INDEX.

REPORT ON THE SALMON FISHERIES OF ALASKA.

Page.

Agreement of salmon-canners 10
Alaska salmon pack, 1883-1890, tabular statement 3
Alaska salmon fisheries, act for protection of 2
origin and development of 1-3
Albatross, steamer 4, 5, 8, 23
Apparatus and methods of the fisheries 11-12
Batcheller, Geo. S., letter of 5
Bean, Dr. T. H., letter of 7-8
the life-history of the salmon 21-38
Board of managers of Alaska canning companies 11
Karluk canning companies 11
Bibliography of the Salmonidæ of Alaska and adjacent regions 39-49
Close season during September and October 14
Genera and species referred to:
Clinostomus tænia 35
Coregonus kennicotti 21
laurettæ 22
nelsoni 22
pusillus 22
quadrilateralis 22
richardsoni 21
Gasterosteus 32
Lamna cornubica 33
Oncorhynchus chouicha 12, 18, 26-27
gorbuscha 12, 18, 28-30
keta 12, 18, 27-28
kisutch 12, 18, 28
nerka 12, 18, 30-33
Salmo gairdneri 12, 18, 23, 33-34
irideus 36
mykiss 23, 34-36
salar 33
virginalis 34
Salvelinus malma 12, 18, 23, 32, 37-38
namaycush 23, 36, 37
Thymallus signifer 22
Uranidea 32
Life-history of the salmon 21-38
Dog salmon (Oncorhynchus keta) 27-28
King salmon (Oncorhynchus chouicha) 26-27
Humpback salmon (Oncorhynchus gorbuscha) 28-30
Red salmon (Oncorhynchus nerka) 30-33
Silver salmon (Oncorhynchus kisutch) 28
Steelhead (Salmo gairdneri) 33-34
Red-throated trout (Salmo mykiss) 34-36
Rainbow trout (Salmo irideus) 36
Lake trout (Salvelinus namaycush) 36-37
Dolly Varden trout (Salvelinus malma) 37-38
Limitation of salmon catch by agreement of canners 9-11

Page.

McDonald, Marshall, letters of 8-9
National Salmon Park, paper by Livingston Stone 14-19
National Salmon Park, establishment of 14
Obstructions in the rivers 4-8
Persons referred to or quoted:
Baker, Marcus 39
Batcheller, Geo. S 4, 5
Bean, Dr. T. H 1, 8, 9, 12
Bean, Dr. T. H., the life-history of the salmon 21-38
Beardslee, Capt. L. A 23, 36
Booth, Mr 30
Bradford, D. F 27, 28, 32
Brommage, W. H 11
Campbell, J. B 38
Clark, J. W 6, 28
Dall, Dr. W. H 25
Dawson, Dr. G. M 26
Dowell, E. F 33, 34
Forbes, Prof. S. A 36
Gill, Dr. Theodore 39
Green, Loren 36
Herendeen, Capt. E. P 21
Hirsch, Chas 26, 27, 28, 29, 31, 32, 33, 38
Hume, Geo. W 11
Hubbard, W. F 33
Johnson, P. H 6
Jordan, Prof. D. S 34
Kennicott, Robt 21
Lansburg, Capt 28
Larsen, L. P 26, 28
Linton, Prof. Edwin 34
Lewis, Robert E 30
McDonald, Marshall 5, 7, 8, 9
McIntyre, B. G 26
Madsen, Peter 35
Maison, Léon 11
Milner, J. W 21, 37
Morton, Levi P 1
Nelson, E. W 22, 26, 29, 31, 38
Richardson, Dr 37
Sloss, Léon 11
Spaulding, O. F 9
Stone, Livingston 14, 30
Tanner, Lieut. Commander Z. L 4, 5, 6, 7, 8, 9
Thompson, Hugh S 5
Townsend, C. H 37
Turner, L. M 27, 28, 29
Washburn, Mr 27, 28, 31, 38
Yarrow, Dr. H. C 34
Present condition of the fisheries 4-11

REPORT ON THE SALMON FISHERIES OF ALASKA—Continued.

	Page.
Prohibition of capture of salmon	20
Protective regulation of the fisheries	13–20
Reproduction as related to methods	13
Statistics of the fisheries	3–4
Species of salmon of economic value:	
Dog salmon	13
Humpback salmon	13
Species of salmon of economic value—Continued.	
King salmon	12
Red salmon	12
Silver salmon	12
Tanner, Z. L., letters of	5, 6, 7
Thompson, Hugh S., letter of	5

DESCRIPTION OF A NEW SUCKER (PANTOSTEUS JORDANI).

Acomus guzmaniensis	54
generosus	55
Catostomus (Acomus) guzmaniensis	55
generosus	54
ardens	53
Catostomus catostomus	52, 53, 56
Catostomus discobolus	51, 52, 55, 56
Catostomus ? generosus	55
griseus	53
guzmaniensis	54
guzmaniense	55
latipinnis	52, 53, 55
nigricans	51
plebeius	54
teres	51
Minomus bardus	53, 55
Minomus delphinus	53, 55
jarrovii	55
platyrhynchus	55
plebeius	54
Pantosteus, list of specimens in U. S. National Museum	56
Pantosteus delphinus	52, 54, 55
dolphinus	55
discobolus	52, 53, 54, 55, 56
generosus	52, 53, 54, 55, 56
guzmaniensis	53
jarrovii	54, 55, 56
jordani	51–56
platyrhynchus	55
plebeius	52, 53, 54, 56
virescens	51, 53, 54

THE FISHES OF TEXAS AND THE RIO GRANDE BASIN.

