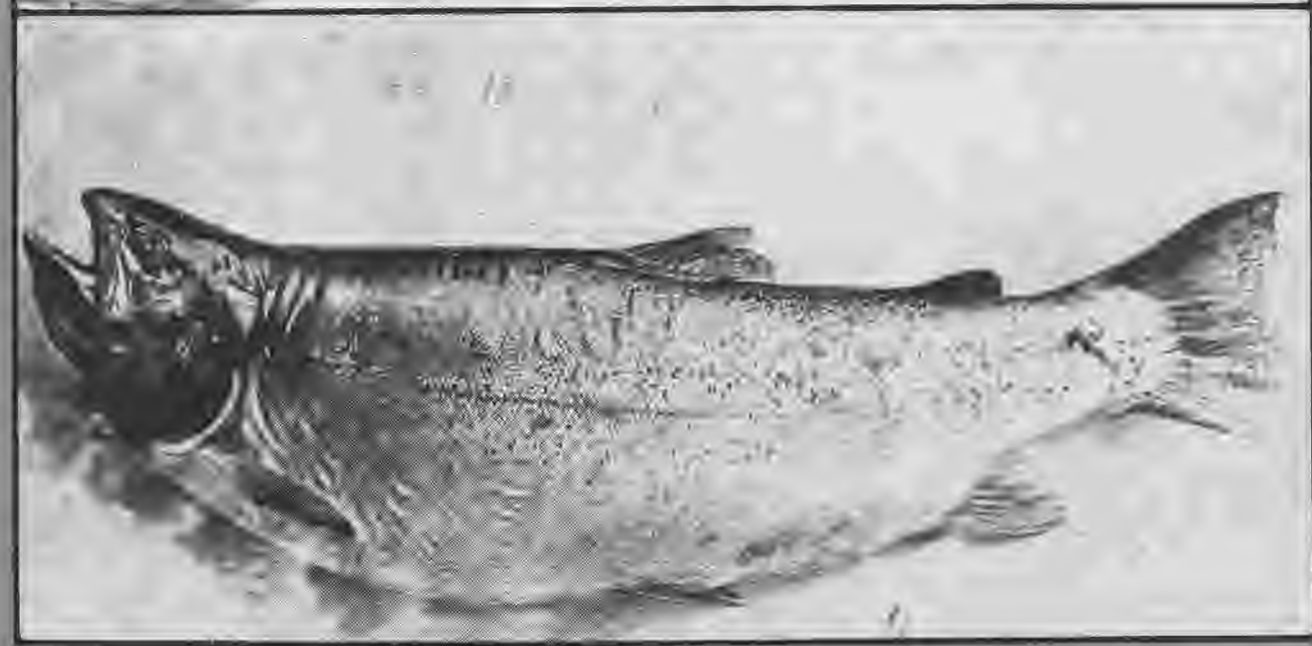
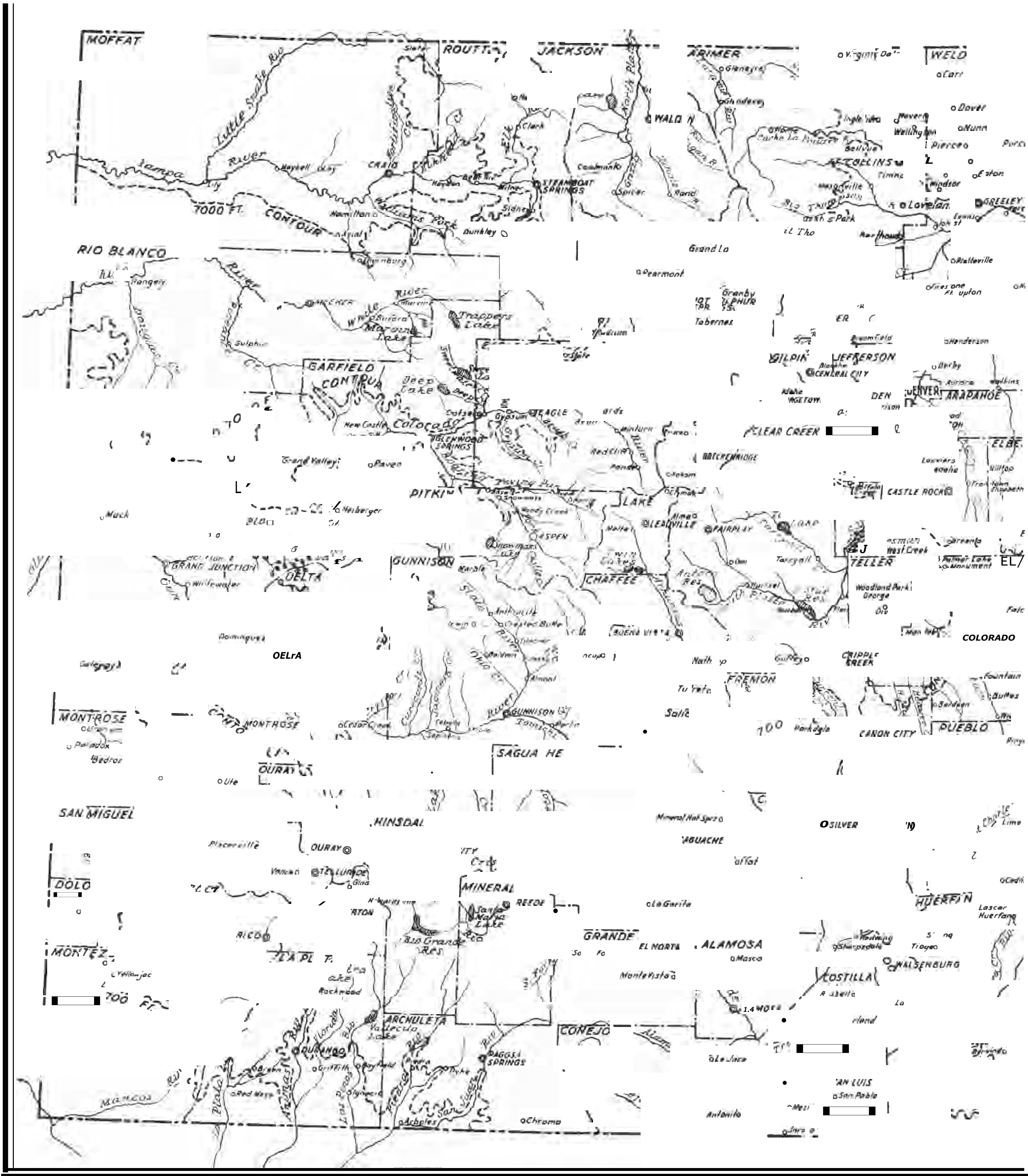
Fish Culture and Stocking in Colorado, 1872-1978

