

34.—REPORT OF SHAD DISTRIBUTION FOR 1887.

By MARSHALL McDONALD.

The number of shad produced for distribution the present season was unprecedented, and the season of active work being restricted to a comparatively short period, the capabilities both of the stations for production and of the means of distribution were taxed beyond their present capacity. To relieve the glut of eggs at Battery Station and Central Station shipments of eggs on trays were made both to the Cold Spring Harbor Station and to the hatching station of the Delaware State commission at Wilmington, an aggregate of 10,718,000 eggs during the season being forwarded to these stations. Further relief was obtained by recourse to the hatching arrangements aboard of car No. 3. The hatching *en route* proved uniformly successful and enabled us to triple the capacity of the car for the work of distribution, and at the same time to relieve somewhat the overcrowding of eggs at the stations.

Summary of production and distribution of shad and shad eggs, season of 1887.

	Fort Wash- ington Sta- tion.	Central Station.	Battery Station.	Steamer Fish Hawk.	Total.
Eggs collected	59,435,000	.....	59,239,000	20,334,000	148,008,000
Eggs received by transfer.....	.....	57,385,000	*1,330,000	.....	.....
Total.....	59,435,000	57,385,000	60,569,000	20,334,000	148,008,000
Fish deposited in local waters.....	2,050,000	.....	11,850,000	†18,934,000	32,834,000
Fish shipped to other waters.....	.....	32,549,000	20,882,000	.....	62,431,000
Eggs transferred to other hatcheries.....	57,385,000	.....	.....	*1,330,000	.....
Eggs shipped to State commissions.....	.....	8,718,000	.....	2,000,000	10,718,000
Eggs delivered to car No. 3.....	.....	3,469,000	.....	918,000	4,387,000
Fish lost at hatchery.....	.....	.....	.....	778,000	778,000
Eggs lost in incubation.....	.....	†12,649,000	17,141,000	7,070,000	36,860,000
Total.....	59,435,000	57,385,000	60,569,000	20,334,000	148,008,000
Gross out-put	2,050,000	44,736,000	42,650,000	20,934,000	110,370,000
Loss in transportation .....	.....	1,133,000	807,000	.....	1,945,000
Net out-put.....	2,050,000	43,598,000	41,843,000	20,934,000	108,425,000

* Includes 24,000 fry. † Includes 3,157,000 eggs. ‡ Includes 11,935,000 eggs lost in transportation.

Summary by river basins of shad fry distributed during 1887.

River basin.	Shad.	River basin.	Shad.
Penobscot River.....	922,000	Shipped to Cold Spring Harbor to be hatched and turned into Hud- son and tributaries..... Shipped to Wilmington, Del., to be hatched and turned into tribu- taries of Delaware Bay.....	6,644,000
Kennebec River.....	1,047,600		
Tributaries of Narragansett Bay.....	1,275,000		
Hudson River and tributaries.....	2,185,000		
Tributaries of Delaware Bay.....	5,099,000		
Tributaries of Chesapeake Bay.....	70,199,000		
Tributaries of Albemarle Sound.....	5,323,000		
Tributaries of North Atlantic coast.....	3,598,000		
Tributaries of Gulf of Mexico.....	7,043,000		
Inland waters.....	1,014,000		
Total planted by the U. S. Fish Commission.....	97,707,000	Total.....	108,425,000

The total production of eggs for the season was 148,008,000, of which there were lost during incubation and at hatchery 37,638,000 and during transportation 1,945,000, leaving the total number of fish and eggs for distribution for the season 108,425,000. The number of eggs produced and the number of fish and eggs distributed is exhibited by stations in the above summary:

Record of distribution of shad and eggs, season of 1887.

SHAD FROM CENTRAL STATION.