Aiken, C. E	76
Anderson, W. W	79
Appendix	121–125
Baird & Girard	66, 67, 68
Bigelow, Dr. J. M	71
Black-prairie region	58
Carrington, Campbell	76
Central region	58
Clark, John H	65, 68
Classified list of localities mentioned	120
Climate	58–60
Coast-plain region	58
Coate, Orland	66
Couch, Lieut. D. N	65, 68
Cope, Edward D	65, 76, 78
Cope & Yarrow	76, 77
Dall, Dr. W. H	123
Dawes, C. M	76
Drainage	61–65
Earll, R. Edward	79
Eigenmann, C. H	89
Emory, Maj. W. H	67, 68
Evermann, Barton W	66, 82
Explanation of plates	126
Fishes known from Texas and the basin of the Rio Grande	95–119
Fishes known only from Texas and the Rio Grande Basin	89–90
Fishes of the Mexican portion of the Rio Grande Basin	89
Fishes represented in the Texan and Rio Grande fauna, list showing the species of each family	82–85
Garman, Samuel	65, 79
Geographical distribution of fishes in Texas and the Rio Grande Basin	91–94
Geography of Texas	57–65
Gilbert, Charles H	65, 81
Girard, Charles	68, 69, 70, 71, 72, 73, 74, 75, 76
Goode, G. Brown	77
Graham, J. D	65, 67, 68
Gurley, Dr. R. R	121, 123
Henshaw, H. W	76
Historical and bibliographical	65–82
Introduction	57
Jordan, David S	65, 77, 80, 81
Jordan & Meek	79
Jordan & Gilbert	65, 79, 80, 95
Kennerly, C. B. R	65, 68, 71
Kumlein, Ludwig	79
Llano Estacado	58–59
Localities mentioned, classified list	120
Loew, Dr. Oscar	76
Marcy, Capt. R. B	65, 66, 67
Marshall, Lieut. L. H	70
Marshall, Lieut. W. L	76
McClellan, Capt. Geo. B	65, 66, 67
McDonald, Marshall	57
Müllhausen, H. B	68, 71
Mollusks collected	123–125
Nominal species described from Texan or Rio Grande localities, list of	85–88
Pope, Capt. John	68, 70, 71
Potts, John	68, 70
Reptiles and batrachians collected, annotated list of	121, 122
Rothrock, Dr. J. T	76
Shedd, W. G	76
Shumard, Dr. G. C	65, 67, 68, 70
Singley, J. A	121, 123
Species found both in the Wabash River and Rio Grande basins	90
Species of fishes:	
Achirus fasciatus	79, 85, 94, 119

THE FISHES OF TEXAS AND THE RIO GRANDE BASIN—Continued.

Species of fishes—Continued. Page.

Adinia multifasciata 76, 83, 87, 89, 92, 106
Aëtobatis freminvillei 82, 90, 91, 96
Agosia oscula 83, 87, 89, 92, 104
yarrowi 77, 83, 87, 89, 90, 92, 104
Alutera schœpffi 79, 85, 90, 94, 119
Ameiurus lupus 72, 78, 82, 85, 89, 91, 97
melas 78, 82, 85, 91, 96
natalis 72, 77, 82, 85, 90, 91, 96
natalis bolli 78, 82, 85, 89, 90, 91, 97
nebulosus catulus 78, 80, 82, 85, 89, 91, 96
Ancylopsetta quadrocellata 85, 90, 94, 119
Anguilla chrysypa 75, 77, 84, 88, 90, 92, 108
anguilla rostrata 81
Aphredoderus sayanus 84, 93, 110
Aplodinotus grunniens 74, 81, 84, 88, 89, 90, 93, 116
Archosargus probatocephalus 74, 79, 84, 93, 116
Astroscopus anoplos 79, 85, 90, 94, 118
Bairdiella chrysura 79, 84, 93, 116
Batrachus tau 74, 85, 94, 118
Brevoortia tyrannus patronus 79, 83, 87, 92, 105
Campostoma anomalum ... 69, 75, 78, 80, 83, 86, 89, 90, 91, 98
formosulum 69, 75, 77, 83, 86, 89, 91, 98
ornatum 69, 75, 83, 86, 89, 90, 91, 98
Caranx hippos 74, 84, 88, 90, 93, 110
Carcharhinus platyodon 79, 82, 90, 91, 95
Carpiodes carpio 80, 82, 91, 97
velifer 80, 82, 90, 91, 97
velifer tumidus 68, 69, 74, 77, 78, 80, 82, 85, 89, 91, 97
Catostomus teres 83, 90, 91, 98
Centropomus undecimalis 79, 84, 93, 115
Chænobryttus gulosus 70, 81, 84, 88, 93, 111
Chætodipterus faber 79, 84, 90, 93, 117
Chasmodes bosquianus 85, 90, 94, 119
Chilomycterus schœpffi 79, 85, 90, 94, 119
Chloroscombrus chrysurus 74, 84, 88, 93, 110
Citharichthys spilopterus 85, 90, 94
Cliola vigilax 67, 69, 73, 75, 80, 83, 86, 91, 100
Clupea chrysochloris 79, 81, 83, 92, 105
Cochlognathus ornatus 69, 75, 78, 83, 86, 89, 91, 100
Cynoscion nebulosus 74, 79, 84, 93, 116
nothus 74, 84, 90, 93, 116
Cyprinodon elegans 66, 75, 83, 87, 92, 106
latifasciatus 78, 83, 87, 89, 90, 92, 106
variegatus 66, 75, 79, 83, 87, 89, 92, 106
Dasabatis sayi 82, 90, 91, 95
Dionda amara 69, 75, 77, 83, 86, 89, 91, 99
episcopa 69, 72, 78, 80, 83, 86, 89, 91, 99
fluviatilis 69, 75, 83, 86, 89, 90, 91, 99
melanops 69, 75, 83, 86, 89, 91, 99
punctifer 78, 83, 86, 89, 90, 91, 99
serena 69, 72, 75, 77, 78, 83, 86, 89, 91, 99
Dormitator maculatus 74, 84, 88, 89, 94, 117
Dorosoma cepedianum 79, 81, 83, 92, 105
Etheostoma australe 84, 88, 89, 93, 115
caprodes 66, 74, 78, 81, 84, 88, 93, 113
chlorosoma 84, 93, 113
fasciatus 76, 84, 88, 89, 90, 93, 113
fonticola 81, 84, 88, 89, 93, 115
fusiforme 76, 81, 84, 88, 93, 115
jessiæ 81, 84, 90, 93, 115
lateralis 76, 84, 88, 89, 90, 93, 115
lepidogenys 84, 88, 89, 90, 93, 114
lepidum 66, 74, 76, 77, 81, 84, 88, 89, 93, 114

Species of fishes—Continued. Page.