William J. Wiltzius



COLORADO DIVISION OF WILDLIFE



Front cover--State field crew seining cutthroat trout spawners at Emerald Lake (above), Hinsdale County, in the early 1900's (Photo from the State Fish Commissioner Biennial Report for 1905-06). A 12-pound exotic rainbow trout (below) caught from the Gunnison River by attorney T. C. Brown of Gunnison on August 18, 1897, a short distance above that town (Gunnison Tribune 1897 Aug 20) (Photo from Outdoor Life 1907 Jul p 241).

State and private fish culturists first stocked this species in the Gunnison drainage in the 1880's. Large rainbow trout began entering creels in the 1890's and the state established a field spawn-collecting station at North Beaver Creek below Gunnison in 1897. Larger specimens of rainbow were later taken there with seines by spawning crews, but I found no evidence that any larger than this one were taken by hook and line from this river.

FISH CULTURE AND STOCKING IN COLORADO, 1872-1978

WILLIAM J. WILTZIUS

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PREFACE

During January 1981, after searching through historic documents for about one year, I prepared a paper entitled, "Compendium of Introduction Dates and State and Federal Annual Stocking of Various Fishes in Colorado, 1872-1978." The paper was used by State attorneys who were then involved in litigations with the Colorado River Water Conservation District, Southwestern Water Conservation District. Only ten copies of that paper were made, but some of those who read it requested a copy or expressed the need for wider distribution.

When I prepared the original paper, important data especially that regarding early private pisciculture in Colorado had to be omitted because of an early deadline. Pertinent material that had been requested through interlibrary loans was not received until after the original version was written. Consequently, I undertook the task to enlarge the original script to its present form, which I hope will have a much wider distribution.

