcheries has been in operation for about fifteen years, and the latest for two years. The principal ones have existed since 1873. Their entire cost to date has been \$259,400.

The whole number of fish bred and distributed from 1868 to 1881 is about 105,000,000, of which about 20,500,000 were salmon and about 69,500,000 were whitefish.

The total catch of these two kinds of fish in the five provinces where hatcheries exist is given in the census returns as follows:

Kind of fish.	1871.	1881.
	Pounds.	Pounds.
Salmon.....	3, 263, 200	4, 754, 800
Whitefish.....	4, 608, 400	7, 848, 200

Appropriations for the United States Fish Commission work, 1871-'85.

Fiscal year.	Food fishes inquiry.	Illustrations	General work of propagation.	Hatcheries, ponds, and distribution.	Steam vessels.	Rail-road cars.	Rent of office.	Buildings at Wood's Hall.	Total.
1871-'72	\$5,000 3,500								\$8,500 00
1872-'73	5,000	\$500	\$15,000 00 10,000 00						30,000 00
1873-'74	5,000	1,000	17,500 00 15,000 00						38,500 00
1874-'75	5,000	1,000	17,500 00						23,500 00
1875-'76	5,000	1,000	47,500 00 17,500 00						71,000 00
1876-'77	5,000	1,000	30,000 00 45 00						36,045 00
1877-'78		1,000	50,000 00 17,500 00	\$2,200 00					70,700 00
1878-'79		1,000	20,000 00 50,000 00	5,000 00					76,000 00
1879-'80	3,500	1,000	75,000 00 15,000 00	5,000 00	\$45,000 12,500				157,000 00
1880-'81	3,500	1,000	85,000 00	5,000 00	15,000				121,500 00
1881-'82	3,500	1,000	95,000 00 35,000 00	6,000 00 10,000 00	15,000 115,709		\$1,500		328,710 45
1882-'83	3,500	1,000	115,000 00 379 60	5,001 45 30,000 00	42,000 25,000 45,000	\$8,000	1,500		220,570 60
1883-'84	3,500	1,000	125,000 00	30,000 00	10,000 35,000	5,500	1,500	\$25,000	242,500 00
1884-'85	3,500	1,000	125,000 00	45,000 00	6,000 45,000	4,500	1,380	20,000	245,380 00
Total	54,500	12,500	878,124 60	154,201 45	411,209	18,000	5,880	45,000	1,679,415 05

* Deficiency appropriation.

1879-'80. Appropriation for the International Fishery Exhibition in Berlin, \$20,000.

1882-'83. Appropriation for the International Fishery Exhibition in London, \$50,000.

1883-'84. Deficiency appropriation for the International Fishery Exhibition in London, \$20,000.

Statement compiled from the customs returns of the receiver-general of the exports of fishery products from Newfoundland to all countries during the year ending December 31, 1883.

Articles.	Quantity.	Total value.
Dry codfish, at \$3 to \$5.20	quintals 1,163,934	\$4,725,060
Core fish, at \$2	do 1,372	2,744
Pickled codfish, at \$2	do 947	1,894
Pickled Labrador herring, at \$3.20	barrels 19,001	60,803
Pickled shore herring, at \$2.50	do 44,383	110,958
Pickled salmon, at \$22	tierces 4,046	89,012
Pickled mackerel, at \$3	barrels 4	12
Pickled trout, at \$8	do 532½	4,262
Ling, at \$2	quintals 44	88
Haddock, at \$2.60	do 470	1,222
Turbot, at \$10	barrels 10	100
Caplin, at 50 cents	do 115	58
Pickled halibut, at \$6	do 4	24
Lobsters, at 10 cents	pounds 505,968	50,597
Cod-roes, at \$3	barrels 170	517
Tongues and sounds, at \$3	do 54	162
Frozen herring, at \$2	do 5,240	10,480
Fish guano	tons 103½	6,000
Codfish oil, at \$124	tuns 2,930½	364,157
Codfish oil, refined, at \$192	do 404	77,568
Seal oil, at \$124	do 5,340½	662,253
Herring oil, at \$36	do 14	1,344
Whale oil, at \$108	do 38½	4,158
Blubber, at \$14	do 54	756
Seal skins, at \$1	322,603	322,603
Seals, at \$2	300	600
Whalebone, at \$15	cwt 25	375
Total		6,498,727

Statement by countries of the quantities of fishing products exported from Newfoundland in 1883.

Articles.	To the United Kingdom.	To Canada.	To the United States.	To the West Indies.	To Spain, Portugal, and Gibraltar.	To all other countries.	Total.
Dry codfish..... quintals..	45, 107	36, 055	45, 093	98, 913	573, 181	*364, 985	1, 103, 934
Core fish..... do.....			1, 300			172	1, 372
Pickled codfish..... do.....		947					947
Pickled herring, Labrador, bbls..	5, 979	4, 858	8, 164				19, 001
Pickled herring, shore..... do.....		31, 106	8, 233	4, 971		173	44, 383
Pickled salmon..... tierces..	623	781½	1, 064½	502	7½	1167½	4, 046
Pickled mackerel..... barrels..			3	1			4
Pickled trout..... do.....	15	23	430	64½			532½
Ling..... quintals.....				44			44
Haddock..... do.....				470			470
Turbot..... barrels.....				3		17	10
Dried caplin..... do.....	94			21			115
Pickled halibut..... do.....		4					4
Lobsters in tins..... pounds..	323, 568	105, 648	76, 752				505, 968
Cod-rocs..... barrels.....	135					144	179
Tongues and sounds..... do.....	13		35			16	54
Frozen herring..... do.....		550	4, 690				5, 240
Fish guano..... tons.....	193½						193½
Codfish oil..... tuns.....	2, 503	279½	143½	2		111	2, 936½
Codfish oil, refined..... do.....	219	59	124				404
Seal oil..... do.....	3, 681½	391½	6½			§1, 201½	5, 340½
Herring oil..... do.....	14						14
Whale oil..... do.....	38						38½
Blubber..... do.....	1	53					54
Seal-skins..... do.....	320, 012	1, 691					322, 003
Seals..... do.....		300					300
Whalebone..... cwt.....	25						25

* Of this amount, 295,094 quintals went to Russia.

† To Jersey.

‡ Of this amount, 1,220½ tuns went to Hamburg.

§ Of this amount, 164½ tierces went to Italy.

Statement compiled by the customs returns of the receiver-general of the exports of fishery - products from Newfoundland to the United States during the year ending December 31, 1883.

Articles.	Quantity.	Total value.
Dry codfish, at \$5.20..... quintals..	45, 693	\$237, 604
Core fish, at \$2..... do.....	1, 300	2, 600
Pickled Labrador herring, at \$3.20..... barrels..	8, 164	26, 125
Pickled shore herring, at \$2.50..... do.....	8, 233	20, 583
Pickled salmon, at \$22..... tierces..	1, 064½	43, 216
Pickled mackerel, at \$3..... barrels..	3	9
Pickled trout, at \$3..... do.....	430	3, 440
Preserved lobsters, in tins, at 10 cents..... pounds..	76, 752	7, 675
Cod tongues and sounds, at \$3..... barrels..	35	105
Frozen herring, at \$2..... do.....	4, 690	9, 380
Codfish oil, at \$124..... tuns.....	143½	17, 763
Codfish oil, refined, at \$102..... do.....	124	23, 808
Seal oil, at \$124..... do.....	6½	806
Total.....		393, 114

RESUSCITATION OF CARP.—October 15, 1884, Mr. E. G. Blackford received at the Fulton Market, in New York, 30 pounds of large carp which had been taken from the ponds of Prospect Park, Brooklyn. They were brought over in a box, and after having been out of the water two hours Mr. Blackford placed them in water and they all revived immediately.

Quantities of fishery products exported from Labrador for the year ending December 31, 1883.

[From the report of Hon. W. J. S. Donnelly, receiver-general of customs for Newfoundland.]

Dried codfish	quintals..	368,089
Pickled salmon	tierces..	899
Preserved salmon	tins..	23,000
Pickled trout	barrels..	547
Pickled herring	do....	54,162
Seal skins	number..	490
Seal oil	tuns..	26
Cod oil	do....	21
Blubber	do....	3

OSTER CULTURE AT COLD SPRING HARBOR, NEW YORK.—Mr. Henry C. Bunce has for several years past with much persistency continued throwing overboard on his oyster grounds every season thousands of bushels of tin cans, hoop skirts, branches of trees, and other rubbish of various kinds. He now finds a splendid set of oysters on these odd receptacles. Some old hoop-skirt frames and tin cans contain hundreds of the young oysters nicely started, while the boughs of trees are thoroughly weighted down with them. The theory of Mr. Bunce is that the spawn floats along about a foot or more from the bottom and is more readily collected by the boughs and preserved. In support of this theory he finds boughs at the height of a foot or more from the bottom covered with the small seed oysters, while the shells on the bottom near and surrounding these boughs contain none. The boughs will in time rot down and the large oysters find a secure resting-place on the bottom.—*October, 1884.*

PROPOSED OYSTER PLANTING IN A SALT LAKE.—Writing from Rix's Mills, Ohio, under date of November 17, 1884, Mr. B. V. Moore says: "I am about removing to Texas, and the region where I intend to locate contains a salt lake covering perhaps 500 acres. I would be very glad to make an experiment with oysters in this salt lake to see if they can be propagated therein."

RESULTS OF OYSTER EXPERIMENTS AT SAINT JEROME IN 1884.—Writing from Saint Jerome Station October 20, 1884, Mr. W. de C. Ravenel reports: "On Saturday I took up all of the collectors that I put in the first pond except the shells that were sowed on the bottom, and found 18 young oysters attached, varying in size from one-half an inch to two and one-half inches in diameter. I think that we may find more on the shells in that pond. I also took up the collectors in the small pond and found 3 in that, all on slate collectors. I have not taken up the collectors in the other three ponds, though I have examined a great many of them, and can find no oysters at all. I had the collectors that had nothing in them put away for future use, and those with oysters attached put back in the ponds."

Shipments of salmon from Portland, Oreg., to San

[In

Date.	Vessel.	From											
		Wm. Hume.	Cutting Packing Company.	Thomes & Knowles.	Washington Cannery.	G. W. Hume.	Astoria Packing Company.	Scandinavian Company.	I X L Company.	Pillar Rock Company.	J. O. Hanthorne Company.	Eureka Packing Company.	A. Booth & Sons.
April 6	Steamer Oregon	24	63	494									
10	State of California		60										
14	Columbia		69		1								
18	Steamer Oregon		208										
22	State of California		100			100	126						
26	Columbia		400										
May 8	Columbia		500			562	83	200	300	250	1	4	
16	State of California									134	538	300	
24	Steamer Oregon					5					345		
28	State of California	600	1,000		1,000	1,000		300					
June 1	Columbia		1,000		500		450					500	
6	Steamer Oregon	1,200											
14	State of California		100		500	200					700		
16	Columbia				500		200			1,800			
21	Steamer Oregon		1,250			1,200	750			1,200			
26	State of California										800	500	
July 1	Columbia						350		200				
6	Steamer Oregon	300									500		
11	State of California					300	50	300			180		
16	Columbia					1,000							
21	Steamer Oregon					480	1,000					800	
26	State of California					2,000	156				550		
31	Columbia		500	502			100				1,950		
Aug. 6	Steamer Oregon			1,000			150				1,700		
10	State of California		500	1,500			100	500			1,162		
15	Columbia			2,000			425				365		
21	Steamer Oregon						1,400		5,000				
25	State of California					200	625				137		
30	Columbia			52	100	200	325						
Sept. 4	Oregon							109					
9	State of California		575		337					50			
14	Columbia							500					
19	Oregon				1,000	200							
24	State of California						200						
29	Columbia									100	132		
Oct. 4	Oregon	481											
	Total	2,605	4,325	5,548	4,138	7,263	6,490	1,609	600	5,450	3,926	8,363	2,100

JUMPING OF SPANISH MACKEREL.—Mr. Barnett Phillips, while in the Gulf of Mexico, off west coast of Florida, 30 miles north of Tampa Bay, January 27, 1884, wrote:

“Last night a Spanish mackerel (*Cybium maculatum*), length 18 inches, jumped into the yawl-boat in tow.” The captain says that often at night a half a dozen of these fishes are caught in the same way. I suppose the fish thinks the boat is an enemy and jumps to get out of its way.

Francisco, Cal., for the season of 1884-1885.

cases.]

whom.

West Coast Company.	San Elmore.	Aberdeen Company.	Ocean Company.	Point Adams Company.	Anglo-American Company.	White Star Company.	Badollet & Co.	Union Company.	Megler & Co.	Tillamook Company.	Warren & Co.	Columbia River Company.	W. T. Coleman & Co.	Knappton & Co.	Columbia Company.	Astoria Company Stencil.	Unspecified.	Total.	Total for the month.
870	25	750	200	300	50	5												581	
	85		640															80	
																		70	
																		208	
																		326	
																		400	
																		1,000	1,645
																		1,367	
																		1,635	
																		4,595	
																		800	9,407
																		8,050	
																		2,055	
																		1,803	
																		2,573	
																		4,861	
																		1,300	15,742
																		1,350	
																		1,100	
																		980	
																		1,218	
																		4,818	
																		2,700	
																		3,052	15,224
																		4,325	
																		4,988	
																		2,700	
																		8,540	
																		2,825	
																		4,527	27,095
																		1,184	
																		1,853	
																		1,800	
																		4,985	
																		1,447	
																		1,478	
																		634	12,247
																		634	634
1,670	1,660	2,304	5,588	1,715	1,150	53,113	2,025	1	5	925	5,438	100	901	750	567	600	.....	82,984	

THE MENHADEN SEASON OF 1884.—Mr. W. Z. King, surveyor of customs at Greenport, Long Island, has reported, the quarter ending September 30, 1884, the number of menhaden taken to factories and rendered into oil and guano 117,000,000; number taken and used for manure, 5,000,000; total catch, 122,000,000; gallons of oil manufactured, 585,000; tons of soap (dry made), 81,000; of edible fish marketed, 230 tons. The number of sailing vessels is 201; of steam vessels, 29; total 230.