Etheostoma microperturus 81, 84, 88, 89, 90, 93, 115
pellucidum clarum 81, 84, 93, 113
phlox 78, 84, 88, 89, 90, 93, 113
scierum serrula 81, 84, 88, 93, 113
scovelli 81
shumardi 81, 84, 90, 93, 113
vivax 81, 84, 90, 93, 113
whipplei 76
Etropus crossotus 79, 85, 90, 94, 119
Erimyzon sucetta 69, 72, 74, 83, 86, 90, 91, 98
Felichthys marinus 68, 74, 79, 82, 91, 97
Fundulus diaphanus 83, 90, 92, 106
heteroclitus grandis .. 66, 75, 79, 83, 87, 89, 92, 107
pallidus 83, 87, 89, 90, 92, 106
similis 66, 75, 77, 79, 83, 87, 89, 92, 106
zebrinus 76, 77, 83, 89, 92, 106
Gambusia affinis ... 66, 75, 76, 78, 79, 81, 83, 87, 89, 90, 92, 107
Gerres gracilis 84, 93, 116
gula 74, 84, 93, 116
Gobiesox virgatulus 85, 90, 94, 118
Gobiomorus dormitator 74, 84, 89, 90, 93, 117
Gobionellus oceanicus 74, 85, 88, 90, 94, 118
Gobiosoma bosci 85, 94, 118
molestum 74, 85, 88, 94, 118
Gobius boleosoma 84, 94, 117
lyricus 74, 79, 84, 88, 89, 94, 117
soporator 74, 84, 88, 90, 94, 117
würdemanni 74, 85, 88, 90, 94, 118
Gymnothorax ocellatus nigromarginatus 75, 84, 88, 90, 92, 108
Harengula arcuata 83, 92, 105
Hemirhamphus unifasciatus 79, 84, 90, 92, 108
Heros cyanoguttatus 68, 74, 84, 88, 89, 93, 117
pavonaceus 78, 84, 88, 89, 90, 93, 117
Hiodon alosoides 81, 83, 90, 92, 105
Hybognathus nuchalis 77, 80, 83, 90, 91, 99
Hybopsis storerianus 80, 83, 90, 92, 104
æstivalis 69, 75, 77, 81, 83, 87, 89, 92, 104
æstivalis marconis 81, 83, 89, 92, 104
Hypleurochilus geminatus 74, 85, 88, 90, 94, 119
Ictalurus furcatus 68, 74, 82, 85, 89, 90, 91, 97
punctatus 74, 78, 80, 82, 85, 89, 90, 91, 97
Ictiobus bubalus 80, 82, 91, 97
cyprinella 82, 91, 97
Isesthes hentzi 85, 90, 94, 119
ionthas 85, 90, 94, 119
scrutator 79, 85, 88, 90, 94, 119
Labidesthes sicculus 84, 90, 93, 109
Lagocephalus lævigatus 79, 85, 90, 94, 119
Lagodon rhomboides 74, 79, 84, 93, 116
Larimus fasciatus 84, 90, 93, 116
Leiostomus xanthurus 74, 79, 84, 93, 116
Lepidogobius gulosus 74, 85, 88, 94, 118
Lepomis albulus 70, 72, 84, 88, 90, 93, 113
cyanellus 66, 67, 68, 70, 72 73, 77, 78, 81, 84, 88, 90, 93, 111
heros 68, 72, 73, 84, 89, 90, 93, 112
humilis 72, 78, 81, 84, 88, 93, 112
megalotis 67, 68, 72, 73, 74, 77 78, 81, 84, 88, 90, 93, 112
miniatus 84, 93, 112
pallidus 68, 72, 73, 77, 78 81, 84, 88, 89, 90, 93, 112
symmetricus 84, 90, 93, 111

THE FISHES OF TEXAS AND THE RIO GRANDE BASIN—Continued.

Page.

Species of fishes—Continued.

Lepisosteus osseus 80, 82, 90, 91, 96
platystomus 73, 77, 82, 85, 90, 91, 96
tristœchus 73, 82, 85, 89, 91, 96
Leptops olivaris 78, 80, 82, 89, 90, 91, 96
Leuciscus conspersus 78, 83, 87, 89, 92, 105
pulcher. ... 68, 69, 75, 77, 78, 81, 83, 87, 89, 92, 104
Lucania parva 83, 92, 107
venusta 75, 76, 83, 87, 89, 92, 107
Lucius vermiculatus 84, 92, 108
Lutjanus aya 84, 93, 115
caxis 74, 84, 93, 115
Malthe vespertilio 79, 85, 90, 94, 119
Megalops atlanticus 79 83, 90, 92, 105
Menticirrhus americanus 74, 79, 84, 88, 93, 116
littoralis 79, 84, 90, 93, 116
Menidia peninsulæ 84, 93, 109
vagrans 79, 84, 90, 93, 109
Micropogon undulatus 74, 79, 84, 93, 116
Micropterus salmoides 68, 72, 73, 78, 81, 84, 88, 89, 90, 93, 113
Minytrema melanops 69, 74, 83, 86, 90, 91, 98
Mollienesia latipinna 75, 76, 79, 84, 87, 89, 92, 107
Morone interrupta 84, 93, 115
Moxostoma congestum 68, 69, 75, 78, 80, 83, 86, 89, 91, 98
pœcilurum 80, 83, 90, 91, 98
Mugil cephalus 74, 79, 84, 88, 93, 109
Myrophis punctatus 79, 84, 88, 92, 108
Neoconger mucronatus 75, 84, 88, 90, 92, 108
Notemigonus chrysoleucus .. 69, 73, 75, 77, 83, 87, 90, 92, 105
Notropis amabilis 69, 75, 83, 87, 89, 90, 92, 103
bubalinus 67, 69, 73, 77, 83, 86, 89, 92, 102
cayuga atrocaudalis 83, 89, 91, 100
chihuahua 83, 86, 89, 90, 91, 101
deliciosus 69, 73, 77, 80, 83, 86, 91, 100
dilectus 73, 77, 80, 83, 87, 90, 92, 103
formosus 69, 75, 83, 86, 89, 90, 92, 102
fumeus 83, 87, 89, 90, 92, 103
garmani 78, 83, 86, 89, 90, 92, 102
lepidus 69, 73, 83, 86, 89, 90, 92, 102
leoninus 69, 73, 75, 83, 86, 89, 91, 101
lutrensis .. 67, 69, 73, 75, 77, 78, 80, 83, 86, 89, 91, 101
macrostomus 69, 75, 83, 86, 89, 92, 102
nitidus 69, 75, 83, 86, 89, 90, 91, 100
nocomis. 83, 89, 91, 100
notatus 69, 73, 80, 83, 86, 89, 92, 103
notemigonoides 83, 87, 89, 92, 103
nux 83, 89, 91, 100
ornatus 69, 75, 83, 86, 89, 90, 91, 101
proserpina 69, 75, 83, 86, 89, 91, 102
sabinæ 80, 83, 86, 90, 91, 100
simus 77, 83, 86, 89, 90, 91, 100
socius 69, 75, 83, 87, 89, 92, 103
swaini 69, 75, 78, 80, 83, 87, 89, 92, 103
texanus 69, 75, 80, 83, 86, 89, 92, 103
umbratilis 69, 73, 83, 87, 92, 103
venustus 69, 75, 78, 80, 83, 86, 89, 92, 102
Noturus nocturnus 80, 82, 85, 91, 96
Oligoplites saurus 74, 84, 88, 93, 110
Ophidion marginatum 74, 85, 88, 90, 94, 119
Opisthonema thrissa 79, 83, 90, 92, 105
Opsopœodus oscula 83, 87, 89, 92, 105