Searches of the literature indicated that the history of pisciculture, which involves that branch of agriculture dealing with the culturing of fishes, had never been adequately reported for Colorado. Anybody who ever read History of Agriculture in Colorado by A. T. Steinel and D. W. Working (1926) in which the earliest introduction of nearly every domestic animal in Colorado was documented, but with only about three mentions of fish, probably would have concluded that pisciculture was a minor endeavor for our early pioneers. To the contrary, pisciculture is truly an ancient art and has been with us since man first came in contact with fish. The usual pattern has been that man first sees fish in the water; he then catches them to consume for food or commerce; usually reduces or depletes the original source in a short time; so he finally resorts to pisciculture to replenish and perpetuate the dwindling stocks of fish.

Colorado has been endowed with an abundant supply of unpolluted snow-melt waters that course through five principal river drainages. The waters in the upper reaches of most of these drainages contained robust populations of fishes, principally four subspecies of cutthroat trout, namely: the greenback cutthroat trout (Salmo clarki stomias) in the South Platte and Arkansas drainages; the Colorado River cutthroat trout (S. c. pleuriticus) in the Colorado River drainage; the Rio Grande cutthroat trout (S. c. virginalis) in the upper reaches of the Rio Grande drainage; and the yellowfin cutthroat trout (S. c. macdonaldi) scientifically collected only from Twin Lakes near Leadville. Some believed the yellowfin trout originally existed in many tributaries of the Upper Arkansas River (Field and Farm 1890 Mar 8, p 6) and may have been successfully introduced into the Grand Mesa Lakes in western Colorado (Arthur H. Carhart 1950 Fishing in the West The MacMillan Co., N. Y., Pp 19-20, 108), or into the mountain streams of France (The Scientific Monthly 1923 Aug p 104). Despite this, the yellowfin trout is now believed to be extinct.

[1]Nomenclature follows R. J. Behnke (1979 Monograph of the native trouts of the genus Salmo of Western North America USFWS, Denver, Colo. 215pp). In the present text I often times for brevity omitted "cutthroat" or have used the term variety when referring to particular subspecies of cutthroat trout; hence, greenback trout, greenback variety, yellowfin trout, etc.

An overwhelming number of early accounts indicated that originally there were no trout in the upper North Platte River drainage in Colorado and Wyoming (Fig. 1). Private parties likely started introducing trout there as early as the late 1870's. Colorado abounds with many springs of rather uniform temperatures that were used by our early culturists in hatcheries to artificially incubate ova from cutthroat trout as well as ova from other desired game species or food fishes that were not originally indigenous to Colorado.

Of 89 different fishes, including subspecies, expected to be found in Colorado (W. Beckman 1952 Guide to the fishes of Colorado p 1), 54 were said to be native, 2 were described as potential residents, and 33 had been introduced. Many others have been introduced since then.

This report first shows some of the events and territorial laws that permitted early settlers to be involved in pisciculture activities. Included here are discussions of early commercial fishing operations and factors that led to the formation of sportsmen's groups that became involved with fish stocking, enforcing laws, and legislative lobbying. Most discussions of private fish culturists are limited to those 19th-century pioneers who had access to hatcheries.

I discuss and document the involvement of federal and state agencies in early pisciculture and some of their interactions with private culturists. Early changes in laws that deemphasized private piscicultural activity are given and data are also presented on how private culturists compensated these changes. Many of the fish hatcheries that operated within Colorado have been tabulated and some are illustrated in various sections of the report.

I have presented a "Then and Now" pictorial comparison for pertinent state fish culture and stocking functions. Egg and fry handling, feeding, loading, and distributing of the fish are separately illustrated and briefly described. Following a short discussion of available records and nomenclature problems, an annual summarization is presented for each "species" of fish known to have been distributed in Colorado between 1872 and 1978 by state and federal hatcheries. The report ends with documentation of the earliest known dates for the introduction of various exotic fishes into Colorado's East Slope and West Slope waters, with the responsible parties noted and referenced. I have not attempted to update the annual fish stockings or introductions since 1978.

Recently in Colorado some effort has been made to emphasize stocking endemic cutthroat trout that have been out-competed by or naturally hybridized with exotics and, in some instances, have nearly become extinct. Most of the early literature heretofore available on these trout was concerned primarily with taxonomy or geographical distributions with little information regarding their habits and biology. I have, therefore, included in Appendix B some early writings by Gordon Land primarily depicting details on the habits of the greenback trout. I hope that these writings may assist fish managers and researchers in their attempts to successfully reestablish this subspecies or, at least, point out potential problems.