Memorandum of exports of salmon from Portland, Oreg., and upon wheat vessels, from August 25, 1883, to September 7, 1884.

[Compiled from the Portland Journal of Commerce of October 11, 1884.]

Flag.	Rig.	Vessel.	Destination.	Dispatched by.	Sailed.	Arrived out.	Quantity.	Average price per case.	Value.	
British	Bark	Kate F. Troop	Liverpool	Meyer, Wilson & Co.	1883. Aug. 25	1884. Jan. 15	Cases. 50,200	\$4 60	\$230,920	
Do.	do.	Glenbervie	do	Sibson, Church & Co.	Sept. 1	Jan. 18	21,837	5 00	109,185	
Do.	do.	Chasca	London	do	Oct. 19	Mar. 9	11,467	5 00	57,330	
Do.	Ship	Griesdale	Liverpool	Balfour, Guthrie & Co.	Nov. 3	Feb. 23	26,923	5 00	134,814	
Do.	do.	Killochan	do	do	Dec. 1	Apr. 22	4,800	5 00	24,000	
Do.	Bark	Spirit of Dawn	do	C. Caesar & Co.	Dec. 15	Apr. 19	5,385	5 00	26,925	
American	Ship	Ice King	London	Geo. W. Hume	Dec. 30	May 14	47,491	4 52	214,497	
British	do.	Eskdale	Liverpool	Balfour, Guthrie & Co.	1884. June 12	.....	9,300	5 12	47,638
Do.	Bark	Itata	do	C. Caesar & Co.	June 15	.....	8,640	5 00	43,170
Do.	Ship	Chs. Cotesworth	do	Meyer, Wilson & Co.	June 10	.....	13,658	5 00	68,290
Do.	do.	Aberyth Castle	do	Sibson, Church & Co.	June 27	.....	22,060	5 07	111,800
Do.	Bark	Jessie Jameson	London	A. W. Berry	July 15	.....	22,516	5 15	116,088
Do.	do.	Woodlark	Liverpool	Meyer, Wilson & Co.	July 18	.....	36,100	5 00	180,425
Do.	Ship	City of Delhi	do	do	Aug. 6	.....	48,820	4 86	241,808
American	do.	Alameda	do	Sibson, Church & Co.	Aug. 29	.....	46,800	5 00	234,000
Do.	Bark	Belle of Oregon	do	Meyer, Wilson & Co.	Sept. 6	.....	33,730	5 42	182,818
Total								400,727		2,023,838

OYSTER CULTURE IN NORTHERN MASSACHUSETTS.—Writing from Newburyport, Mass., December 4, 1884, Mr. James W. Gunnison states that, in connection with Mr. J. R. Dyer, two years ago he planted in the bed of the Parker River (a small stream flowing through Newburyport and entering into Plum Island Sound) some seed oysters taken from Buzzard's Bay. They survived the winter, and, being encouraged by this, 200 bushels more were planted last spring with the expectation that they would propagate during the summer. A few young oysters are now found, which are called this year's growth, but the territory is small and the tide swift, which has led the experimenters to think that much of the spat floated beyond their limits. The river bed is covered with water at all times of tide, and is navigable. The town authorities issued a license to Mr. Dyer to use the small tract in question, but the greater part of the river bed is leased to another person who has made no experiments.

STAR-FISH DEPREDATIONS.—The oyster beds, covering several hundred acres, off Milford and New Haven Harbors, have suffered seriously this summer from the depredations of star-fish. One Milford firm engaged in oyster-growing has employed a submarine diver to investigate their movements. It is proposed to gather the star-fish in purse-nets and carry them ashore for use as fertilizers. Many of the oystermen east of Bridgeport will put out but few shells this season on account of the bad prospect. The star-fish are less numerous at the west end of the sound, and more shells will be planted off Stamford, Greenwich, Norwalk, and Westport.

The large increase in star-fish is explained by some as due to the absence of menhaden, which used to swarm in the sound, and, as is alleged, devour star-fish spawn. The menhaden schools, which formerly covered thousands of acres, as well as the herring and alewives, which were numerous, and all considered as enemies of star-fish, have been caught up by the fishermen for oil, and are now rarely seen in the Sound.

The method of attack is thus described by Capt. S. J. Martin, under date of July 17, 1884: "Holding the oyster firmly as in a vise, the star-fish waits till the bivalve becomes hungry and attempts to open its shell to obtain the food. At this instant a reddish fluid, familiar to those who have caught star-fish at the sea-side in summer and experienced the irritation which contact with it produces on the hands, is injected between the shells of the victim, stupefying and rendering it an easy prey."

DIAMOND-BACKED TERRAPIN.—Writing under date of October 4, 1884, Dr. T. H. Parramore, of Hampton, Va., states that the diamond-backed terrapins are diminishing in that region, and he thinks that unless something is done to protect the species and to propagate it this terrapin will soon be exterminated. He will, therefore, devote some attention to the study of this subject. Professor Baird suggests in

reply that artificial culture in the fullest sense would be difficult, but that it is entirely practicable to collect the young whenever they can be had, and by feeding, rear them to a suitable market size.

FOOD OF MUSKRATS.—Mr. Charles Carpenter, of Kelley's Island, Ohio, who has already been quoted on this subject, (Bull. F. C., 1884, p. 295), writes under date of October 31, 1884, to say that he has learned from Mrs. Dr. McMeans, who has charge of Jay Cooke's residence at Put-in-Bay, that she has lost many chickens this season by the depredations of muskrats, as investigation showed. Mr. E. Alvord, fish-dealer in Sandusky, Ohio, stated that he also had lost chickens by the same means, and often. An old rat-trapper said, "They eat a great variety of food—indeed, they will eat almost everything."

WHAT FISH SOMETIMES SWALLOW.—Having seen the allusion to cod-fish swallowing knives and cards (F. C. Bull., 1884, p. 175), Mr. Henry Ffennell, of the Land and Water office, 2 Salisbury court, Fleet street, London, E. C., under date of September 23, 1884, writes: "I have before me a pewter flask which was presented to my father, the late Mr. Ffennell, commissioner of fisheries. On the flask is the following inscription: 'This flask, containing *two glasses of an ardent spirit*, was found in the stomach of a ling (*Molva vulgaris*), taken off Brandon Head, County Kerry (Ireland), presented by G. J. E. Stopford, esq., LL.D., and W. Andrews, esq., to W. J. Ffennell, esq., in testimony of esteem and of the sense of the services rendered by him as commissioner of fisheries.' The flask is round in shape, and when full holds just four wine glasses. From its appearance it is supposed to have belonged to a Dutch sailor. Although I know many instances of strange things having been taken from the stomachs of fish, I have never heard of so curious a case as this."

A SEA-MONSTER.—Mr. Alfred Morris wrote from Sidney, N. S. W., August 4, 1884, an account which appeared in Nature of September 25, 1884. He says: "Capt. W. Hopkins, of the schooner Mary Ogilvie, who has just returned from a voyage round Australia, has given the following information in order that other travellers may study the character of the animal, which, if an octopus, must be of much larger dimensions than those usually met with:

"On June 15, when in south latitude $21^{\circ} 37'$, and east longitude $113^{\circ} 49'$, about 5 miles off the Exmouth Gulf, on the western coast of the continent, he saw an immense creature which he took to be a species of octopus. His attention was drawn to it by a perfect cloud of sea-birds, and at first he naturally thought it must be a dead carcass. On approaching it, however, he found it was alive, and sluggishly disporting itself. In shape it was like a violin, but of immense size, with some six feelers about the greater diameters of the violin. It lay almost flat upon the water, was of a dark gray above and lighter gray below, and was

continually elevating one of its feelers, apparently twice the thickness of a man's arm, to a height of from 6 to 8 feet. It appeared to be vomiting, and as the birds were evidently feeding that accounted for their presence in such numbers. Its size was so great that, had it grasped the vessel, it could easily have capsized it. The captain, therefore, got out of the way as quickly as possible, and without making definite measurements; but a large whale in the vicinity looked quite diminutive. It is a pity that something more exact as to size is not available, but the description is sufficient to convey an idea of the nature of the monster. All along the northern and western coasts of the continent vast shoals of pumice, in portions varying in size from ordinary gravel to about a foot in diameter, and completely covered with barnacles, were passed through."

TO PREVENT FISH FROM REDDENING.—Writing from Gloucester under date of September 30, 1884, Mr. A. Howard Clark states that the boneless fish packers at Gloucester are using a preparation called preservaline in order to prevent the fish from turning red. With an ordinary dredging box the powder is sprinkled over the layers of boneless salt cod as they are packed in the box, about one pound being used for 35 pounds of fish. Fish thus prepared are warranted not to turn red even in the warmest weather.

Two 5-pound boxes of bank cod were put up several weeks previously and allowed to lie in a place favorable for reddening. The fish in the box containing no preservaline turned almost entirely red, while those in the box sprinkled with preservaline were clear and sweet. This was regarded as a pretty good test of the value of the powder. The substance, together with the labor of using it, costs from one-half to three-fourths of a cent per pound, and this has thus far prevented its general use on large lots of whole fish in the butts or on the flakes. It was introduced about a year ago. Another preparation is somewhat in use, which consists of a liquid, into which the fish are dipped.

The so-called preservaline has been analyzed under the direction of the United States Fish Commission and found to contain borax and common salt.

FISH FOR ENGLAND.—Under date of September 20, 1884, Mr. W. Oldham Chambers, secretary of the National Fish-Culture Association, wrote from the exhibition grounds at South Kensington, London, and stated: "It has been decided by the most honorable the Marquis of Exeter, Mr. Edward Birkbeck, M. P., and the members of the council of this association, to take measures to introduce for the purpose of acclimatization special food-fishes from foreign countries. With this object in view we have dispatched to the United States Mr. William T. Silk, who has been commissioned to bring over to Great Britain in suitable carriers, with which he is provided, specimens of fish indigenous to your country, viz: Black bass, whitefish, catfish, sheepshead, gar-fish, sun-fish, &c. Accordingly, on the 13th of October, 1884, there were de-

livered from the United States Carp Ponds to Mr. Silk 100 leather carp, 100 mirror carp, 20 blue carp, and 10 *Idus auratus*.

On the 25th of November, 1884, Mr. Silk wrote from Stamford, England, transmitting the thanks of the Marquis of Exeter, president of the National Fish-Cultural Association, for the different kinds of carp.

ENGLISH, LATIN, AND GERMAN NAMES OF EDIBLE BRITISH FISHES AND MOLLUSKS.—The following list is copied from the Second Annual Report of the Fishery Board of Scotland:

List of edible British fishes.

English.	Latin.	German.
Anchovy	<i>Engraulis encrasicolus</i>	Sardelle.
Angler	<i>Lophius piscatorius</i>	Seeteufel.
Atherine	<i>Atherina presbyter</i>	
Barbel	<i>Barbus vulgaris</i>	Barbe.
Bass	<i>Labrax lupus</i>	Saudart, zander.
Boarfish	<i>Capros aper</i>	
Bogue=ox-eye	<i>Box vulgaris</i>	
Bream, fresh-water	<i>Abramis brama</i>	Brassen, brachsen.
Bream, rays	<i>Brama Rafi.</i>	Castinaue.
Bream, sea	<i>Pagellus centrodontus</i>	Blei.
Brill	<i>Rhombus levis</i>	
Carp	<i>Cyprinus carpio</i>	Karpfe.
Char, Alpine	<i>Salmo alpinus</i>	
Char, American	<i>Salmo fontinalis</i>	
Char, Willughby's	<i>Salmo Willughbii</i>	
Chub	<i>Leuciscus cephalus</i>	Kanlbära.
Coal-fish	<i>Gadus virens</i>	Köhler, Koblfisch.
Coal-fish, young=Saithe	<i>Gadus virens</i>	Grundoroch.
Cod	<i>Gadus Morrhua</i>	Kabotjan.
Comber	<i>Serranus cabrilla</i>	
Conger-eel	<i>Conger vulgaris</i>	Meernaal.
Coregonus	<i>Coregonus oxyrhynchus</i>	Schnepel.
Crucian carp	<i>Carassius vulgaris</i>	Karassche.
Dab	<i>Hippoglo-soides limandoides</i>	Butte.
Dab, pole	<i>Pleuronectes cynoglossus</i>	
Dab, smear	<i>Pleuronectes microcephalus</i>	
Dace	<i>Leuciscus vulgaris</i>	Weissfisch, lauben.
Dentex	<i>Dentex vulgaris</i>	Zahnbrasse.
Eel	<i>Anguilla vulgaris</i>	Aal.
Eelpout	<i>Gadus lota</i>	Quappe.
Flounder	<i>Platessa flesus</i>	Thorbutte, flunder.
Forkbeard, greater	<i>Phycis blennioides</i>	
Gar-fish	<i>Belone vulgaris</i>	Hornrecht.
Gilthead	<i>Pagrus auratus</i>	Goldbrassen, goldföhre, goldforelle.
Gravling	<i>Thymallus vulgaris</i>	Gräuling.
Gudgeon	<i>Gobio fluviatilis</i>	Gründling.
Gurnard=Garnet butterfly	<i>Trigla hirundo</i>	Seeschwabe.
Gurnard, gray	<i>Trigla gurnardus</i>	Knurrhahn.
Gurnard, lantern	<i>Trigla obscura</i>	
Gurnard, red	<i>Trigla cuculus</i>	
Gurnard, streaked	<i>Trigla lineata</i>	
Gwinead	<i>Coregonus clupeoides</i>	Ranken.
Haddock	<i>Gadus ogletfinus</i>	Schellfisch.
Hake	<i>Morluccius vulgaris</i>	Rothauge.
Halibut	<i>Hippoglossus vulgaris</i>	Heilbutte, heilbutte.
Herring	<i>Clupea harengus</i>	Hering.
John Dory	<i>Zeus faber</i>	S. Petersfisch, sonnensfisch.
Lamprey, fresh-water	<i>Petromyzon fluviatilis</i>	Pricke-
Lamprey, sea	<i>Petromyzon marinus</i>	Lamprete.
Ling	<i>Lota molva</i>	Leng, langling, langfisch.
Loach or groundling	<i>Nemacheilus barbatus</i>	Schmerle, schmerling.
Loach, spined	<i>Cobitis taenia</i>	Steinplitzger.
Lump fish=lump-sucker	<i>Cyclopterus lumpus</i>	Lump, sechase.
Mackerel	<i>Scomber scomber</i>	Makrele
Mackerel, horse=sead	<i>Caranx trachurus</i>	Stachelmakrele.
Mackerel, Spanish	<i>Scomber colias</i>	
Mullet, gray	<i>Mugil capito</i>	Riesenbarbe.
Mullet, red	<i>Mullus surmuletus</i>	Rotlburt, meerbarbe.
Old wife	<i>Cantharus lineatus</i>	
Opah	<i>Lampris luna</i>	
Perch	<i>Percis fluviatilis</i>	Barsch, böra.
Perch, dusky	<i>Serranus gigas</i>	
Pike	<i>Esox lucius</i>	Hecht.
Pilchard	<i>Clupea pilchardus</i>	Pilchard.