Date.	Waters stocked.	Place of deposit.	Number shipped.	Messenger.
1887.				
Apr. 29	Occoquan River	Wood Bridge, Va.	865,000	Newton Simmons.
30	Quantico Creek	Quantico, Va.	438,000	Do.
May 2	Acquia Creek	Acquia Creek, Va.	425,000	Richard H. Dana.
3	Rivanna River	Charlottesville, Va.	270,000	Do.
4	Broad Run	Bristoe, Va.	325,000	L. D. Terrell.
5	Rapidan River	Rapidan Station, Va.	523,000	Richard H. Dana.
6	Mattapony River	Milford, Va.	359,000	C. A. Steuart.
8	Burnt Corn Creek	Brewton, Ala.	574,000	W. A. Dunnington.
8	Big Escambia River	Flomaton, Ala.	174,000	Car No. 2.
9	Patuxent River	Laurel, Md.	500,000	C. A. Steuart.
10	Patuxent River	Patuxent, Md.	583,000	Do.
11	Broad Run	Bristoe, Va.	898,000	J. E. Brown.
11	Mattapony River	Milford, Va.	765,000	C. A. Steuart.
11	Little River	Taylorville, Va.	400,000	Do.
12	Catawba River	Catawba, S. C.	300,000	Car No. 3.
12	Congaree River	Columbia, S. C.	²¹ 798,000	Do.
12	North Anna River	C. & O. Junction, Va.	750,000	C. A. Steuart.
12	Dan River	Danville, Va.	1,431,000	Car No. 2.
12	Cedar Run	Catlett, Va.	400,000	J. E. Brown.
13	Chickahominy River	Huntletts, Va.	344,000	C. A. Steuart.
13	Mattapony River	Penola, Va.	345,000	J. E. Brown.
14	Youghiogheny River	Oakland, Md.	380,000	H. E. Quinn.
14	Chopowansic Creek	Quantico, Va.	400,000	J. E. Brown.
14	Quantico Creek	Quantico, Va.	400,000	C. A. Steuart.
15	Hudson River	Albany, N. Y.	³² 223,000	Car No. 3.
16	Chickasawha River	Enterprise, Miss.	578,000	W. A. Dunnington.
16	Leaf River	Hattiesburgh, Miss.	4578,000	Car No. 2.
17	Monongahela River	Fairmont, W. Va.	582,000	H. E. Quinn.
17	Meherrin River	Bellefield, Va.	546,000	C. A. Steuart.
17	Meherrin River	Bellefield, Va.	457,000	Do.
17	Stony Creek	Stony Creek Station, Va.	428,000	J. E. Brown.
18	Stony Creek	Stony Creek Station, Va.	440,000	Do.
19	James River	Lynchburg, Va.	500,000	Do.
19	Monongahela River	Grafton, W. Va.	339,000	H. E. Quinn.
19	Otto River	Otto River Station, Va.	500,000	C. A. Steuart.
20	Neabaco Creek	Freestone, Va.	880,000	J. E. Brown.
20	Kennebec River	Augusta, Me.	⁵¹ 398,000	Car No. 3.
20	Potomac River	Little Falls, Md.	756,000	Joseph Mace.
21	Cheat River	Rowlesburg, W. Va.	374,000	H. E. Quinn.
22	Rappahannock River	Fredericksburg, Va.	938,000	J. E. Brown.
22	Rivanna River	Charlottesville, Va.	819,000	C. A. Steuart.
23	Savannah River	Harbins, S. C.	⁵¹ 230,000	Car No. 2.
23	North Anna River	C. & O. Junction, Va.	736,000	C. A. Steuart.
23	Mattapony River	Milford, Va.	912,000	J. E. Brown.
24	Mattapony River	Milford, Va.	609,000	Do.
24	Powers Creek	Cherry Hill, Va.	730,000	J. E. Brown.
24	Occoquan River	Wood Bridge, Va.	700,000	C. A. Steuart.
24	Potomac Run	Brooke, Va.	655,000	Do.
25	Nottaway River	Stony Creek, Va.	585,000	Do.
25	Stony Creek	Stony Creek, Va.	535,000	J. E. Brown.
26	Monongahela River	Clarksburg, W. Va.	250,000	H. E. Quinn.
27	Six Runs	Clinton, N. C.	389,000	S. G. Worth.
27	Pamunkey River	White House, Va.	400,000	C. A. Steuart.
27	Fountain Creek	Margarettsville, N. C.	400,000	J. E. Brown.
31	Jordan River	Salt Lake City, Utah	1,157,000	Car No. 2.
31	Ponds at station	Wytheville, Va.	30,000	G. A. Jones.
June 3	Mohawk River	Schenectady, N. Y.	299,993	William F. Page.
	Total		⁷³⁴ 934,000	

¹Of this number 57,000 were lost in transit.

²Of this number 59,000 were lost in transit.

³Of this number 238,000 were lost in transit.

⁷Of this number 803,000 were lost in transit, leaving 34,181,000 as the number actually placed in the

⁴Of this number 40,000 were lost in transit.

⁵Of this number 349,000 were lost in transit.

⁶Of this number 60,000 were lost in transit.

SHAD FROM BATTERY STATION.