Page.

Species of fishes—Continued.

Orthopristis chrysopterus 74, 79, 84, 88, 93, 115
Ostracion tricorne 79, 85, 90, 94, 119
Pantosteus plebeius .. 68, 69, 75, 77, 78, 81, 83, 85, 89, 91, 98
Paralichthys lethostigma 79, 85, 94, 119
Phenacobius mirabilis 77, 81, 83, 89, 92, 103
Pimephales notatus 69, 72, 80, 83, 86, 91, 100
promelas confertus. 69, 72, 77, 83, 86, 89, 91, 100
Polynemus octonemus 74, 84, 88, 93, 110
Pœcilia couchiana 76, 84, 87, 89, 92, 108
Pogonias chromis 74, 79, 84, 93, 116
Pomoxis annularis 84, 93, 111
sparoides 81, 84, 93, 111
Porichthys porosissimus 79, 85, 88, 90, 94, 118
Prionotus scitulus 85, 90, 94, 118
tribulus 79, 85, 94, 118
Pristis pectinatus 79, 82, 90, 91, 95
Pterophryne histrio 79, 85, 90, 94, 119
Rhinichthys dulcis 77, 81, 83, 87, 89, 92, 103
Rhomboplites aurorubens 74, 84, 90, 93, 115
Roccus chrysops 81, 84, 90, 93, 115
Salmo mykiss spilurus 73, 77, 81, 83, 87, 89, 92, 106
Scaphirhynchus platyrhynchus. 77, 80, 82, 90, 91, 96, 119
Sciæna ocellata 74, 79, 84, 93, 116
Selene vomer 74, 84, 90, 93, 110
Semotilus atromaculatus 69, 73, 83, 87, 92, 104
Siphostoma floridæ 84, 90, 92, 108
fuscum 84, 90, 92, 109
louisianæ 84, 92, 109
Stelliferus lanceolatus 84, 90, 93, 116
Stolephorus browni 83, 90, 92, 105
mitchilli 79, 83, 92, 105
Stypodon signifer 78, 83, 87, 89, 90, 92, 104
Symphurus plagiusa 85, 94, 119
Synodus fœtens 75, 83, 92, 106
Tachysurus felis 68, 74, 79, 82, 85, 91, 97
Tetragonopterus argentatus 68, 75, 78, 83, 87, 89, 92, 105
Tetrodon nephelus 79, 85, 94, 119
Trachynotus carolinus 74, 84, 93, 110
Trichiurus lepturus 74, 79, 84, 93, 110
Trigon sabina 79, 82, 90, 91, 95
Tylosurus longirostris 74, 79, 84, 88, 92, 108
Upsilonphorus y-græcum 85, 90, 94, 118
Vomer setipinnis 74, 84, 93, 110
Zophendum plumbeum 69, 72, 83, 85, 86, 89, 91, 99
Zygonectes escambiæ 78, 83, 90, 92, 107
funduloides 83, 87, 89, 90, 92, 107
jenkinsi 83, 87, 89, 92, 107
notatus 78, 81, 83, 92, 107
pulvereus 83, 87, 89, 92, 107
Stevenson, C. H 126
Test, Frederick C 121
Trans-Pecos Region 59–60
Van Vliet, Capt 68
Vegetation 60–61
Wheeler, Lieut. G. M 76
Whipple, Lieut. A. W 68, 70, 71
Wilkinson, E 81
Woolman, A. J 81
Yarrow, Dr. H. C 65–76