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List of edible British fishes—Continued.

English.	Latin.	German.
Plaice	Platessa vulgaris	Plattfisch, goldbutte.
Pollack	Gadus pollachius	
Pollan	Coregonus pollan	
Ronch	Leuciscus rutilus	Roche.
Rockling, five-bearded	Motella mustela	
Rockling, three-bearded	Motella vulgaris	
Ruff=pope	Acorina vulgaris	Seequappe.
Salmon	Salmo salar	Goldbors.
Salmon, severn	Salmo cambricus	Salu, lachs.
Salmon trout	Salmo trutta	Lachsforolle.
Sand-eel	Ammodytes tobianus	Sandaal.
Sand-lancee	Ammodytes lancea	
Sardine	Clupea pilchardus	Sardine.
Sciaena	Sciaena aquila	Adlersfisch.
Shad=allis	Clupea alosa	Alose, maifisch.
Shad=twaiter	Clupea finta	
Skate	Raja batis, R. maculatus	Meerroche, mairroche.
Sole	Solea vulgaris	Meerscholle.
Sole, lomon	Solea aurantiaca	
Sole, variegated	Solea variegata	
Sparling=smelt	Osmerus eperlanus	Stint, seestint.
Spratt	Clupea sprattus	Sprotte.
Stone-bass	Polyprion cernium	
Sturgeon	Acipenser sturio	Stör.
Sword-fish	Xiphias gladius	Schwertfisch.
Tench	Tinea vulgaris	Schlei.
Thornback	Raja clavata	Dornroche, stachelroche.
Torsk	Brosminus vulgaris	Dorsch.
Trout	Salmo fario	Forelle.
Trout, loch leven	Salmo levenensis	
Tunny	Thynnus vulgaris	Thunfisch.
Turbot	Rhombus maximus	Steinbutte.
Vendace	Coregonus vandesais	
Weaver=wyvern	Trachinus draco, Trachinus vipera	Petermännchen, n. seedrache.
Whiting	Gadus merlangus	Weisling.
Whiting-pout	Gadus luscus	Breiter schellfisch.
Wolf-fish	Anarrhichas lupus	Seewolf
Wrasse	Labrus maculatus	Meerschlie.

List of edible British mollusks and shell fish.

English.	Latin.	German.
Clam	Hippopus maculatus	Hufmuschel.
Cockle	Cardium edule	Strahlmuschel.
Cuttle-fish	Sepia officinalis	Tintenfisch.
Crab	Cancer pagurus	Taschkrebs.
Cray-fish	Astacus torrentium	Flusskrebs.
Lobster	Homarus vulgaris	Hummer.
Lobster, Norway	Nephrops Norvegicus	
Lobster, Spiny	Palinurus vulgaris	Languste.
Limpet	Patella vulgaris	Napfschnecke.
Oyster	Ostrea edulis	Auster.
Periwinkle	Littorina littorea	Hornmuschel.
Prawn	Palaeomon serratus	Garnale, seegarnale.
Shrimp	Crangon vulgaris	Garnate.
Scallop	Pecten maximus	Jakobsmuschel, kammuschel.
Whelk	Buccinum undatum	Trompeten schnecke.

REPORT ON SCHOODIC SALMON SENT TO SCOTLAND.—Sir James Gibson Maitland makes the following report upon eggs of Schoodic salmon sent him in March, 1884. He writes under date of September 6: "The Schoodic salmon have done remarkably well, and will shortly be transferred to a large pond. The young are now large enough to en-

able me to determine their species. They are undoubtedly a charr (*salvelinus*). The vomerine teeth being absent, they will undoubtedly improve our British charrs, but I fear the cross with *S. salar* will be sterile.

1. Number of boxes received, one.
2. Date of receipt (day and hour), March 19, 1884, 9 a. m.
3. Day and hour of unpacking, March 19, 1884, 9.30 a. m.
4. Number of eggs received, 5,000.
5. General condition on unpacking, good.
6. Number of eggs dead on unpacking, 25.
7. Number of eggs that died from time to time before hatching, 30.
8. Date of hatching, April 7.
9. Number that died after hatching, 139.
10. Temperature of water used for hatching, 44° 5 F.
11. Number of young fish lost in transportation, none.
12. A shipment of young fish was made from the hatching-house, as follows:
 - A. Date, June 24.
 - B. Number of fish taken, 4,800.
 - C. Lost on journey, none.
 - D. Time on the way, half an hour.
 - E. Number actually planted, 4,800.
 - F. Waters stocked (lake, pond, or large river), No. 2 plauk pond.
 - G. In what tributaries, if any, they were placed, none.
 - H. In or near what village, city, or town, Howietoun fishery, Stirling.
 - I. In what county and State, Scotland.
13. Anything unusual in hatching or rearing? No.

"You will be glad to hear that the cross between *S. fontinalis* and the Loch Kannoeh charr, *S. struanensis*, which I made three years ago, will prove fertile. The milt in a male, examined by Mr. Day (the product of *S. fontinalis* female and *S. struanensis* male), this week being fully developed and the most beautiful hybrid I have yet produced. A cross between *S. levenensis* female and *S. fontinalis* male also shows unmistakable signs of fertility.

"I propose to ship 100,000 *S. levenensis* ova the week commencing November 24. These eggs differ from the *fontinalis* in requiring a much larger supply of water, and it is absolutely necessary they should in no case be laid down so as to lie one above another. The water over them should not be more than half an inch, with a supply of two gallons a minute; size of trough, 7 feet by 20 inches. They will asphyxiate in 6 inches of water; temperature, 45° F.; date, a week before hatching. *Fontinalis* ova under the same circumstances hatch perfectly. This was a test experiment, and has been repeated with the same results seven years running."

A SCOTCH VIEW OF OUR METHODS.—The great superiority of the exhibit made by the United States Fish Commission at the International Fisheries Exhibition held in London in 1883, and the profound impression which the explanations of its methods and purposes of fish-culture produced upon European fish-culturists, induced the Scottish fishery board to send to the United States Prof. J. Cossar Ewart, one of its members, for the purpose of becoming practically acquainted with the systems in use in this country.

Professor Ewart succeeded Sir Wyville Thompson, the scientific head of the Challenger expedition, as professor of zoology in the University of Edinburgh, and is himself highly distinguished as an investigator. Every facility was afforded Professor Ewart in the examination of the various stations of the United States Fish Commission, and the following letter was written by him just before leaving New York to return to Edinburgh. He expects to revisit the United States next year in time to study the operations in the hatching of shad and fresh-water herring.

Under date of New York, November 5, 1884, writing to Professor Baird, he says:

"I have just returned from visiting all the stations you suggested, with the exception of Northville. I feel very grateful for the facilities given me to study the work of the Fish Commission. From what I have seen I am convinced that Scotland in doing her little has done best to follow in your footsteps, and that although your Commission has accomplished much already it is in reality only beginning its work, a work which will be of immense national importance. There is no doubt that fish-culture has a splendid future if carried on, as it has been by your Commission, in a truly scientific spirit. When I saw Wood's Holl, with its great facilities, I felt that I might confidently return to Scotland and advise the board of fisheries to devote all the means at its disposal to improving by artificial means the sea fisheries. I am extremely grateful for your kindness, and for the courtesy extended to me by all the officers of the Commission and others it has been my privilege to meet."

THE HOWIETOUN HATCHERY IN SCOTLAND.—One of the most successful private fish-cultural establishments in Great Britain is that known as the "Howietoun Fishery," and owned by Sir James Gibson Maitland, of Stirling, Scotland. At the International Fisheries Exhibition in Edinburgh, in 1882, he received a gold medal for fish-cultural apparatus and a silver medal for live salmonidæ. The *Société d'Acclimatation* of Paris has also awarded him its gold medal.

Upwards of 10,000,000 of trout ova are now annually incubated at the hatchery. Last year 90,000 yearling trout were delivered to all parts of Great Britain and Ireland. Two consignments of trout ova and one of salmon ova were forwarded to New Zealand successfully. Yearlings are recommended to its customers as the size for general purposes. They are

strong enough to find their own food, thus avoiding the principal cause of mortality among fry, namely, starvation. They are easily carried, and stand a journey well; they accommodate themselves with the greatest facility to new water, and they thrive fast in ponds. Two-year-olds are recommended where coarse fish or large trout already exist in the water. No difficulty has been found in carrying the trout in ice-water for any journey not exceeding twenty hours, but the water into which the trout are to be introduced must be of the same temperature in order to prevent inflammation of the gills. Accordingly the fish are forwarded only in cold weather. They are sent by express passenger trains in tanks of two sizes: 40 gallons weighing between 500 and 600 pounds, and 18 gallons weighing about 150 pounds. The following table will give an approximate idea of the prices charged for fry, yearlings, and two-year-olds:

Table of prices of trout and trout eggs at the Howietoun fishery, Scotland.

Kinds of trout propagated.	Partially-eyed ova— November to February.			Fry—February to April.		Yearlings, 2½ to 5 inches—January to March.		Two-year-olds, 5 to 8 inches long— December to February.	
	For 1,000.	For 15,000.	For 100,000.	For 1,000.	For 5,000.	For 100.	For 1,000.	For 100.	For 1,000.
<i>Salmo leuvenensis</i> (Loch- leven trout)	\$5	\$35	\$210	\$10	\$24	\$10	\$48	\$24	\$122
<i>Salmo fario</i> (common trout)	5	35	210	10	24	10	48	24	122
<i>Salmo fontinalis</i> (Amer- ican brook trout).....	5½	48	288	14½	35	12	72	31	102

SHIPMENT OF CATFISH TO BELGIUM.—The correspondence between the United States Fish Commission and the Government of Belgium has been several times alluded to in this Bulletin (1881, I, p. 340; 1882, II, p. 153; 1883, III, pp. 220, 437). On Saturday, November 15, 1884, the steamship Rhineland, of the Red Star Line, took from New York 100 live catfish (*Amiurus nebulosus*) consigned to Alfred Lefebvre, Ghent, Belgium. Messrs. Peter Wright & Sons, the agents, kindly furnished free passage, and instructed the officers to observe the directions for their care which were communicated by Prof. H. J. Rice, of the Fulton Market laboratory. Mr. E. G. Blackford arranged for the purchase of the fish and delivered them on board.

Under date of November 28, 1884, Monsieur E. Willequet, writing from Ghent, Belgium, announces the safe arrival of 95 of the live catfish, only 5 having died during the voyage. The 95 were safely transferred to the botanical garden of Ghent, and placed in quarters favorable for their multiplication.

FISHING IN THE BLACK SEA.—Mr. George Lambert Lehrs, an American citizen residing at Kadikovka, near Balaclava, on the Crimea, Russia, writes under date of November 6, 1884:

“The methods practiced in Balaclava for catching fish are very much

behind those in use in the United States. Trawling and drift-net fishing are not at all known, and the only way in which mackerel are caught is by a sort of trap made of netting and set up on piles. It works very well if the fish come into the trap, but sometimes they just pass by it. Fishing is confined to the bay and to certain seasons, at which time the fishermen are all on the alert, and various kinds of fish are caught. The consequence is that there are times when the market is glutted and other times when the supply is far short of the demand.

"If there were some way of catching the fish, especially mackerel, by going out to sea and fishing greater part of the year, the proceeds would always bring a remunerative price and the market be steadied. Mackerel are sold both fresh and salt."

RECEIPT OF PARADISE FISH FROM GERMANY.—Under date of November 11, 1884, Mr. Paul Matte, a fish-culturist of Bremerhaven, Prussia, wrote that he had just sent a consignment of *Macropodus venustus*, paradise fish. He is a member of the German Fishery Association, and engaged in raising ornamental fish for aquaria, which he imports from all parts of the world. He says, "I have recently introduced from Yokohama the first vail-tails (*Schlierschwänze*) ever brought to Europe."