Date.	Waters stocked.	Place of deposit.	Number shipped.	Messenger.
1887.				
May 6	Susquehanna River	Battery Station, Md.	229, 000	Station employés.
9	Susquehanna River	Port Deposit, Md.	500, 000	Do.
10	Brandywine River	Wilmington, Del.	¹ 2, 200, 000	Car No. 1.
10	North East River	North East, Md.	300, 000	L. D. Terrell.
11	Nantico River	Seaford, Del.	² 2, 200, 000	Car No. 1.
11	Elk River	Elkton, Md.	300, 000	Richard H. Dana.
12	Bush River	Bush River, Md.	360, 000	Do.
12	Elk and Bohemia Rivers.	Bush River, Md.	2, 000, 000	Steamer Halcyon.
13	Gunpowder River	Gunpowder, Md.	360, 000	Richard H. Dana.
13	Tuckahoe River	Hillsborough, Md.	³ 1, 800, 000	Car No. 1.
13	Susquehanna River	Port Deposit, Md.	420, 000	Richard H. Dana.
14	North East River	North East, Md.	360, 000	Do.
14	Swan's Creek	Battery Station, Md.	2, 000, 000	Station employés.
16	Pocomoke River	Whaleysville, Md.	⁴ 1, 800, 000	Car No. 1.
16	Susquehanna River	Fites Eddy, Pa.	360, 000	Richard H. Dana.
17	Susquehanna River	Peach Bottom, Pa.	560, 000	Do.
17	Susquehanna River	Battery Station, Md.	973, 000	Station employés.
18	Susquehanna River	Safe Harbor, Pa.	300, 000	Richard H. Dana.
19	Appoquinimink Creek	Middletown, Del.	75, 000	Car No. 1.
19	Blackbird Creek	Middletown, Del.	75, 000	Do.
19	Smyrna Creek	Clayton, Del.	75, 000	Do.
19	Leipsic Creek	Morton, Del.	75, 000	Do.
19	Jones Creek	Dover, Del.	75, 000	Do.
19	Murderkill Creek	Felton, Del.	75, 000	Do.
19	Mispillion Creek	Milford, Del.	75, 000	Do.
19	Broadkill Creek	Ellendale, Del.	75, 000	Do.
19	Indian River	Millsborough, Del.	400, 000	Do.
19	Chester River	Chestertown, Md.	400, 000	Steamer Halcyon.
19	Susquehanna River	Safe Harbor, Pa.	800, 000	Richard H. Dana.
19	Susquehanna River	Battery Station, Md.	1, 573, 000	Station employés.
20	Susquehanna River	Marietta, Pa.	300, 000	Richard H. Dana.
20	Susquehanna River	Harrisburg, Pa.	1, 500, 000	Car No. 1.
20	Susquehanna River	Battery Station, Md.	1, 991, 000	Station employés.
21	Susquehanna River	Battery Station, Md.	1, 518, 000	Do.
21	Brandywine River	Wilmington, Del.	1, 924, 000	Car No. 1.
22	Susquehanna River	Battery Station, Md.	557, 000	Station employés.
23	Susquehanna River	Battery Station, Md.	1, 400, 000	Do.
23	Susquehanna River	Battery Station, Md.	176, 000	Do.
23	Tuckahoe River	Hillsborough, Md.	1, 600, 000	Car No. 1.
23	Bush River	Bush River, Md.	300, 000	Richard H. Dana.
24	Elk River	Elkton, Md.	300, 000	Do.
24	Taunton River	Dighton, Mass.	⁵ 1, 500, 000	Car No. 1.
24	Susquehanna River	Battery Station, Md.	69, 000	Station employés.
25	Susquehanna River	Battery Station, Md.	2, 292, 000	Do.
25	Patapsco River	Relay Station, Md.	300, 000	L. D. Terrell.
26	North East River	North East, Md.	300, 000	Do.
26	Susquehanna River	Battery Station, Md.	997, 000	Station employés.
27	Susquehanna River	Battery Station, Md.	70, 000	L. D. Terrell.
27	Bush River	Bush River, Md.	300, 000	Do.
28	Nantico River	Seaford, Del.	1, 400, 000	Car No. 1.
29	Gunpowder River	Gunpowder River, Md.	385, 000	L. D. Terrell.
30	Ohio River	Louisville, Ky.	⁶ 1, 618, 000	Car No. 3.
June 3	Susquehanna River	Battery Station, Md.	38, 000	Station employés.
5	Etowah River	Cartersville, Ga.	450, 000	Car No. 1.
5	Oostenaula River	Resaca, Ga.	⁷ 1, 050, 000	
	Total		⁸ 42, 650, 000	

¹Of this number 25,000 were lost in transit.

²Of this number 220,000 were lost in transit.

³Of this number 60,000 were lost in transit.

⁴Of this number 66,000 were lost in transit.

⁵Of this number 225,000 were lost in transit.

⁶Of this number 618,000 were eggs when placed on the car, and 137,000 were lost in transit.

⁷Of this number 22,000 were lost in transit.

⁸Of this number 52,000 were lost in transit.

⁹Of this number 11,850,000 were deposited in the local waters mentioned in the table, 807,000 were lost in transit, as specified in preceding foot-notes, and 29,993,000 were planted in other waters.

The number of shad eggs sent out to be hatched elsewhere is shown by the following table. It is not possible at this time to state the waters stocked, the consignees not having yet reported upon the subject.