	Page.
Akutan Pass	144
Alamitos Bay	189
Alaskan Coast, Deep-Sea Soundings and Dredgings in the North Pacific Ocean	154
Alaska Peninsula, off the southern side of	149–154
Alaska, southeastern	155
Albatross Bank	151
Albatross, building and employment of	127–131
Albatross, movements of	130–131
Alert Bay	156
Amak Island	136
Anacapa Passage and Island	186
Anderson Rock	153
Baird Bank	136–140
Bait	148–153
Ballenas Bay	178
Barclay Sound, Vancouver Island	162
Beaver Harbor	156
Bering Sea	132–148
Black-cod	150
Bodega Head	175
Bogoslof Island and Volcano	148
Bottom on the Banks, character of	152
British Columbia	155, 156
Broad Bay	145
California	174–195
California boundary line to Point Arena	174
California, investigations south of	195–197
Cape Blanco	173
Cape Cheerful to Makushin Bay	146
Cape Falcon	167
Cape Flattery to Grays Harbor	164
Cape Lookout	168
Cape Meares	168
Cape Perpetua to Umpqua River	170, 171
Cerros Island	196
Charts and other publications, list of	198–201
Charts and reports of U. S. Fish Commission	198, 199
Charts of U. S. Hydrographic Office	201
Chernoffsky Bay	146–147
Coal mine at Mine Harbor	142, 143
Coast line south of Golden Gate	178
Coast pilots and charts of the U. S. Coast and Geodetic Survey	200–201
Cod in Bering Sea	141, 142
Columbia River	166
Continental platform	157
Cordell Bank	177–178
Cortes Bank	190–192
Davidson Bank	150
Departure Bay	155
Dogfish	155
Drake Bay	178
Dredgings	152–156
Elder Point	145
Fanny Shoal	177
Farallon Islands	177
Fisheries of the Santa Barbara region	187–188
Fishes obtained by *Albatross* between Point Reyes and Monterey Bay	176–177
Fishing-grounds northeast of Unimak Pass	134–144
Fishing vessels in Bering Sea	147
Fish trap on Wood River	144
Flounders in Bristol Bay	142
Food-fishes obtained in vicinity of Santa Barbara Islands, list of	187
Food-fishes obtained on Cortes Bank	192
Food-fishes taken on Coasts of Washington and Oregon, list of	159
Fort Rupert	156
General features of region examined	132–134
Grays Harbor to Columbia River	165–166
Gulf of California	196–197
Hagemeister Island	140
Hague Channel	142
Halibut fishery	162–164
Halibut in Bristol Bay	142
Heceta Bank	171–173
Herendeen Bay	142–143
Introduction	127–131
Itinerary of investigations	132
Johnston Channel	142
Kiliulink Bay	144
Kulukak Bay	140–141
La Paz Bay	196
Lenard Rock	153
Los Coronados	193
Lower California, outer coast of	195–196
Magdalena Bay	195
Makushin Bay to Umnak Island	146–147
Mangrove oysters	196
Middleton Island	154
Mine Harbor	142–143
Mitrofania Bay	153
Monterey Bay	175–177
Monterey Bay and vicinity	179
Monterey Bay to Point Conception	180
Nateekin Bay	145
Nestuggah Bay	168
Newport Harbor	189
North Pacific Ocean, deep-sea soundings and dredgings off the Alaskan coast	154
Nushagak River, salmon fishery on	143–144
Oregon	166–173
Oregon and Washington	157–173
Orford Reef	173
Oyster beds in Algodones Lagoon	196
Pamplona Rocks	154
Point Arena to Point Reyes	174–175
Point Conception	182
Point Reyes	174
Point Reyes to Monterey Bay	175–177
Portlock Bank	151
Port Moller	142–143
Pribilof Islands	133
Priest Point	146
Reports and charts of U. S. Fish Commission	198–199
Revillagigedo Group	195
Salmon fishery on Nushagak River	143–144
Salmon, movements of	143
San Clemente Island	181–193
San Diego, region off of	193
San Lorenzo Channel	196
San Miguel Island	183–184
Sannak Bank	150
Sannak Bank and Shumagin Islands	151
San Nicolas Island	181–190
San Pedro Channel	182

FISHERY INVESTIGATIONS OF THE ALBATROSS, 1888-92—Continued.

	Page.
San Pedro Region	188-189
Santa Barbara	183
Santa Barbara Channel	181
Santa Barbara Island	189
Santa Catalina Gulf	193-194
Santa Catalina Island	181-189
Santa Cruz Island	185
Santa Rosa Island	185
Shumagin Bank	151
Shumagin Islands to Kadiak Island	151
Siletz Bay	168
Slime Bank	133, 134, 136
Southeastern Alaska	155
Southern cruise of 1891	197
Straits of Juan de Fuca and Puget Sound	159-162
Striped bass	179
Tanner Bank	190-192
Tillamook Rock	167
Tomales Point	175
Trials for fish	152, 153
Trinity Islands	154
Umnak Island	146, 147
Unalaska	150
Unalaska Harbor	144, 145, 146
Unalaska Island and vicinity	144-147
Unalga Pass	144
Unimak Pass, fishing-grounds northeast of	134-144
Ulakta Head	145
Umpqua River	170-171
Umpqua River to Cape Blanco	173
U. S. Coast and Geodetic Survey, coast pilots and charts of	200, 201
U. S. Fish Commission, reports and charts of	198, 199
U. S. Hydrographic Office charts	201
Walrus Group	140
Washington	159-166
Washington and Oregon	157-173
Weather in Bering Sea	134
Wood River	144
Yaquina Head	169, 170

THE OYSTER INDUSTRY OF MARYLAND.

Alabama, oyster product of	207, 283
oyster revenue in	282
planting law adopted	252
Alexandria, Va., oyster trade of	264
Annapolis, hospital service at	245
oyster markets at	264, 272
Anne Arundel County, oyster markets in	272
planting in	258
police protection in	286
Baltimore, dredging vessels	236, 243
hospital service	245
markets	214, 222, 223, 265-270
Barren grounds	292-296
Bay-shore grounds	224
Bendann, Daniel	207
Boats and vessels, dredging	239-241
scraping	250
tonging	233, 234
transporting	261
Boys, tonging	229
British Isles, oyster product of	207
Broca, Paul de	275
Bug-eyes	239
Bushel measure, size of	264
California, oyster product of	207
oyster revenue in	282
planting law adopted	252
Calvert County, oyster grounds in	223, 258
police protection in	286
Cambridge, hospital service	245
markets	222, 264, 271
Canada, oyster product of	207
Canning trade	210, 211, 213, 267
Canoes	233
Charles County, oyster grounds in	223, 224
police protection	286
Chesapeake and Delaware Canal	263
Chester River, oyster grounds and product	222, 263
police protection	286
Chestertown, oyster trade at	264
Choptank River, oyster grounds and product	221, 263
police protection	286
Claiborne, oyster markets	222, 271
Cleaver, T. J	263
Clerks of circuit courts	229, 247, 284
Close season, dredging	235, 238
general, adoption of	210
effect of	263, 290
scraping	247, 248
tonging	212, 227, 228, 230
Commission sellers	266
Connecticut, oyster culture in	294
oyster product of	206, 207, 283
oyster revenue in	282
planting law adopted	252
County commissioners	229, 256, 259, 260
County treasuries	211, 284
County waters	210, 215-226, 239, 247
Crisfield, hospital service	245
markets	221, 258, 264, 271
Cull law	212-214, 289-291
Davidson, Hunter	218, 275
Delaware, oyster planting in	252, 260
oyster product of	206, 207, 283
oyster revenue in	282
oystermen of	209
Dorchester County, oyster grounds	220, 221
oyster markets	271
planting operations	257, 258
scraping in	212, 247-250
tonging	228
Dredgers	206, 243-246
Dredges	209, 241-243, 290
Dredging	209, 215, 235-246
effects of	242, 290
grounds	218, 224, 238
revenue from	280
statistics	276
Du Bois, C. A., & Co	258
Eastern Bay, oyster grounds and product of	222, 236, 263
police protection	286
Easton, oyster trade at	264
Edmonds, R. H	261
Europe, cull laws	212
oyster product of	205, 206
Fishing bay	257, 263, 286

THE OYSTER INDUSTRY OF MARYLAND—Continued.