The paradise fish arrived at New York via steamer Werra, on or about November 26, and were taken charge of at the dock of the North German Lloyd Steamship Company by Mr. E. G. Blackford, who took the best of care of them, and forwarded them to Washington, November 28. Of the 12 fish sent over but 5 reached Mr. Blackford alive. Immediately upon reaching Washington the fish were placed in a tank at the Central Station, but 2 died on the 6th of December, and the others on the 8th and 9th of that month. They were in feeble condition when received, and subsequently became completely covered with fungus.

SCARCITY OF MENHADEN, SEA-TROUT, AND SKIP-JACK OFF COAST OF SOUTH CAROLINA.—Writing from Waverly Mills, S. C., September 24, 1884, Mr. W. St. J. Mazyck says:

"For several seasons I have reported the visits of the menhaden to this coast off Pawley Island, 15 miles north of Georgetown Height. The past summer I have seen very few schools, and fish of all kinds have been scarce. The coral banks, 2 or 3 miles from our beach, usually give us all the fish we need, and commonly repay us for our trouble; we have lately found it almost useless to go to them, and just now, when trout and skip-jack should be plenty, we get none."

November 18, 1884, he again writes:

"Later in September we were visited by easterly winds, when a large number of crevalle were observed and some taken. About the 1st of October the winds were more southerly. Large schools of menhaden appeared and remained on the coast for a week. They were close under the shore in the surf. They then disappeared. In October we usually take a large number of skip-jack and sea-trout, but these were also scarce."

The sea or red bass were particularly so. Very few were caught during the summer. Whiting were also scarce. In fact, it was one of the poorest seasons I have known in eighteen years. We had a fairly good supply of shrimp."

FISH FACTORIES ON DELAWARE BAY OFFENSIVE.—A petition was received by the United States Fish Commission December 4, 1884, signed by twenty-nine fishermen and citizens of Lewes, Del., reading as follows:

"Knowing the interest which our Government, during the entire century of its existence, has taken in the coast fisheries, as well as the care and expense with which it is now guarding that industry, we presume to address you on a subject which is of vital importance to us as fishermen and citizens of the town of Lewes. Less than two years ago license was granted by the town commissioners to establish fish factories on the bay. We say little of the means by which this license was obtained. Our people were deceived. The fishing interest of the place, which amounts to from \$8,000 to \$10,000 annually, was entirely destroyed, and even the air we breathe was bartered away. In this distress we ask your aid. We ask you to remove from our shore that which is depriving us of our means of subsistence."

HABITS OF ALEWIVES.—Under date of July 26, 1884, Mr. E. M. Stillwell, one of the Maine fish commissioners, inquired:

Do the alewives spawn more than once? Do they visit our river, the Penobscot, to spawn, and then return to the ocean to die? There is an important case now before me where the alewives ascend the river through a good fishway; when they return, after casting their spawn, the water is low; the fishway is closed, owing to the factory using the water, and the fish return to the ocean through the flume of the factory and get ground up in the machinery. If the alewives born in the river return to spawn but once, the fact constitutes a very important point in the case before me."

Under date of August 6, 1884, Professor Baird replied as follows:

"It is impossible to answer satisfactorily your inquiry in regard to the habits of the alewife. We know, of course, that they spawn in fresh and perhaps slightly brackish waters, and that the young return to the sea. We also know that the adults do likewise, but whether they come back again the second time it is difficult to say. My own guess is that they do, and so far as we know, most of our fishes spawn for several successive years, as the trout, the salmon, the carp, &c. We infer that the shad does the same, from the fact that very few dead fish are found floating in the rivers or lying on the shores and in the bay. The fish are known to run out of the Saint John's River in the summer and to fatten up in the flats at the head of the bay, when they become even better than they are in the early spring. Where shad are undisturbed for a long time we find them of enormous size, up to 10 and 12 pounds; thus showing that they continue to grow for a long period.

"I think if alewives died after spawning the fact would be noticed before they leave the rivers. When they get back to the ocean they have every opportunity, by abundance of suitable food and other favorable conditions, to recover their waste of flesh."

NOTE ON THE HERRING FISHERIES OF GREAT BRITAIN.—Writing from 10 The Crescent, Chapel Field, Norwich, November 20, 1884, Mr. Thomas Southwell says:

"The herring fishery here, which is rapidly coming to a close, has been remarkable for the immense catches, but the quality of the fish, as a rule, has been poor and the prices so low as to be hardly remunerative. I was at the Peterhead in August in the midst of the Scotch herring fishery and heard the same complaints as to quality. The whale and seal fisheries have been on the whole successful, and of this as well as of the herring I hope to send further particulars."

MOVEMENTS OF A SCHOOL OF HERRING.—Writing under date of August 26, 1884, Rev. Henry T. Cheever states that on the quiet evening of the 6th of August there occurred a phenomenon in York River never before seen by that traditional personage, the oldest inhabitant. At about half tide, between 8 and 9 at night, there came rushing from the ocean, as though in mad panic, a prodigious school of herring, reckoned at many millions. The sound they made was like that of water rolling over stones or shallows, or of a strong wind stirring the tops of trees. Visitors and people at a little distance from the river side thought at first by the noise that a notable dam had given way and that its pond was breaking loose. But on reaching the shore, behold, innumerable shining fishes leaping up into the moonlight, crowding the channel, dashing against the piers, striking and jostling one another; cleaving the flood and plunging into the mud on the bottom; flirting into boats that were out on the river, and capering every way in a most extraordinary manner as if on a lark or a fright or frenzy, one could not tell which. Many were seen to fall back into the water and sink, but millions followed on continuing for 6 or 7 miles with the inflowing tide, passing under three bridges, covering all the coves and marshes and leaving their dead in countless numbers caught and stranded by the returning tide or sunk in deep water.

In the morning the river flats, rocks, and marshes were piled with countless thousands, that looked from a distance like a shining pavement of silver or of white stones. Whether any appreciable number swam back to the ocean seems to be unknown, and the cause of their dying so largely is also in doubt. Was it from panic and fright by pursuing dogfish, that hideous monster of the deep? Was it from panting and suffocation (if asphyxia be possible to fish when in their native element) by being crowded in such numbers in the river channel and flats, when they had been used to the roomy breadth of the deep sea? Was it from concussion in the coast waters by late torpedoes

and dynamite? Or were they smitten with an epidemic or plague from the sewage of cities turned into the sea? Or did any noxious gases evolved in connection with earthquake commotions have to do with this remarkable phenomenon?

The farmers gathered them for manure to put on their lands, but millions were left to rot in the sunlight, and to exhale their pestiferous odors in the surrounding atmosphere. Had there been an oil mill in the vicinity one may think a small fortune might have been realized by at once collecting and grinding them up for oil and fertilizers.

SUNSET COTTAGE, YORK, ME., *August 26, 1884.*

HERRING AND MACKEREL EATEN BY SQUID.—Writing from Gurnett Life-Saving Station, Plymouth, Mass., November 15, 1884, the keeper, Mr. John F. Holmes, states that during the last three or four weeks large schools of squid and small herring, locally known as spiraling, have frequented the waters of that vicinity, and quite often during the night more or less have been thrown upon the beach. This includes both squid and herring, the herring predominating. Many of the herring were found bitten on the back at the point where the head joins the body, some of the heads being bitten entirely off, and 90 per cent. of them being bitten in about the same place. The squid are quite large, some of them measuring 26 inches from the end of the longest tentacle to the end of the tail. Recently, between 6 and 8 o'clock p. m., the water being very smooth, a large school of what was supposed to be spiraling was seen close to the shore. Two men ran into the surf and kicked more or less specimens on the beach. These proved to be squid and spiraling, each squid having a spiraling grasped in its tentacles, and each having already gnawed a hole in the spiraling. The beach, for a distance of 6 or 8 miles, has been strewn with these spiraling for some time. More or less squid and some mackerel have been found among them. The spiraling and mackerel had been bitten in the manner described in almost every instance. Upon examination some of the squid were found to have their suckers stuffed with minced herring.

Commenting upon the above, Captain Collins, under date of November 21, 1884, says:

"The facts are not entirely new to me, so far as the habits of the squid are concerned. It is not an uncommon thing to see squid attack capelin on the Grand Bank, and so extremely voracious are these animals that they have sometimes been caught on a jig while still clinging fast to a capelin which they held in their beak and arms. It would appear from this that they are in the habit, at least occasionally, of attacking a second small fish before they have eaten the first they caught.

"In former years, when I was engaged in the mackerel hook fishery in the Gulf of Saint Lawrence, squid sometimes—particularly towards evening—came alongside of the vessel with the mackerel, and I have

no doubt that they often attacked the latter; at least they would often fasten on to a mackerel that was being hauled in on a jig. This we were able to see, as the fish came to the water's surface, but we could, of course, only surmise what the squid might do deeper down, when they were out of our sight."

I notice in the Cape Ann Advertiser of yesterday, the following, which is corroborative of the above:

"The mackerel fleet, some fifteen sail, which hoped to intercept the mackerel schools along the Cape shore, as they came out of the Bay of Saint Lawrence, and thus secure late fares, have been disappointed, as the mackerel have been destroyed by the immense schools of squid which infest that shore."

May there not be in this a possible solution of the scarcity of mackerel some seasons as compared with other years immediately preceding?

ABUNDANCE OF SCALLOPS.—Mr. Elisha Slade, of Somerset, Mass., under date of December 12, 1884, sends the following note, which he regards of considerable local interest:

"During the autumn of 1884, scallops (*Pecten irradians*) were very abundant in this vicinity, and dredging was carried to greater extent than in any previous year. From information gathered at different times, from what I suppose to be reliable sources, about 40,000 bushels have been taken from the Taunton River and the head of Mount Hope Bay, into which Taunton River empties. Scallops have been plenty in former years, but nothing like this amount has been caught in any one season; at least I find no record nor tradition to compare with it. The greater part of the fishing was performed between September 20, and November 20."

HAKE IN NANTICOKE RIVER.—Mr. E. W. Humphreys, Maryland commissioner of fisheries, writing from Salisbury, December 6, 1884, says:

"Small hake, averaging in length 10 to 15 inches, have been taken in Nanticoke River during the last few weeks. Several hundred were caught in pound-nets by fishermen near Vienna, Dorchester County. The water has been quite salt well up the river on account of the extreme drought which prevailed during the summer and early fall. The fishermen say that the hake has never before been taken in the Maryland rivers."

NORWEGIAN HALIBUT FISHERIES.—Under date of Washington, November 27, 1884, Capt. J. W. Collins says:

"The following replies of Capt. Niels Juel, of Bergen, Norway, to inquiries I made relative to the occurrence of halibut in the waters of Northern Europe, particularly on the west coast of Norway, seem to be of special interest just now. The success of our fishermen last summer,

at Iceland, may induce them to extend their cruises into still more distant seas.

"Writing to Captain Juel, under date of October 16, 1884, I asked the following questions: (1.) 'Can you give me any information as to the abundance of halibut on the coast of Norway? (2.) When and where do they occur? (3.) Do the Norwegians make use of them for commercial purposes? (4.) Would the Norwegian Government permit American vessels to buy or catch halibut near its shores?'"

"Of course I understand that foreign vessels can fish outside the limit, but I am interested to know if your people would be kindly disposed toward our fishermen if they came on your coasts?"

"Under date of November 5, 1884, Captain Juel, says:

"Halibut are found all along the coast of Norway, and in almost all the firths, and are fished for almost all the year round, but particularly in early summer, which is the spawning season. It does not give occasion to any particular fishery, but the halibut is taken with the ling, cod, and other fishes, by the shore fishermen. In some places they use particular lines on grounds where the halibut resort in greater numbers than ordinary. The fish is either salted in barrels or cut in strips and dried. Only smaller quantities are shipped in ice to England, particularly from Aalesund. The export from Bergen in 1883 was about 118,000 kilograms net (equal to 260,172 pounds). The salted and dried halibut is consumed in the country.

"British fishermen are taking halibut during the months of May to July on the banks of Skagerack and the North Sea, 10 to 15 geographical miles south and southwest of the Norwegian coast. Round Iceland is also a very good halibut fishery during the summer.

"All kinds of exports are reserved to the inhabitants, except that of fresh and salted fish, which is allowed to foreigners from June 15 to September 30, from several fishing places specially named by law in the counties of Nordland and Tromsö. If, for instance, foreigners wish to buy fish, they are obliged to use a commissioner, who can easily be procured. No fishery will be allowed within a distance of 6 geographical miles (minutes) from the coast; at least the Government tries to keep the 6-mile (1 Norwegian mile) limit; but we have no coast guard, and as coast fishing is not very much practiced in summer, except off Aalesund, foreigners will seldom interfere with our fishermen."

HALIBUT GETTING SCARCE.—The Boston Daily Advertiser of July 9, 1884, says:

"Halibut of late years are getting to be very scarce, and very few can now be found on our banks, where twenty years ago they were numerous. Our vessels have to hunt for new grounds, and fish in deep water to get any."

HALIBUT IN FRESH WATER.—One of Mr. Blackford's correspondents, Mr. N. W. Foster, of Riverhead, N. Y., says:

"In this village, near the dock last Saturday afternoon [November 15,

1884], one of our boys captured a halibut, weighing 65 pounds. I never heard before of their going into fresh water."

Riverhead is situated at the head of Little Peconic Bay, and the waters are shoal and not very salt near the village. The river is entirely fresh water, and falls over a mill dam not over 300 feet from the bay. The halibut was taken by a fifteen-year-old boy with an eel-spear, between the mill dam and the bay.