SHAD EGGS FROM CENTRAL STATION.

Date.	Consignee.	Place of deposit.	Number shipped.
1887.			
May 6	Dr. E. G. Shortlidge*	Wilmington, Del	2, 074, 000
7	Fred Mather*	Cold Spring Harbor, N. Y	2, 414, 000
15	E. G. Blackford*	do	2, 029, 000
20	E. M. Stillwell*	Bangor, Me.†	1, 084, 000
21	E. G. Blackford*	Cold Spring Harbor, N. Y	2, 201, 000
	Total		9, 802, 000

*Delivered by car No. 3.
†For the Penobscot River.

‡Of this number 162,000 eggs were lost in transit.

FROM STEAMER FISH HAWK.

Date.	Waters stocked.	Place of deposit.	Shad and eggs.
1887.			
May 4	North East River	Havre de Graco, Md.	1, 184, 000
5	do	do	1, 845, 000
6	do	do	713, 000
6	Sassafras River	do	1, 250, 000
7	North East River	do	*3, 157, 000
8	do	do	261, 000
9	do	do	401, 000
10	do	do	997, 000
11	do	do	1, 577, 000
12	do	do	1, 527, 000
14	Chester River	do	1, 054, 000
16	North East River	do	1, 038, 000
17	do	do	994, 000
18	do	do	740, 000
19	do	do	574, 000
20	do	do	1, 196, 000
21	do	do	251, 000
22	do	do	175, 000
	Total		18, 934, 000

*Eggs not quite ready to hatch.

In addition to the above, 2,000,000 eggs were delivered, May 13, to the Delaware commission.

The most important experiment looking to the acclimatization of shad in new rivers was made in connection with the hydrographic basin of Great Salt Lake. This inland sea would seem to present all the conditions necessary for the reproduction of the shad under natural conditions. The value that would arise to the inhabitants of that section of the country from the introduction of some anadromous species like the shad in their waters was so evident, that it was determined by Professor Baird, the Commissioner, to test by an exhaustive experiment the capabilities of these waters to supply the necessary conditions. Accordingly car No. 2, with 1,000,000 fry, was sent to Utah and the fish successfully planted. The deposit was made in the Jordan River, it being deemed better to concentrate all the fish in a single plant than to distribute them in smaller numbers to tributary streams of Utah Lake. It is in contemplation to repeat this work for two successive seasons.

From the rapid increase in the volume of the work of shad distribution it is evident that it will be necessary to increase the efficiency of our distributing service in order to meet the demands that will probably be made upon it next season. This may be accomplished in two

ways: First, by the establishment of auxiliary field stations in those river basins which are to be stocked with shad. These stations should be properly equipped to give them a capacity of six or eight million eggs at one time. To these at the proper season a car can be dispatched carrying a full complement of eggs in one shipment, in this way quadrupling the present capacity of the cars in the work of distribution and reducing the cost of distribution per million *pro tanto*. Second, to increase the capacity of the producing stations so as to enable us to take care of all eggs at these stations until hatched. This would necessitate an increase in the number of cars for distribution; one or two at least in addition would be needed to provide for the anticipated increase in the volume of this work. Full details of distribution by stations, showing the streams stocked, the locality of the plant, and the number planted in each case are herewith given.

WASHINGTON, D. C., July 6, 1887.

35.—THE FINWHALE FISHERY ON THE LAPLAND COAST IN 1886.

By ALFRED HENEAGE COCKS, F. Z. S.

[Abstracted from the Zoologist, London, England, for June, 1887.]

The finwhaling season of 1886 off the north coast of Norway and Russia proved a good one as far as the number and size of the whales were concerned, but, owing to the continued low prices of oil and baleen, the result is not entirely satisfactory.

Rudolphi's rorqual, which in 1885, for the first time on record, appeared in such large numbers to the eastward of the North Cape, in 1886 confined itself again to its usual habitat, only 8 individuals being taken by ships of the companies having their stations to the east of that headland; and it is quite likely that some, and possibly all of this small number, were actually killed to the west of Cape North. None were even seen by the Russian boats.

The blue whale reappeared last year in more like its former numbers; but there was an appreciable falling off in the catch of this species as regards the Norwegian coast, though apparently this was not the case in the eastward portion of the Russian waters. A comparison for 1884, 1885, and 1886 of the numbers of common rorquals killed will show a steady increase, the totals for each company in 1886 averaging more than double the number obtained in 1884. The totals of humpbacks killed during each of these three years were very nearly the same.

With regard to the time when the different species of finwhale appear on the North European coast it may be stated that probably the first whale killed last year was a humpback, yielding about 39 barrels of oil, which was taken on February 24. Humpbacks are said to arrive on the east Finmark coast every February, but the weather was so bad