Page.

Florida, oyster product of 207, 283
oyster revenue in 282
planting law adopted 252
France, oyster product of 207
General measurers 264
Georgia, oyster product of 207, 283
oyster revenue in 282
planting law 252, 295
Germany, oyster product of 207
Governor 213, 246, 264, 285
Historical notes, dredging 235–238
general 208–214
marketing 266, 267
oyster culture 251–253
scraping 247–249
tonging 226–232
Historical notes, transporting 261
Hodson, Thomas S 207, 257
Holland, oyster product of 207
Illiteracy of dredgers 244
Incomes of dredgers 246
oyster planters 256, 257
shuckers 269
tongmen 234
transporters 262
Italy, oyster product of 207
Kent County 222, 229
Laws, dredging 237
planting 253, 256, 259
scraping 247, 248
tonging 230, 231
License regulations, dredging 235, 236, 237
general 211
measuring 264
scraping 247
tonging 227, 229, 230
transporting 261
Licensed measurers 264
Licenses, number of dredging 238
scraping 249
tonging 232
Louisiana, oyster product of 207, 283
oyster revenue in 282
planting law adopted 252
McDonald, Marshall 295
Maine, planting law adopted 232
Maltby, C. S 212, 236, 266, 275
Markets, Baltimore 265–270
county 271–273
general 213, 221–224, 264–274
canning trade 210, 211, 213, 267
raw-shucking trade 210, 266
Maryland oyster commission 218, 219
Massachusetts, oyster product of 207, 283
oyster revenue in 282
planting law adopted 252
Mississippi, oyster product of 207, 283
oyster revenue in 282
planting law adopted 252
Nanticoke River 209
Nativity of dredgers 244
Natural oyster ground, area and location of 206, 216, 219, 233, 238, 249
condition of 206, 216, 219, 233, 238, 249, 287, 293

Page.

Natural oyster ground, definition of 216
depletion of 209, 214, 217, 289
improvement of 291
lease or sale of 291
New Jersey, oyster product of 206, 207, 283
oyster revenue in 282
planting law adopted 252
New York, oyster product of 206, 207, 283
oyster revenue in 282
planting law adopted 252
North Carolina, oyster product of 207, 265, 283
oyster revenue in 282
planting law adopted 252, 295
Open and closed districts 291
Oregon, oyster product of 207, 283
oyster revenue in 282
planting law adopted 252
Owners of dredging vessels 240
Oxford, oyster markets 222, 264, 271
hospital service 245
Oyster commissioners, Somerset County 253
Oyster culture 251–260, 292–296
Oyster fund 220, 284, 285
Packers' fund 284
Patuxent River 223, 263
Pennsylvania, oyster product of 207, 282
Planters, oyster 206, 255–259
Planting, oyster 205, 209, 228, 251–260
grounds 252, 254–259, 292
Platt, William D 207
Pocomoke City, oyster trade of 264
Pocomoke River, boundary question 221
Pocomoke Sound 218, 220, 247, 257
Port Deposit, oyster trade of 264
Potomac River 217, 218, 223, 224, 263
Price of oysters 211, 214, 239, 257, 263, 267, 269, 279, 288
Prince George County 223
Products, oyster 207, 209, 212, 214, 226, 231, 239, 274–279, 281, 283
Protection to oyster beds 259
Pungies 239
Queen Anne County 222, 229, 272
Restrictions, night fishing 212
quantity of oysters 209, 225
steamers 211, 237
Sunday fishing 212
Also see Close season and cull laws.
Revenue, State 229, 249, 261, 280–285, 294
Rhode Island, oyster product of 207, 283
oyster revenue in 282
planting law adopted 252
Sams, Conway W 207
St. Mary County 210, 223, 224, 258, 286
St. Michael, oyster trade of 222, 264, 271
Salisbury, oyster trade of 264, 271, 272
School fund 211, 229, 284
Scrapemen 206, 250
Scraping 211, 215, 247–251
grounds 216, 219–222, 249
revenue 249, 280
statistics 277
Seaford, Del., oyster trade of 209, 221, 271
Seed oysters 228, 256, 257, 259, 263, 290
Seth, Joseph B 207, 218
"Set" of oysters 219, 221, 258, 260, 290
Shells oyster 208, 211, 225, 259, 260, 273, 284, 291

THE OYSTER INDUSTRY OF MARYLAND—Continued.

Page.

Shipping commissioners ... 244, 246
Shuckers ... 267, 269, 271
Shucking trade ... 210, 266
Sinepuxent Bay ... 212, 225, 255, 259, 286
Size of oysters ... 288
Smith, Marion de K ... 207
Somerset County ... 210, 211, 212, 213, 220, 231, 236, 247, 250, 253, 257, 260, 271, 286
South Carolina, oyster product of ... 207, 283
oyster revenue in ... 282
planting law adopted ... 252
State as an oyster farmer ... 259
State fishery force ... 212, 260, 285, 286
State treasury ... 211, 227, 229, 248, 283-285
State waters ... 210, 215, 218, 222, 226, 238, 247
Statistical summary ... 274-278
Surgical cases from dredging vessels ... 245
Survey of oyster reefs ... 217
Susquehanna River ... 217
Talbot County ... 212, 221, 229, 247, 250, 258, 271, 287
Tangier Sound ... 210, 218, 220, 247, 263
Texas, oyster product of ... 207, 283
planting law adopted ... 252, 295
Tidal-water area ... 215, 216
Tonging ... 209, 215, 226-235
grounds ... 219-224, 232
revenue ... 229, 280
statistics ... 276
Tongmen ... 206, 215, 229, 234

Page.

Tongs ... 209, 234
deep-water ... 223, 228
Tonnage grade of dredging vessels ... 240
Transporters ... 262
Transporting ... 209, 261-263
statistics ... 278
with other States ... 262
Travers, Samuel M ... 263
U. S. Coast and Geodetic Survey ... 218
Vienna, oyster trade of ... 221
Violations of oyster laws ... 212, 213, 233, 239, 286, 289
Virginia, boundary ... 221, 223, 231
dredging interdicted ... 209
oyster product of ... 206, 207, 214, 265
planting law adopted ... 252
revenue ... 282, 283
Washington, D. C ... 224, 245, 264
Washington, State of, oyster product ... 207, 283
oyster revenue in ... 282
planting law adopted ... 252
Whitehaven, markets ... 221
Wicomico County ... 220, 228, 272, 286
Winslow, Francis ... 221
Women tonging ... 229
shucking ... 267, 269
Worcester County ... 210, 211, 212, 225, 227, 228, 229, 252, 253, 255, 259
Wyman, Surgeon-General ... 245

FYKE NETS, AND THE FYKE-NET FISHERIES OF THE UNITED STATES.