BLACKFISH EGGS IMPREGNATED.—Writing from Charleston, S. C., under date of March 25, 1880, Mr. R. E. Earll reported:

"This morning while at the fish-wharves I discovered that nearly all of the 'blackfish' (*Centropristris atrarius*) were thoroughly ripe, and eggs running from fully 50 per cent. of the females when handled. I took a number of thousand and impregnated them. They sink readily in salt water, and have a diameter of one twenty-seventh of an inch. I have saved some in alcohol and glycerine. Many of the other species are well advanced, and will spawn in two or three weeks at most. I shall try to get a full series of ovaries in alcohol for future examination."

CAPTURE OF BLACKFISH.—About 3 o'clock in the afternoon of Saturday, November 15, 1884, a school of blackfish (*Globocephalus melas*), was announced at Provincetown, Mass., as being present in the bay. Immediately a large force of men, in sail and row boats, went in pursuit and captured some by the use of lances. One small section of the school was driven into shoal water and the fish captured. On the following morning a much augmented fleet went in pursuit and drove the fish across the bay to the shores of Dennis and Brewster, but without eluding them into shoal water. Fearing a total loss of the fish, the boats dashed into their midst about dark, and many of the largest and best were killed with case-knives. About 60 were thus taken. On Monday the pursuit was again renewed, and the fish were driven into Wellfleet Harbor, where 150 went ashore at Indian Neck, and were killed by the boatmen and inhabitants. Others were driven ashore at Blackfish Creek, making, in all, a capture of about 1,400 blackfish.

The carcasses were sold at auction for from \$7 to \$12 each, and will average a weight of 4,000 pounds apiece. There were a few young which weighed from 150 to 200 pounds each. The blubber is tried for the oil, and it is estimated that there will be \$25,000 worth of oil. Most of them will be tried at the Cape Cod Oil Works of Cook & Co., Princetown, Mass. Some 450 persons engaged in the capture and will share the prize-money.

The foregoing account has been compiled from newspapers, while the following has been furnished by Mr. D. C. Stull, of Princetown, in a letter dated December 15, 1884:

"About noon on Saturday, November 15, 1884, blackfish were sighted about 4 miles southeast from Wood End, Provincetown. Boats chased them until midnight to drive them ashore. Owing to the presence of

sharp-nose porpoises among them they could not be driven ashore, for they would turn off just as soon as they struck shoal water. We had the fish almost ashore a number of times during the night, and we could have driven from 1,000 to 2,000 ashore if it had been daylight. On Sunday morning, November 16, the boats went to look for the fish and found them at night on Dennis shore, when they drove 64 of them ashore. On Monday morning boats came from Wellfleet and joined our boats and commenced to drive them toward Wellfleet. They succeeded in driving them into shoal water known as Blackfish Creek, South Wellfleet. Here the fish were completely hemmed in by land and shoal water. Then the fish commenced to go ashore, the boats going among them and lancing them. The men were engaged in killing them all Monday night and Tuesday. It was the largest amount of blackfish ever driven ashore here at any one time, the number being about 1,400, which was not half the number that was in the bay on Saturday. The fish were sold at public auction Wednesday, the 19th, to Provincetown parties, at an average of \$10.21 apiece, the gross proceeds being between \$14,000 and \$15,000. This amount will be divided into 468 parts (the number of men and boats engaged in the catch), or about \$30 each. The average yield of oil from each fish will be one barrel. The parties who purchased the fish have just finished boiling them for oil. They will be well paid for their time and trouble, as the oil which is extracted from the body of the fish is selling at from 55 to 60 cents per gallon, while that from the head of the fish is worth a good deal more. This is the first school of blackfish that has been seen here for a number of years."

NOTES ON THE RED SNAPPER.—Writing from Pensacola, Fla., November 26, 1884, Mr. Silas Stearns says:

"In any part of the northern Gulf of Mexico where there is a rock coral or gravel there is a certainty of there being red snappers. Sometimes there are kinds of food on shelly bottoms which attract the snappers. In the southern gulf groupers occur under the same circumstances. Forty fathoms is the deepest that we have searched, and there may be fishing grounds beyond that depth. The *Caulolatilus microps* is always present in 40 fathoms in about one locality, and sometimes a dozen or more are caught in one day.

"A few codfish nets were brought here from Boston and sent out on one of the smacks, but the fishermen did not understand hauling them and were indifferent as to their success, so that they were not fairly tested. This fall we have Capt. D. E. Collins, of Gloucester, and a full crew of experienced trawl fishermen to man the vessel, and we have material for nets on a fishing schooner now bound for this place.

"Capt. J. W. Collins, of the United States Fish Commission, has suggested trying the cod gill-nets on the red snapper grounds, and under date of December 2, says: 'Owing to the peculiar shape of red snap-

pers, deep and narrow, the capture in gill-nets might be facilitated by having the nets taken up a trifle more in the hanging. The 7 and 8 inch mesh cod gill-nets with which the Albatross is provided would, perhaps, be rather small for snappers, and I think two nets of the proper size mesh should be procured. They are now using in Gloucester a superior kind of twine, which, I am told, makes a more durable kind of net."

WHERE AND HOW THE RED SNAPPER IS CAUGHT.—In a recent circular Warren & Co., of Pensacola, Fla., say that this fish is one of the most common in the Gulf of Mexico. It is gorgeously colored, very graceful in all its movements, and unusually wary and capricious. In weight it ranges from 2 to 35 pounds, averaging 7 pounds. Its home is in the strictly salt waters of the gulf, a short distance from the coast. There it lives on the bottom at a depth of 60 to 240 feet. The ocean floor off Florida declines greatly at first, for a distance of from 30 to 50 miles from the shore, to a depth of 300 feet, then very abruptly descends to a depth of 600 feet, beyond which the slope is more gradual to a depth of about 12,000 feet. The first slope is a sandy one; the second is sandy, rocky and muddy, while the third is wholly muddy. The surface of the second, with its uneven rocks, afford homes and comparative security for all kinds of small marine animals, such as crabs, barnacles, corals, &c. These attract myriads of small fish, which are preyed upon in turn by larger, and so on upward.

The red snapper is most prominent in these communities. It is one of the largest and most active species. Its life is spent about the patches of rocks, swimming about 6 feet from the bottom among tall branching corals and waving grasses, forever on the alert to dash upon some smaller fish. Its whole appearance suggests craftiness, smartness, and conceit. Ordinarily it has about fifty species of beautifully delicate fishes to select its food from, and it seems to show considerable judgment in the selection. Among these are rare fishes that live only about the coral reefs of warm seas. Even that most celebrated little fish of the Romans—the red mullet—that was so highly esteemed by the epicurean emperors, furnishes an occasional meal for the red snapper. In consequence of living upon food of this character, the flesh of the red snapper is peculiarly firm and sweet, being disposed in regular layers that make it especially desirable for serving at the table.

The red snapper is caught altogether with hook and line. Vessels carrying 6 or 8 men go to sea prepared with all appliances for capture and preservation, and are about one week in securing what is termed a load. They go from home as far as 250 miles, being then about 50 miles from land. The places where the fish live are found by sounding-lines that indicate the depth known to the fisherman, and that have baited hooks attached which are quite sure to get a victim if there are fish near by and they are disposed to bite. The vessels are anchored over the spot or allowed to drift across it, while the fishermen ply their lines

as rapidly as possible. Each man handles a single line, which has two large hooks and several pounds of lead attached. When the fish are hungry they bite as fast as the lines are lowered to them and even rise near to the surface of the sea in their eagerness, biting at bare hooks or anything that is offered. From this habit they have gained the name of snappers. Very often two large fish are hooked at once, and then the fisherman has a hard pull, for the snapper is gamey. While it is so easily captured at times, there are spells when it cannot be lured by any kind of bait or snare. It is truly a capricious fish.

Storms, adverse winds, and currents affect the business of the fishermen very much, and at best theirs is a hard, disagreeable life.

The principal red-snapper fishing-grounds of the gulf lie between Mobile Bay and Cedar Key. This places Pensacola nearer to them than any other shipping point, and besides there is no other city so conveniently located for receiving and shipping the catch of the large fleet of vessels that are now engaged in the business.

HOW TO COOK THE RED SNAPPER.—Warren & Co. have also furnished receipts for cooking this fish in some half dozen different ways, viz :

BOILED.—Take a fish of 5 to 8 pounds, cut off head, wash clean in cold water, tie up tight in a clean cloth so that it will not break to pieces in the water. Put it in enough hot water to cover well, with half a cup of vinegar and a handful of salt; boil steadily for three-quarters of an hour, or until the flesh cleaves readily from the bone. Serve hot with this sauce. Take one pint of water, make a flour-thickening, stir in the water, and let it boil till clear. Add salt to season, a little pepper, a tablespoonful of butter, and two hard-boiled eggs, sliced.

BAKED WITH DRESSING.—Take a fish of 5 to 8 pounds, wash it clean in cold water, leave on the head, and, in removing the entrails, see that no longer cut is made in the belly of the fish than is absolutely necessary to clean the cavity. Prepare a dressing as follows: Have ready enough stale bread to fill the cavity in the head and belly, soften it with cold water, take two tablepoonsfuls of lard in a sauce-pan, cut finely a medium-sized onion, put it in the lard and cook thoroughly, but not to brown; add to this the softened bread, mix well together and season to the taste with pepper, salt, and herbs; stuff the fish with this dressing and cook in a hot oven, having a little hot water in the bottom of the pan, dredging the fish with a very little flour. Cook until done, and serve hot.

BAKED WITH TOMATO DRESSING.—Prepare the fish as before. Make a dressing by soaking twice as much bread as above directed with the contents of a 2-pound can of tomatoes, or an equivalent quantity of fresh tomatoes, heat it thoroughly in a sauce-pan, season with salt and pepper, adding a tablespoonful of butter. Stuff the fish with this dressing; spread the remainder of the dressing over the outside of the fish, as it lies in the pan. Bake in a hot oven as before directed.

BROILED IN THE OVEN.—Take a fish of 3 to 5 pounds, split the fish through the backbone; put in a dripping pan two heaping tablespoonsful of butter, set on the top of the stove and let the butter get hot; lay in the fish, spread open, skin-side down, put salt and pepper on it and bake in a very hot oven, basting frequently with the butter. After placing the fish on a platter for the table, squeeze over it the juice of a lemon and serve without delay.

FRIED.—Cut the fish in pieces off the backbone, wash clean and dry with a towel, sprinkle on salt, and roll in corn meal. Fry in a pan, half full of lard, as hot as possible, and yet not hot enough to burn the fish.

COURT BOUILLON.—Use a fish of from 5 to 8 pounds weight. Take two teaspoonfuls coloring pepper, one-half teaspoonful black pepper, quarter teaspoonful cayenne pepper, two garlies cut in thin slices, put all in a tea-cup and pour cold water over them. Put in a kettle on the fire half cup of lard, let it get very hot, slice into this a medium sized onion and let it cook, stirring constantly. Add a half a can of tomatoes, or three ripe tomatoes, let it cook well together, then put in the fish, the mixture of pepper and garlic, sufficient salt to season, and a half a cup of flour. Stir well, then cover with boiling water, and let it boil ten minutes. Serve at once.

SALMON FROM NOVA SCOTIA, MASSACHUSETTS COAST, AND THE COLUMBIA RIVER IN NEW YORK MARKET.—Mr. E. G. Blackford, writing under date of November 25, 1884, says:

“We are having a singularly large amount of fresh salmon from Nova Scotia. During the last two weeks about 1,000 pounds have arrived in this city. They are all of about one size, that is, weighing from 7 to 9 pounds each. There are also occasional salmon coming to the market caught in the mackerel weirs off the Massachusetts coast. Some half dozen have arrived within a week. They sell in this market for 75 cents per pound-

“I am also receiving from the Columbia River very handsome specimens of the *Salmo gairdneri*, or, as Dr. Bean suspects, large California trout. They are selling at present for 35 cents a pound.”

Writing again under date of December 2, Mr Blackford says:

“In regard to the salmon that are caught on the coast of Nova Scotia I would say that they are all clean-shaped fish. No hook-noses among them, but handsome, bright, and silver-white in color. I cannot ascertain the exact point where they were caught, as they are consigned to some party in Boston and are forwarded by them to this market. They average in weight about 8 pounds, and, so far as I can ascertain, about 1,500 pounds have been received in this city during the past twenty days.

“The salmon caught off the coast of Massachusetts are taken in the mackerel weirs, principally in the vicinity of Truro, but not in any large numbers. Altogether about twenty fish, averaging 7 pounds each, have been received in this market. They are also a clean, fresh-run fish.”

STRIPED BASS IN TANGIPAHOA RIVER.—Under date of July 5, 1884, Mr. J. Dock. Harrell, of Osyka, Miss., forwarded a small fish for identification and stated that some of the same kind caught there weighed from 2 to 3 pounds each. In a subsequent letter dated July 16, he reported the same fish as becoming numerous and that since the forwarding of the specimen others of the same size had been caught and great schools of still smaller ones had been seen. At that date specimens weighing from 4 to 6 pounds each had been taken. The specimen was identified by Dr. Tarleton H. Bean as striped bass, *Roccus striatus*, who has reported upon this and another specimen received in April, 1883, from Mr. Thomas S. Doron, in Proceedings of the United States National Museum, 1884, page 242.

BITING HABITS OF THE BLACK CROSS-TOOTHED FISH (*Chiasmodon niger*).—Under date of July 30, 1884, Captain Collins transmits the following note upon a specimen presented to the United States Fish Commission in June last by Capt. George A. Johnston :

“When first seen by Captain Johnston the fish was swimming with its belly up at the surface of the water. It was going around in a circle at a great speed, and savagely biting itself just above its tail. When captured, Captain Johnston says that part of its body next its tail was more or less scarred with marks of its teeth. As the stomach of the fish was inflated at that time it may be that its attack on itself was a desperate attempt to relieve itself from the unnatural and uncomfortable position in which it was placed. However this may be, the fish exhibited the same peculiarity after being put in a bucket of water on the vessel's deck. It also bit viciously at the dory scoop in which Captain Johnston dipped it up from the water's surface. After being placed in a bucket its temper was tried by putting a piece of rope in front of it. This it fiercely attacked, sinking its teeth so far into the rope that there was some difficulty in separating the two without injuring the fish. Wishing to see what it might do after the air was let out of its stomach, Captain Johnston thrust a smooth round stick down its throat, but the moment the gas escaped the fish died.”

ON THE DIMINUTION OF THE OCEAN FISHERIES.—The trawling commission of Great Britain, having its office at 6 Old Palace Yard, Westminster, with a view of ascertaining what, if any, effect the efforts of men, especially with the beam trawl net, have upon reducing the ocean fisheries, has addressed several questions to the leading countries of Europe and to the United States, from the replies to which the following data has been extracted :

Has the inshore fishing within 5 miles of low-water mark diminished of late years along the whole or any part of the coast, and if so, to what cause is it ascribed?

FRANCE.—No diminution has been noticed, but the amount of fish taken varies according to the seasons, some being better than others.

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The French Government makes no distinction between "coast" and "deep sea fishing;" herring and mackerel salting and cod-fishing excepted.

DENMARK.—There is no diminution on the "scaw" or on the west or east coasts. There is a diminution in the "sound" and some parts of the "Kattegat" where gar-fish, mackerel, and whiting have nearly disappeared, as have also to a great extent large cod, ray, halibut, and smeadab. In the deep channel running from Helsingborg, haddock have totally disappeared. The diminution is ascribed to the increase in the number of fishermen and natural causes resulting from changes of weather and stream and the abundance or dearth of food.

BELGIUM.—No general diminution has been noticeable, though at places of minor importance there has been a sensible diminution in the inshore herring fishery, the herring keeping further out to sea.

NORWAY.—There is no diminution in deep-sea fishing, though the fish disappear and reappear from time to time. There is a local diminution in the inshore fishing.

SWEDEN.—There is no general diminution, though the fish disappear and reappear from time to time.

HOLLAND.—Except in the Texel there has been a general diminution in the coast fishing, which has been attributed to the increase in fishermen, especially of trawlers, among whom are many Englishmen. The diminution is also attributed to the destruction of immature fish by the shrimp dredge-net, the mesh of which is very small.

GERMANY.—There has been a diminution in the "coast" fisheries of the North Sea, especially among flat-fish, cod, and halibut. The size of flat-fish has materially diminished during the last few years. This is attributed to the destruction of fry and immature fish by trawl-net fishing in the North Sea.

UNITED STATES.—On certain parts of the coast of the United States, particularly on the Atlantic coast between Eastport, Me., and the Chesapeake Bay, there has seemingly been some decrease of the abundance of certain species of food fishes, but the supply varies so much at the different seasons that it is difficult to make any precise statement. The halibut, however, is one species in which there has been a very remarkable diminution during the past thirty years, both inshore and on the outer banks. This appears to be due to the operation of man; for wherever sought the halibut have usually become scarce in a limited number of years on grounds where they had formerly existed in remarkable abundance. Cod and its allied species have in some instances become locally scarce from unknown causes.

Are fish generally taken in deeper water and at greater distances from

the land than formerly, and does the practice of fishing with the beam trawl-net from steam and sailing vessels exist on any part of the coast?

FRANCE.—The beam trawl-net is used principally by sailing vessels, and almost without exception outside the 3-mile limit. Possibly engines of this nature have frightened the fish into deep water. Its use is forbidden within 3 miles of the shore with certain exceptions. The size of the mesh *must* be at least 25 millimeters square.

DENMARK.—The use of the English trawl is, by the law of March 9, 1872, forbidden within three-fourths mile of the shore. Very great injury has been done by miniature trawls in the firths. It is not thought that fish have been driven to deeper waters.

BELGIUM.—The beam trawl is used exclusively by sailing vessels and in various places in this country. The movements of the fish have not been observed to vary except according to the different seasons of the year. No restriction has been placed on the use of any apparatus.

NORWAY.—The beam trawl is not used.

SWEDEN.—The beam trawl is not used. The fish appear to have taken to deep water, which is possibly owing to the increase in the size or number of the implements which are in use.

HOLLAND.—The larger fish certainly keep at a greater distance from the land than formerly, probably owing to the change in the temperature of current. There is no restriction on the beam trawl-net except in the waters of the Zuyder Zee and Zeeland, and it is used by sailing vessels exclusively all along the coast of the North Sea.

GERMANY.—Trawling is forbidden near the State oyster beds and on certain coasts. The trawl is 20 feet beam, and is used by about 300 small sailing vessels along the Prussian coast.

UNITED STATES.—It is suspected that fishing has, in some cases, driven fish to deeper water, but this is not by any means a proven fact. It is highly probable that in certain years some kinds of fish have been kept away from the coast by low temperatures of water.

THE FISH OF INDIAN RIVER.—Writing from Tropic, Brevard County, Florida, under date of September 29, 1884, Mr. M. E. Stevens, says;

“The fish in Indian River are very fine, large in size, and delicious in flavor. Just now we are enjoying the first of the mullet, the run not beginning till about the 1st of October; then they come through Indian River Inlet and pass up the Banana or East Indian River in such countless numbers as to be crowded on shore. These are taken by the tons and cured for winter use at home. Many tons are also being used for fertilizing purposes.

We also have bass, trout, pompano, Spanish mackerel, red snappers, and a medium-sized fish locally called snapper or mutton fish, fine flavor, and a most lovely looking fish, being striped from head to tail with narrow stripes of bright pink and blue on the sides and bright silver on the under side; smaller ones most beautiful in an aquarium.

"If Northern tourists only knew of the green turtles, oysters, and fish that abound in the beautiful Indian River all-the year, they certainly would spend at least a few weeks of winter in some one of the many hotels or comfortable boarding-houses on the mainland or west shore or on Merritt's Island.

SUCCESS OF WHITE FISH PROPAGATION—MEETING OF FISH COMMISSIONERS AT MILWAUKEE, OCTOBER 17 AND 18.—Under date of Northville, Mich., November 11, 1884, Mr. F. N. Clark, has reported:

"There was a good attendance of commissioners, also of the leading fishermen. Many subjects of interest were discussed, though the proceedings were mostly informal.

"Although there was no formal expression relative to the work of the various commissioners, the feeling was most friendly to all and to their work. It was freely asserted on all hands that results were already apparent. There was no question as to the value of propagation; but in order to obtain the best results and to have the work receive the full credit to which it is justly entitled, it was necessary to adopt measures to prevent the wholesale capture of yearling whitefish now accredited to the herring catch.

"The time was when a majority of the men representing the capital employed in the fishing industry of the Great Lakes had little faith in propagation as a means of increasing or preventing a decrease in the supply; but these men are now our strongest friends. The catch of whitefish in Lake Erie last fall brought over those not already converted. Up to the time of the great storm of November 10 to 15, last year, the catch in that lake was greater than for several years, and this year promises to be even better; this is especially gratifying, as the result of our larger plantings could not fairly be called due until last year. Prior to four or five years ago the number of young whitefish planted in this lake did not equal the number of adult fish taken out. This is all in the face of excessive fishing all over the lake, but particularly at the west end. All around the islands, and from Sandusky around to the Detroit River and Canadian shore eastward, the catch had been already growing lighter, as the coast was literally lined with twine.

"Resolutions were passed instructing the commissioners to urge upon the legislatures of the Lake States the enactment of statutes regulating the size of mesh, so as to catch mature fish only, and the adoption of a close season for certain kinds of fish. All in all, the meeting was interesting and profitable, and will, I believe, result in a definite line of action being taken to adjust and regulate the fishing industry of the Great Lakes.

"Speaking for the people of the Northwest I can say that there is now but little opposition to our work on account of a belief that fish-culture, as applied to increasing the food supply of the Great Lakes, is a failure. Of course there is some antagonism to the work; not, how-

ever, on account of any question as to its abstract value, but because it is thought by many to savor of 'class legislation.' Some of this class are of those who are always opposed to anything and everything that calls for a dollar of the public funds, while there are others who honestly think that the cost of maintaining any industry should be borne by the industry itself.

"Our penning work at Monroe promises to be very successful. We now have upwards of 1,500 fish in crates, all doing well, and will put in a few hundred more.

"The young whitefish which we will send you from Northville have been reared on precisely the same food as our brook trout; viz, chopped beeves' or hog's liver. We feed them twice daily. Our success with these fish makes it safe to say that the whitefish can be made a pond fish in cold waters if raised from infancy in ponds or tanks."

GROWTH OF CALIFORNIA TROUT.—Mr. J. S. Delano, writing September 16, 1884, from Mount Vernon, Ohio, says:

"The 51 two-year-old California trout you kindly gave us last spring have done remarkably well, and the young fry from Northville have been a great success, too. I really think some of the two-year-old are 18 inches in length, and we have not lost one.

"Our success has encouraged us to bring from a distance of 1,800 feet another supply of water, which was sufficient, this dry summer, to fill a 6-inch sewer tile, with a fall of about 1 foot in 200; the temperature 50°. This fall the 51 two-year-olds must be moved into the larger lake. The young fry, many of them now 5 inches long, must also be moved."

Mr. Emanuel H. Frantz, of Clear Spring, Washington County, Maryland, under date of August 6, 1883, says:

"Some California trout and landlocked salmon were sent to me, which I placed in the large dam. I saw one jumping up last week which surprised me. It was fully 20 or 24 inches long. They have been in the water over three years. The dam is over 10 feet high, and the back-water extends 150 yards, and is 65 yards wide."

SHAD IN GEORGIA WATERS.—Mr. Newton Simmons, writing under date of December 10, 1884, states that he had recently seen General Young, of Georgia, from whom he learned that the plant of shad made in recent years in the Woostanoula and Etowah Rivers has been a great success, and that a great many shad were taken out of these two rivers last spring and the year before.

Concerning the increase in shad in this State, due to propagation and the taking shad with bait in Chattahoochee River, Dr. H. H. Cary writes as follows in his report to the Commissioner of Agriculture for 1883 and 1884:

"In 1880, 1,000,000 shad fry were planted in the waters of Georgia, and in 1881, 1,800,000. This was the work of the United States Fish

Commission. In three years after the planting they returned to find their spawning-grounds. Of the planting of 1880, 400,000 were released in the Chattahoochee, at Iceville, near Atlanta. It was not expected that these fish could pass up further than Columbus till fishways were placed at the obstructions at that place. The fry constituting this plant were reported to me as being the Connecticut River shad. It is well-known that the Connecticut River shad will take the bait, and the sportsmen can find in the Northern markets tackle for shad fishing. The South Atlantic shad do not take the bait. True to their instincts, shad appeared in 1883 in the Chattahoochee River below Columbus, and were taken with the hook and bait. It is therefore reasonable to suppose that the fish thus taken were of the planting of Iceville in 1880. Of the 1,800,000 shad planted in 1881, 1,000,000 were released in the Ocmulgee at Macon. The fish, of course, were due on their return in the spring of the present year. I have recently visited Macon and made careful investigation in regard to the expected return of these fish, and I am pleased to say that I have not been disappointed. While there was no particular arrangement for catching shad—and hence the catch was light—still they must have appeared in large numbers, as a sporting gentleman informed me that full-grown shad were taken in considerable numbers, the fishermen standing on the bank of the stream and capturing them with the dip-net. I mention these facts to show with what facility a barren river can be impressed by liberal plantings of the shad fry.”

SHAD IN OCTOBER.—Mr. E. G. Blackford, writing under date of October 31, 1884, says :

“I have to report the surprising fact that a large catch of shad has been taken off Truro, Mass.* I received quite a lot October 29, and have telegraphed for 300 more.”

Under date of November 18, he adds :

“In reference to the shad that were in this market from the 5th to the 10th of November, our examination of them gave the following results: The stomachs of every specimen were empty, except in one instance, where a small quantity of gelatinous chyme was noted. The ovaries and spermaries were all small and immature. The largest specimen weighed 6 pounds, and the smallest 2 pounds. Their edible qualities were equal to any shad that are caught in the spring. One of our customers, Judge Shipman, expressed himself as believing that they were as good as any shad he ever ate. I can also bear personal testimony to their excellence, having tried one at a dinner party. Mr. C. R. Miller, editor of the New York Times, also expressed himself in the same terms.”

*The ocean temperature at Race Point, just north of Truro, was 43° to 49° during that period.—C. W. S.

CARP AND IDES SENT TO ENGLAND.—On September 10, 1884, Michael Beverley, M. D., of 52 St. Gile's street, Norwich, England, visited the carp ponds in Washington, and was so much pleased that he requested fish to take back with him to England. He has a small fish-cultural establishment at Brundall, and extended trout ponds of his own. He stated that he had never seen in England any blue carp or leather carp, although he has propagated the scale and mirror carp.

Accordingly, September 30, the Commissioner presented to him 10 young leather carp, 10 blue carp, and 10 golden ides. These were forwarded, in two cans containing about 5 gallons each, to E. G. Blackford, New York, for shipment. Dr. Beverley accompanied them to Liverpool upon the Cunard steamer *Servia*, sailing October 1, 1884.

The carp endured the passage safely, and were placed in Dr. Beverley's ponds October 4. The golden ides, however, were dead when he arrived on board the *Servia*. That was attributed to the presence of some decomposing water-weed which had been placed in the can for the purpose of affording food or for keeping the water aerated. The carp also showed signs of being affected by it, but a change of water and the removal of the plant quickly revived them.