Bollreuse, German name for fyke net ... 305, 349
Botirão, Portuguese name for fyke net ... 301, 354
Bow net, improper name for fyke net ... 299, 300
Brook fyke ... 303, 307, 324
Buckdart, name for fyke net ... 300, 307, 330
Cache, French name for fyke net ... 301, 352
California, fyke-net fishery of ... 335
Canada, fyke-net fishery of ... 348
Cattie fyke ... 330
Century Dictionary, quoted ... 299
China, fyke-net fishery of ... 355
Classification of fyke nets ... 302
Cogolo, Italian name for fyke net ... 301, 353, 354
Connecticut, fyke-net fishery of ... 318
Definition of fyke net ... 299
Delaware, fyke-net fishery of ... 327
Description of fyke nets ... 302
Drop fyke ... 301, 303, 304, 307, 324, 325, 327, 330
Eel bait-pot ... 305
fyke ... 301, 305, 330
Extent of fyke-net fisheries ... 311
Fike, name for fyke net ... 300, 321
Finland, fyke-net fishery of ... 351
Fischreuse, German name for fyke net ... 301
Fischsack, German name for fyke net ... 301, 349
Fishing season for fyke nets ... 314
France, fyke-net fishery of ... 351
Fuik, Dutch name for fyke net ... 300
Funnel-mouth pound, name for fyke net ... 300, 332
Fyke net, classification ... 302
definition ... 299
description ... 302
in California ... 335

Fyke net, in Canada ... 348
China ... 355
Connecticut ... 318
Delaware ... 327
Finland ... 351
France ... 351
Georgia ... 335
Germany ... 349
Great Britain ... 348
Great Lakes ... 338
Japan ... 355
law ... 310
Maine ... 315
Maryland ... 328
Massachusetts ... 316
Middle Atlantic States ... 319
New England States ... 315
New Jersey ... 323
New York ... 320
North Carolina ... 334
Norway ... 350
Pacific States ... 335
Pennsylvania ... 325
Portugal ... 354
Rhode Island ... 317
Russia ... 351
South Atlantic States ... 333
southern Europe ... 353
Spain ... 354
Virginia ... 331
names of ... 300
principle of ... 301
Fyke-net fishery, California ... 335

FYKE NETS, AND THE FYKE-NET FISHERIES OF THE UNITED STATES—Continued.

Page.

Fyke-net fishery, Canada ... 348
China ... 355
Connecticut ... 318
Delaware ... 327
extent ... 311
Finland ... 351
fishermen employed ... 312
fishing season ... 314
France ... 351
geographical review ... 311
Georgia ... 335
Germany ... 349
Great Britain ... 348
Great Lakes ... 338
importance ... 311
Japan ... 355
Lake Erie ... 344
Huron ... 342
Michigan ... 340
Ontario ... 346
St. Clair ... 343
Superior ... 340
Maine ... 315
Maryland ... 328
Massachusetts ... 316
methods ... 314
Middle Atlantic States ... 319
nets and boats employed ... 312
New England States ... 315
New Jersey ... 323
New York ... 320
North Carolina ... 334
Norway ... 350
Pacific States ... 335
Pennsylvania ... 325
Portugal ... 354
products ... 312, 313, 314
Rhode Island ... 317
Russia ... 351
South Atlantic States ... 333
Spain ... 354
statistics, general ... 312, 313, 314
United States ... 311
Virginia ... 331
Geographical review of fyke-net fishery ... 311
Georgia, fyke-net fishery of ... 335
Germany, fyke-net fishery of ... 349
Gobbler, name for fyke net ... 300, 308, 342
Great Britain, fyke-net fishery of ... 348
Great Lakes, fyke-net fishery of ... 338
Guideau, French name for fyke net ... 301, 351, 352
Gumbo fyke ... 330
Hedging fyke ... 309
Hoop net, name for fyke net ... 300, 348
Importance of fyke-net fishery ... 311
Japan, fyke-net fishery of ... 355
Jumbo fyke ... 330
Lake Erie, fyke-net fishery of ... 344
Huron fyke-net fishery of ... 342
Michigan, fyke-net fishery of ... 340
Ontario, fyke-net fishery of ... 346
St. Clair, fyke-net fishery of ... 343
Superior, fyke-net fishery of ... 340
Loup, French name for fyke net ... 301, 352

Page.

Maine, fyke-net fishery of ... 315
Manche, French name for fyke net ... 301, 352
Maryland, fyke-net fishery of ... 328
Massachusetts, fyke-net fishery of ... 316
Methods of fyke-net fishing ... 314
Middle Atlantic States, fyke-net fishery of ... 319
Muzuar, Portuguese name for pot-like fyke ... 301, 354
Names of fyke net ... 300
Neunaugen reuse, German name for fyke net ... 349
New England States, fyke-net fishery of ... 315
New Jersey, fyke-net fishery of ... 323
New York, fyke-net fishery of ... 320
North Carolina, fyke-net fishery of ... 334
Norway, fyke-net fishery of ... 350
Pacific States, fyke-net fishery of ... 335
Pennsylvania, fyke-net fishery of ... 325
Perch fyke ... 330
Persons referred to or quoted:
Bathurst, Charles ... 349
Faber, G. L ... 353
Ingersoll, John D ... 337
Lohsen, Martin C ... 323
Monceau, Duhamell du ... 351
Nordqvist, Dr. Oscar ... 351
Raynor, N ... 332
Shepard, W. S ... 306
Silva, A. A. Baldaque da ... 354
Stone, Livingston ... 337
Thiersant, Darby de ... 355
Wakeham, Dr. William ... 348
Pike net, name for fyke net ... 300, 303, 304, 324
Portugal, fyke-net fishery of ... 354
Pound fyke ... 301, 307, 308, 324
Principle of fyke net ... 301
Queue, French name for fyke net ... 301, 352
Quinqueporte, French name for fyke net ... 301, 352
Raus, Gothic name for fyke net ... 301
Renard, French name for fyke net ... 301, 352
Reuse, German name for fyke net ... 301
Rhode Island, fyke-net fishery of ... 317
Risk, Anglo-Saxon name for fyke net ... 301
Ruse, Danish and Norwegian name for fyke net ... 301
Russia, fyke-net fishery of ... 351
Rysä, Finnish name for fyke net ... 301
Rysja, Swedish name for fyke net ... 301
Sac, French name for fyke net ... 301, 352
San-yen-kao, Chinese name for fyke net ... 355
Set of fykes ... 309, 310, 329, 331
Shad fyke ... 301, 309, 323
Sink net, name for fyke net ... 300, 307, 330
South Atlantic States, fyke-net fishery of ... 333
Southern Europe, fyke-net fishery of ... 353
Spain, fyke-net fishery of ... 354
Stationary hoop net, name for fyke net ... 300, 321
Statistics of fyke-net fishery ... 312, 313, 314
Tcha-kao, Chinese name for fyke net ... 355
Terrapin fyke ... 301
United States, fyke-net fishery of ... 311
Vanda, Russian name for fyke net ... 351
Versha, Russian name for fyke net ... 301
Verveux, French name for fyke net ... 301, 348, 351, 352
Virginia, fyke-net fishery of ... 331
Webster's Dictionary, quoted ... 299
Worcester's Dictionary, quoted ... 299