PRICES OF CARP.—Mr. Amos Smith, Mountain Hill, Harris County, Georgia, under date of November 24, 1884, says :

"I have been selling carp during the past two years from my five ponds, which cover an area of 5 acres. My prices are as follows : One inch to 3 inches long, 10 cents each ; 3 to 5 inches long, 15 cents each ; 5 to 8 inches long, 25 cents each ; 8 to 10 inches long, 50 cents each ; 10 to 12 inches long, \$1 each ; 12 to 20 inches long, \$2 each ; spawners, 6 to 12 inches long, 50 cents each ; spawners, 4 to 6 inches long, 25 cents each."

STREET DUST INJURIOUS TO CARP.—At the United States fish ponds, Washington, the last week in September, 1884, Dr. Hessel found several thousand sickly carp in the north and east ponds, and subsequently about 150 dead. Upon examination small particles of iron, iron-rust, cinders, saw-dust, manure, &c., were found sticking to the gills of the dead fish. A strong wind had prevailed for several days, blowing a large amount of dust from the streets into these ponds, and to this Dr. Hessel attributed the sickness and death of the carp.

A GERMAN VIEW OF AMERICAN CARP-CULTURE.*—At a meeting of the fishery association of Lower Franconia, held November 7, at the Falcon Hotel, and numerously attended, the president of the association, Mr. Zenk, read a paper on the acclimatization of fish, and especially on the introduction of the German carp into North America.

Mr. Zenk said: "Even in the Old World we know that the carp has

* From the *Würzburger Presse*, Würzburg, Bavaria, November 8, 1884. Translated from the German by HERMAN JACOBSON.

migrated considerably, as it has been transplanted from its original home to more northerly latitudes. It is uncertain whether the home of the carp is the Caspian Sea or whether it has also originally been found in the Danube, the Rhine, and the Main. It is certain, however, that it was known to the Greeks and Romans, and that from Central and South Germany it has spread throughout a great part of Europe. Thus the German carp was introduced in England in 1521, into Denmark in 1560, into Prussia in 1769, and thence into the Baltic provinces of Russia. Germany, however, has always remained the principal carp country, and nowhere else has so much attention been given to the raising of carp in ponds. In return for a number of fine good fish which the United States had sent to Germany, the German fishery association has, since 1877, transmitted to America a number of live carp, especially leather and mirror carp. There are quite a number of interesting data relative to the spread of carp in America. Up to January 1, 1883, German carp had been distributed in 17,860 North American waters. In 1881 they were introduced into Canada, in 1882 into Brazil, Colombia, and Ecuador. In America the German carp has grown in a manner utterly unknown even in our best fish-cultural establishments. There are a number of instances to show this. Thus we have a case from Texas where a carp, scarcely 4 inches in length, had in eleven months reached the weight of 4 pounds 11 ounces. As a general rule carp in America increase 3 to 4 pounds in weight in a year. In the beginning many American families did not relish the carp. One lady said that the leather carp deserved its name, as it tasted like leather. Other Americans said that, owing to its rapid growth, its cheapness, and because it is the favorite fish of the Chinese, it was thought that it would bring large masses of the disagreeable pig-tail bearers to the shores of the United States. Gradually, however, the Americans learned to appreciate the carp, and quite recently a Kentuckian declared that a nicely-baked carp was a dish fit to set before a king as well as before a hungry fisherman. Others compare the flesh of the carp to that of the trout, or of the black bass, which is the favorite fish of the Americans. Recently a commencement has been made in America to raise carp in ponds, and the Government has constructed large carp ponds."

Mr. Zenk drew a number of scientific and practical conclusions from various facts connected with the acclimatization of carp in America. The carp thrived best in the Southern States, where the warm season is longer than in the North, and where the carp, abandoning its European habits, does not seek a winter lair, but keeps on eating all the year round, the production of food being very great, owing to the high temperature of the water. The question with us in Germany is, therefore, to plate the carp in circumstances which further its growth as much as possible; that is to say, to place them in ponds which are as warm as possible, and remain warm for a long time, to supply them with good and ample food, and to be very careful in the selection of the

fish which are intended for propagation. It is not impossible that the time will come when we shall import carp from North America, either as food-fish, or to improve our race of carp. In December, 1881, 25 leather carp from the Government ponds at Washington were sent to Scotland. The gregarious habits of the carp have already begun to influence American carp-culturists, and their number in the United States has greatly increased.

CARP IN RIVERS.—Writing from Quincy, Ill., under date of December 9, 1884, Mr. S. P. Bartlett, secretary of the Illinois State fish commission, reports that he had that morning received a carp weighing nearly 8 pounds, which had been caught in the Illinois River. It is supposed to have escaped from some overflowed pond. He adds that quite a number have been caught from time to time along the Mississippi River.

STOCKING STREAMS WITH CARP.—Writing from Saint Louis, December 14, 1884, Mr. I. G. W. Steedman, chairman of the Missouri fish commission, states that he is now stocking public waters with 700 spawners and 60,000 young carp, having procured a bountiful supply from the summer's crop.

CARP PLANTED IN TALLAPOOSA RIVER.—Writing from Augusta, Ga., December 13, 1884, Mr. Newton Simmons in charge of Fish Commission Car No. 2, reports that he has planted 1,700 scale carp, in good condition, in Tallapoosa River, at the nearest point to Tallapoosa City, about 2 miles distant.

CARP PLANTED IN ARKANSAS AND RED RIVERS.—On January 4, 1885, Mr. Simmons planted 2,500 scale carp in the Arkansas River at the crossing of the Missouri and Texas Pacific Railroad, and 2,500 in the Red River at Denison City, Tex. A previous plant of 1,500 was made in Trinity River, Texas, early in 1884.

CALIFORNIA TROUT IN NEBRASKA.—Writing from Omaha, Nebr., under date of January 3, 1885, Mr. B. E. B. Kennedy, one of the State commissioners, says: "If the usual success in taking eggs of the California trout (*Salmo iridea*) at the U. S. station, Baird, Cal., attends this year's operations we desire another lot. We have great faith in the ultimate acclimation and successful cultivation of this fish in certain parts of our State. With those heretofore obtained our success has been somewhat unfortunate. The first lot, which had made excellent growth at two years old, were, in one night, stolen entire from the pond in which they were kept. Of those received later we have a goodly number, and they are doing well—as well as those received last year. With one other lot of 10,000 we hope to establish ourselves securely in the production of all we need for future operations."

TABLE.—Monthly summary of the fresh fish, oysters, &c., inspected by the health officer of the District of Columbia during the year 1884.

Description.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Bluefish* a					21,220	51,405	39,290	38,080	44,925	31,500			226,420
Carp (number)		2	9	16	30								67
Catfish*	3,780	43,890	36,275	19,835	19,845	11,765	16,170	19,145	18,430	17,780	18,650	18,600	243,655
Chubs of North Carolina*	6,600	2,650								1,830	7,900	10,175	29,155
Clams (number)				88,500	587,400	467,000	321,000	230,000	154,000				1,847,900
Crabs (number)				20,900	263,000	194,600	169,000	146,200	57,800	7,700			859,200
Croakers*						24,200	1,665	2,100	525				28,490
Drum (number)					5				88	40			133
Eels*		140	5,105	13,795	6,070	535	745	1,340	1,240	3,190	6,380	2,900	41,440
Flounders*										140	85		225
Herring, fresh-water (number)		1,033	185,430	3,480,819	1,969,023	4,507				608			5,640,812
Hog-fish (number)													600
Mackerel, Spanish (number)					19	2,063	4,690	1,532	1,010	1,513			10,797
Mullet*	1,105	9,775	8,590	1,620	740			415	1,255	7,775	1,455	3,815	36,545
Oysters (bushels)	35,385	42,900	36,450	16,845	1,040				15,432	50,780	60,000	49,000	307,832
Perch, white*	3,730	18,345	45,640	33,345	6,985	1,835	8,610	8,625	18,160	23,545	33,925	12,320	215,065
Perch, yellow*	11,795	24,045	48,655	3,705		330	235	400	125	2,055	6,545	7,215	105,105
Pike*	2,430	8,735	11,870	8,265	240	395			1,050	3,140	6,465	4,825	47,415
Rockfish* b	1,645	16,695	37,885	21,110	9,765	9,795	19,235	24,030	29,145	50,320	65,270	55,565	340,460
Scup (number) c		17			44	512			8				581
Shad (number)			20,351	159,464	49,581	1,715							231,111
Shad, winter*	3,180	2,830	70							8,110	9,370	4,855	30,775
Sheepshead (number)					1,086	776	178	155	291	61			2,547
Spot (number)					300	360	2,620	5,570	7,615	14,680			31,145
Star fish* d							2,450						2,450
Sturgeon (number)				9	503	534			102				1,588
Taylor, fresh-water (number) e			2,312	17,372	2,002								21,686
Terrapin, diamond-back (number)													264
Trout*							19,620	12,500	5,135	16,900	22,255	9,295	86,130
Trout, gray (number)					6,243								6,243
Trout, salmon (number)					1,628					430	880		3,243
Turtle, sea (number)					54	33	30	4	4	1			126

* Reported in bunches, but here reduced to pounds.
a Or salt-water taylor.

b Or striped bass.
c Or porgies.

d Or crevallé.

e Or skip-jacks, or hickory shad.

A MOVING HATCHERY.—In the evening of February 9th one of the Fish Commission cars left Washington for New Orleans, having on board, among other things, 200,000 whitefish eggs. These were to be taken to New Orleans and hatched for the exhibition. All arrangements had been made for holding them in circulation in water while *en route*. Unexpectedly, the handling of them caused hatching to commence, and Colonel McDonald, who was in charge, found himself confronted with the problem of transferring and collecting the fry while the car was in rapid motion, it being attached to a passenger train. The experiment, however, proved perfectly satisfactory, the hatching-jars worked just as well in the car as on the hatching tables at the hatchery. The fry were collected in aquaria as fast as hatched. The circulation of water was obtained by use of the tanks in the upper part of the car, which are refilled by pumping as often as necessary.

TRIP OF CAR NO. 3 TO MICHIGAN.—On November 7, 1884, Mr. Ellis took on board at Central Station 17,000 carp, 200 goldfish, 12 ides, and 6 adult carp. He left Washington that evening and arrived at Columbus, Ohio, on the afternoon of the 8th. Here he delivered to the Ohio commission 88 pails containing 4,000 carp. On the 10th he delivered to four express companies a total of 341 pails of carp for applicants in Ohio. November 11th, at Indianapolis, he delivered to three express companies 235 pails of carp for applicants in Indiana. From Indianapolis, the Wabash, Saint Louis and Pacific Railroad furnished free transportation to Toledo, which city was reached in the evening of the 12th. From this point the Flint and Pere Marquette Railroad furnished free transportation to Northville. On the 13th, 41 pails of carp were delivered to the American Express Company for applicants in Michigan, and the 6 large carp with 750 small ones to Mr. Clark for filling later orders. About 37 carp were lost on the trip.

There were received from Mr. Clark 10,000 trout eggs, 20 large whitefish, and 25 small whitefish to be transported to Washington. The car left Northville at 1.20 a. m., November 14. At Monroe it took on board 25 large whitefish weighing from 2½ to 8 pounds each, received from Mr. S. Root. The return passage was by way of Toledo, Pittsburgh, and Harrisburg. The car reached Washington November 16, having traveled 1,778 miles. The 10,000 trout eggs were delivered at Central Station to be hatched. A part of the large whitefish died in transit, but the remainder were delivered at Central Station. Several of those whitefish are now (April 1, 1885) in the tanks at Central Station, and appear to be in good condition.

CARP FISHING.—The following is from a letter by Baron P. Tcherkassoff, published in the Fishing Gazette of January 3, 1885:

In the southern part of Russia carp are very plentiful, and sometimes attain the enormous weight of 60 pounds. The largest specimen taken with rod and line which I have heard of weighed 36½ pounds. The tackle on which it was captured was of the most genuine "clothes prop" description.

In this part of the country these fish are fairly plentiful, and if they do not attain the above-mentioned enormous weight, still, 20-pounders are by no means uncommon; though it must be owned they seldom are taken with rod and line. The largest I ever caught weighed 15 pounds, and he ran out at least 70 yards of line before I succeeded in stopping him, the rod all the time bending like a bow.

The season for carp generally opens between the 14th of July and the 2d of August. It continues sometimes as late as the end of September or middle of October.

The best baits are cockchafer grubs, those from $\frac{3}{4}$ inch to 1 inch in length being by far the most killing; maiden lobes, brandlings, marsh-worms, wasp grubs, gentles, boiled potatoes, creed wheat, and bread paste. Of all these baits cockchafer grubs and marshworms are, according to my experience, the most killing ones; but on other rivers where I have had no opportunity to fish, creed wheat is *the* bait. As to ground-baits, those most generally used are buckwheat, groats, and rye, well boiled; sometimes curd is used, as well as well-boiled potatoes, mashed and kneaded into balls about the size of a hen's egg.

The best time of day is between one hour before sunrise and noon; but, strange enough, one day you get all your fish just before or soon after sunrise; another, you get them between 10 o'clock and noon. When the carp are "on" I have known as many as 9 being caught from half-past 9 to 11 o'clock, 6 fish smashing the tackle during this time. Those caught averaged 4 pounds each.

This year's carp fishing has been an utter failure. The bream, on the contrary, were, for about two weeks well "on," so that I seldom failed to get my 25 to 35 pounds in a morning's fishing from 3 till 9 o'clock.

Speaking of baits, I think it may not be uninteresting to say that cockchaffer grubs are a most killing bait for master chavin. Another most killing bait for this gentleman being the *raw* tail of a crayfish. The length of this tail should not exceed $1\frac{1}{2}$ inches. It is much easier to peel when slightly parboiled; but in point of attractiveness, according to my experience and many of my countrymen, it is not to be compared with the raw bait.

FISH-CULTURE IN ILLINOIS.—Writing from Quincy, Ill., January 10, 1885, Mr. S. P. Bartlett, secretary of the State commission, says the board has not spent very much money on trout and salmon, but has done a good deal in planting native fish in their waters and with excellent results. During November and December the State board received 5,000 communications relative to carp.

FISH-CULTURE IN WYOMING TERRITORY.—Writing from Cheyenne about January 8, 1885, Mr. H. J. Maynard says:

"The Territorial legislature has made an appropriation with which we have built a small but complete hatching house, and we are now successfully hatching whitefish and lake-trout eggs received from the United

States Commission. Several small plantings of New England trout in the Territory have succeeded most admirably. These have grown within 4 years to weigh over 3 pounds in the Little Laramie River. It is thought that this will be a useful fish for all the streams of the Territory."

PROPAGATING TROUT IN KENTUCKY.—Writing from Louisville, January 10, 1885, Mr. J. N. Neelley says:

"Early in 1880 I received a can of trout which I placed in my pond and spring streams. I guarded them carefully and had the satisfaction of having hundreds of beautiful trout. So jealous of them was I that I never took one or allowed any one else to do so. In the spring of 1883 a water spout burst the banks of my reservoir and my trout went into Gun River. My father picked up a number in the sand (9 to 12 inches long) and gave them to the neighbors. I spent two weeks there last fall and found trout in all the small streams running into Gun River, and am well satisfied that I have stocked the stream. Fishermen come from all parts of the country to get a chance at them. A conductor on the Michigan and Ohio Road told me that he took 14 in an hour."

CULTIVATION OF CALIFORNIA TROUT AND LAND-LOCKED SALMON.—Mr. G. W. Delawder, one of the Maryland fish commissioners, writing under date of Oakland, February 8, 1885, says:

"In 1882 or 1883, I got from you 5,000 California trout eggs, and from this lot have already sent you specimens of young. I also received land-locked salmon eggs. Both lots of young were deposited in Deep Creek, and the yearlings of both were taken last summer by hook and line, showing a most wonderful development. When the spring opens I shall be able to show the progress they have made for the second year. Deep Creek has a wonderful depth, an abundance of food, pure water, and is capable of maintaining large fish, and a great number of them."

TROUT FOR SALE.—Mr. George A. Starkey, of Troy, N. H., states that he has 1,000,000 trout eggs ready for shipment in January, 1885, and that from February 1 to April 1 he will have in the Monadnock trout ponds a considerable quantity of fry for sale. His prices are as follows:

TROUT EGGS.

Per thousand, up to 10,000	\$2 75
Per thousand, over 10,000 up to 25,000	2 50
Per thousand, over 25,000	2 25

TROUT FRY, THREE MONTHS OLD.

Per thousand, up to 10,000	\$5 00
Per thousand, over 10,000 up to 25,000	4 50
Per thousand, over 25,000	4 00

CODFISH TAKEN OFF THE COAST OF NORTH CAROLINA.—Mr. E. G. Blackford, of Fulton Market, New York, writing under date of February 19, 1885, says: "I had yesterday a codfish, weighing 6½ pounds, that was caught off the coast of North Carolina in shad nets."

PRICE LIST OF HUGO MULERTT, 507 RACE STREET, CINCINNATI, OHIO.—The following list is furnished under date of February 12, 1885:

Common goldfish:		
Small and medium.....	each..	\$0 25
Large	do...	50
Japanese goldfish:		
Fringetail, small and medium.....	\$2 50 to	10 00
Fantail, small and medium	each..	50
Comet, small and medium	do...	1 00
Nymphæ, small and medium	do...	50
Chinese paradise fish:		
Small (<i>Macropodus</i>).....	per pair..	1 00
Old enough to spawn	do...	5 00
German carp (mirror, leather, and scale), young.....	each..	25
German gold orfe, young (4 inches)	do...	1 00
German tench, young	do...	
Blue and pumpkin-seed sunfish, medium	do...	25
Straw, moss, and black bass, small	do...	50
Yellow or ring perch, and rock bass, small	do...	
Black-nosed dace	do...	
Dogfish (mud dace)	do...	25
Black catfish and top minnows, small	do...	15
Newts	do...	20
Tadpoles	do...	5
Snails	per dozen..	25
Aquarium sand.....	per quart..	10
Aquarium cement	per pound..	35
Dip net	each..	15
Dipping tube	do...	25
Cultivator.....	do...	40
Wiper.....	do...	40
Fish food.....	per box..	10
<i>Nymphæa odorata</i> (flowers white), strong roots.....	each..	25
<i>Nymphæa flava</i> (flowers yellow, foliage variegated), strong roots	do...	50
<i>Nymphæa flava</i> yearlings (fine for aquariums)	do...	25
<i>Nymphæa sphaerocarpa rubra</i> (flowers carmine pink), strong roots	do...	
<i>Nelumbium luteum</i> (seed).....	do...	10
<i>Nelumbium speciosum</i> (seed).....	do...	25
<i>Nelumbium rubrum</i> (seed)	do...	25
<i>Nuphar advena</i> (roots).....	do...	50
<i>Aponogeton distachyon</i> (strong roots).....	do...	2 00
<i>Limnocharis humboldtii</i>	do...	50
<i>Villarsia nymphæoides</i>	do...	25
<i>Trapa natans</i> (seed).....	do...	25
<i>Hydrocharis cordifolia</i>	do...	25
<i>Sagittaria sagittifolia</i>	do...	5
<i>Sagittaria lancifolia</i>	do...	25
<i>Sagittaria natans</i>	do...	25
<i>Pontederia cordata</i>	do...	25

Iris (assorted)	each..	\$0 10
Cyperus alternifolius.....	do...	25
Ceratophyllum demersum	per bunch..	10
Myriophyllum spicatum.....	do...	15
Ludwigia florida	do...	25
Anacharis canadensis	do...	10
Cabomba viridifolia and rosæfolia	do...	25
Potamogeton crispus	do...	15
Vallisneria spiralis.....	each..	10
Utricularia vulgaris.....	do...	10
Lemna minor	per mass..	10

APPEARANCE OF VARIOUS KINDS OF FISH.—Writing under date of May 18, 1885, Mr. Frederic Stanly, keeper of the Fourth Cliff life-saving station, at Scituate, Mass., states that the first mackerel made their appearance off Scituate May 17, 1885.

The keeper of the Cape Fear life-saving station, Mr. Dunbar Davis, writes that a small school of menhaden made its appearance in the vicinity of that station May 10, 1885. There were no other fish visible except porpoise, which remain on the coast the year round.

Mr. David A. Vail, keeper of the Tianna life-saving station, at Atlanticville, N. Y., writes that alewives first appeared on that coast February 26; porgies, April 20; sea-robins, April 22; mackerel, April 30; butterfish, April 30.

Mr. N. B. Rich, keeper of Parramore's Beach life-saving station, writes from Wachapreague, Va., that the steamer Daisy caught 50,000 menhaden on that coast May 19, being the first taken in the season of 1885.

Mr. G. A. Veeder, keeper of the Surfside life-saving station, Nantucket, Mass., states that the first codfish of the season was caught off Surfside station April 7, 1885, about $1\frac{1}{2}$ miles from the shore, in about 8 fathoms of water. The fish would average about 8 pounds each. The people here generally catch codfish from March to the fore part of June, after which the cod start off for deeper water, 15 or 20 miles from shore. Very little spawn is found in them in the spring. Fish caught in the spring are much larger than those caught in the fall. Fish strike in about the last part of October and stay around until the middle of December. In mild winters they are around all winter, but we have to go farther offshore for them; we find much more spawn in them in fall than in spring.

THE FIRST MENHADEN.—A small school of menhaden was seen going north April 23, 1885, by the employés of the Great Egg life-saving station, located 6 miles below Absecom light, on the New Jersey coast. The keeper, Mr. L. P. Casto, whose post-office address is Atlantic City, N. J., kindly forwards the information.

MOVEMENTS OF SHAD.—On the morning of April 17, 1885, Mr. E. G. Blackford, of Fulton Market, received from New Bedford, Mass., twenty-two shad that had been caught in that vicinity. They were large, weighing from $5\frac{1}{2}$ to 6 pounds each, and had every characteristic of the

Connecticut River shad. He supposed these specimens to be from a school of shad which was waiting for a rise in temperature before making for the Connecticut River.

BAIT FOR LOBSTERS.—A. C. Smith, M. D., who lives at Newcastle, New Brunswick, writing under date of February 23, 1885, says that the most successful method of attracting lobsters is by placing in the traps mackerel refuse, suspended in *closed* cotton bags. This illustrates the keen sense of smell possessed by the lobsters.

Since the publication of Dr. Smith's notes on page 121 of this volume, he states that he has learned that lobsters are found on the coast of Labrador.

SAWDUST INJURIOUS TO FISH.—Mr. J. J. Brown, of Ludington, Mich., writing under date of June 3, 1883, states that mill-owners at Ludington and other places have dumped large quantities of sawdust and shingle shavings into Lake Michigan, covering the bed of the lake for miles in a manner that destroys the feeding grounds of the fish.

TROUT PLANTED IN MICHIGAN.—Mr. J. E. Bassett, of Ypsilanti, Mich., under date of February 2, reports that 25,000 lake trout obtained from the Northville hatchery last May were planted in a lake at Lodi, 10 miles southwest from Ann Arbor. A few which were saved out were put in a small reservoir and grew finely, but those in the lake have not yet been heard from.

Mr. Bassett has in his own ponds both brook trout and California trout of different weights, from 2½ pounds down to yearlings. He has fed them through the ice this winter with chopped liver.

One thousand California trout fry obtained from Northville he planted in a brook 2 miles southwest of Ypsilanti. He reports that they have done well, and that a few of them were taken last November by parties fishing for bait minnows.

TROUT AND WATER SNAKES.—Mr. F. Best, of Andover, England, has a trout which was found dead in shallow water with about 18 inches of the body of a water snake protruding from its mouth. The fish was carefully opened, and in it was found a partially digested snake, measuring 27 inches. When alive it must have been longer, as its head was gone. That it had been swallowed alive was proven by the fact that the stomach of the trout had been bitten by the snake. It is well known that trout are fond of eels, and it is possible that the trout mistook the water snake for an eel.

OPINION ON EDIBLE QUALITIES OF THE CARP.—E. C. Spitzka, M. D., of 137 East Fiftieth street, New York, under date of October 22, 1884, says: "As to the carp served at the last dinner of the Ichthyophagous Club, I would say that its flavor and the general character of the meat were identical with that of the carp I have frequently eaten in Germany and Austria. In fact, if I had been blindfolded I would have immediately recognized the fish by its flavor. To some the sweetish character of the carp's meat is an objection; this is overcome on the Con-

tinient by preparing it with piquant sauces and spicing somewhat on the same plan that the sweet flavor of the rabbit is neutralized in the better class of preparations made of that animal's meat."

CARP IN ENGLAND 300 YEARS AGO.—In a description of the Thames River published in 1577, Holinshed spoke of carp as not "long since brought over into England." John Taverner referred to carp in his "Certain Experiments Concerning Fish and Fruit," printed in 1600. Ger- van Markham freely spoke of it in his "Art of Angling," published in 1613. In 1532 entries appeared in the royal accounts of rewards to persons to bring carp to the King.

FISH AT CENTRAL STATION.—Under date of December 16, 1884, Mr. J. E. Brown reports: "There are at Central Station, this date, 215,000 small leather carp, 500 small scale carp, 400 blue carp, 600 tench, and 175 yearling leather carp. The whitefish delivered here by car No. 3 are in fine condition and I think will winter nicely. There are fourteen of last year's crop, and one two-year old and four large ones that would weigh 4 or 5 pounds each. All the above fish are in splendid order."

DESTRUCTION OF YOUNG FISH BY LARVÆ OF DRAGON-FLIES.—In the Hungarian Rovartani Lapok for December last, L. Biró states that the larvæ of some *Libellula* (species not determined) have made such ravages in the piscicultural establishment of Count Pulffy at Szomolány that in a pond in which 50,000 young fish were placed in the spring of 1884, only 54 could be found the following September, but there was a large quantity of the larvæ of the *Libellula* referred to.

FISH EATEN BY MUSKRATS.—Mr. A. A. Mosher, writing from Spirit Lake, Iowa, under date of April 27, 1885, says: "A muskrat got into a large box containing water 1 foot deep where there were minnows from 2 to 4 inches long. He caught a number and ate all but the heads, which we found lying on the bottom."

USE OF GIANT KELP STEMS BY THE INDIANS.—Mr. James G. Swan, writing, under date of February 14, 1885, from Port Townsend, Wash., says: "I was fortunate yesterday in seeing some Fort Rupert Indians who live at the northeast part of Vancouver Island, near Nawitti. The Fort Rupert band of Nimpkish Indians make great use of the giant kelp stems (*Nereocystis*). Their method is to first peel off the outer cuticle of the kelp, then place it over a slow fire, and as it dries the salt exudes and forms a crust. This is rubbed off and the kelp stem blown up full of wind, and again hung up to dry for a brief period. It is then again rubbed and blown full of air. This process is repeated until the kelp is of a leathery consistence, and it is then used to hold dogfish oil and is equal to an India-rubber tube. The Indians I referred to have promised to prepare me a quantity, which, when received, I will forward to you. I will also have a barrel filled with the green kelp, leaves and all, and fill the barrel with strong pickle. This will give an opportunity of testing the vegetable in its green and prepared state."