FISHES COLLECTED AT SEA ISLE CITY, NEW JERSEY.

	Page.
Achirus fasciatus	363
Alutera schœpfii	363
Anguilla chrysypa	360
Apeltes quadracus	360
Archosargus probatocephalus	362
Bairdiella chrysura	362
Balistes carolinensis	357, 363
Batrachus tau	363
Brevoortia tyrannus	359
Caranx chrysos	357, 361
hippos	361
Carcharias littoralis	357, 358
Carcharhinus obscurus	358
Centropristis striatus	361
Chilomycterus schœpfii	364
Clupea æstivalis	359
pseudoharengus	359
sapidissima	357, 358
Cynoscion regalis	363
Cyprinodon variegatus	359
Dasyatis centrurus	358
Decapterus punctatus	357, 361
Echeneis naucrates	357, 360
Etrumeus sadina	358
Fundulus heteroclitus	359, 360
majalis	359, 360
Galeus canis	358
Gobiosoma bosci	363
Hippocampus hudsonius	360
Leiostomus xanthurus	362
Menidia notata	359, 360
Menticirrhus saxatilis	362
Mugil curema	360
cephalus	360
Mullus surmuletus auratus	357, 362
Ophidion marginatum	358, 363
Opisthonema oglinum	358, 359
Orbidus maculatus	363
Paralichthys dentatus	363
Pleuronectes maculatus	363
Pogonias cromis	358, 362
Pomatomus saltatrix	361
Prionotus carolinus	364
strigatus	364
Raia eglanteria	358
Raia lævis	358
Roccus lineatus	361
Sarda sarda	360
Scomber colias	360
Selene vomer	361
Seriola zonata	361
Siphostoma fuscum	360
Stenotomus chrysops	362
Stolephorus browni	359
Stolephorus mitchilli	359
Stromateus triacanthus	361
Synodus fœtens	359
Tautoga onitis	363
Trachinotus carolinus	361
Tylosurus marinus	360
Vomer setipinnis	357, 361

FISHES OF THE NORTHERN COAST OF NEW JERSEY.

Acipenser sturio oxyrhynchus	368
Anguilla chrysypa	369
Archosargus probatocephalus	375
Brevoortia tyrannus	369
Centropristis striatus	375
Clupea æstivalis	368
mediocris	368
pseudoharengus	368
sapidissima	369
Conger conger	369
Ctenolabrus adspersus	378
Cynoscion nebulosus	377
regalis	376
Dasyatis centrurus	368
Exocœtus sp	370
Gadus morrhua	379
Gymnosarda alletterata	371
Leiostomus xanthurus	377
Leirus perciformis	374
Lutjanus blackfordi	375
Melanogrammus æglifinus	379
Menticirrhus saxatilis	377
Naucrates ductor	373
Paralichthys dentatus	379
Phycis chuss	379
tenuis	379
Pogonias cromis	378
Pollachius virens	379
Pomatomus saltatrix	374
Pound nets on the New Jersey coast	365, 366, 367
Prionotus strigatus	378, 379
palmipes	378, 379
Pseudopleuronectes americanus	380
Raia eglanteria	368
lævis	368
Roccus lineatus	375
Sarda sarda	371
Sciæna ocellata	377
Scomber colias	373
scombrus	372
Scomberomorus maculatus	370
regalis	370
Selene vomer	373
Seriola zonata	373
dumerili lalandi	373
Stenotomus chrysops	376
Stolephorus browni	369
eurystole	369
mitchilli	369
Stromateus triacanthus	374
Tautoga onitis	378
Trachinotus carolinus	373
Tylosurus marinus	369

VIVIPAROUS FISHES OF THE PACIFIC COAST.

	Page.
Introductory note	401
Viviparous fish of the Pacific Coast	401
Types of viviparity in Teleosts	404
Historical notice of *Embiotocidæ*	405
Cymatogaster aggregatus Gibbons	412
Breeding habits	412
Methods of studying living eggs	412
Methods of studying living larvæ	413
Connection of the developing egg and larva with the ovarian structures	413
Position of larvæ in the ovary	413
Intraovarian food	414
Intraovarian respiration	415
Duration of gestation and adolescence and number of young	415
The ovary	418
Secondary sexual characters in *Cymatogaster*	419
Copulation	419
Development of ovarian eggs	421
The mature egg	421
Segmentation	424
Gastrulation	428
Cymatogaster aggregatus—Continued.	
Explanations of figures and diagrams	436
Periblast	437
Yolk nucleus	440
Significance of the yolk nucleus	441
Comparison between the processes of conjugation in ciliate infusoria (modified from Weismann after Maupas) and of maturation and segmentation in *Cymatogaster aggregatus*	446
Formation of the mesoderm	446
Anatomy of an embryo with three protrovertebræ	449
General development of the larvæ	450
Formation of the intestine	451
Kupffer's vesicle	456
Neurenteric canal	458
Kupffer's vesicle in general	459
Formation of liver and air-bladder, mouth, thyroid gland, and hypophysis	461
Gills	464
Summary of conclusions	465
Bibliography	468
Explanations of plates	472