William J. Wiltzius
Wildlife Researcher

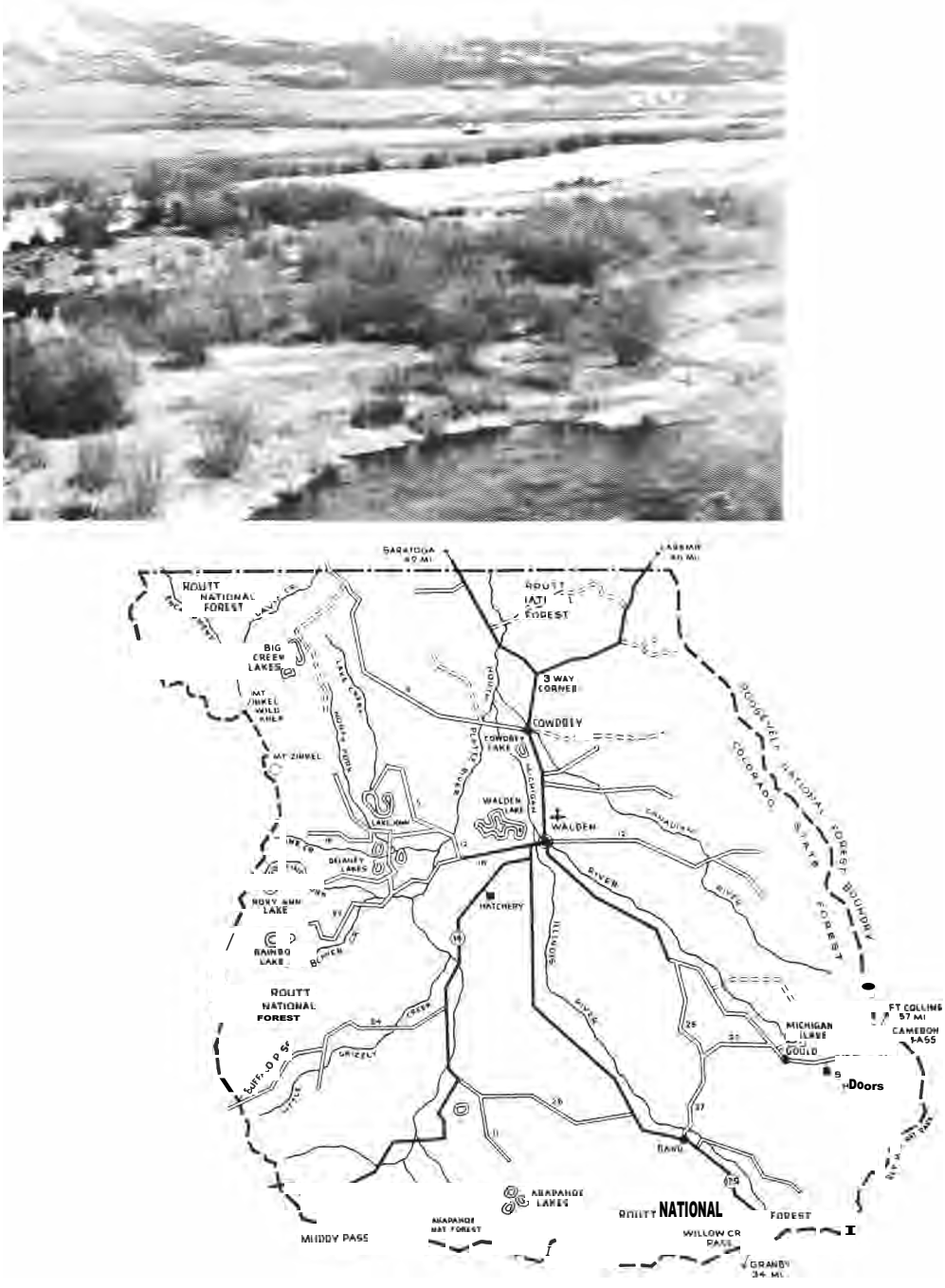

Fig. 1. Most early literature said that streams of the NORTH PLATTE DRAINAGE in North Park originally had no trout. References indicating no trout: 1st, 2nd, and **3rd** Annu. Rep. of the U.S. Geol. Survey of the Territories for the years 1867, 1868, and **TIT69,** USGPO 1873 p 85; Rocky Mountain News 1875 Aug 6:2 c 3, 1877 Jul 27:4; Forest and Stream 1876 Jan 20:372, 1879 c 2, 1888 Jul 19:516 c 1; Chicago Field 1878 Jul 27:172 c 1; American Angler 1883 May 26:328, 1884 Mar 29: - ; Crofutt's Grip-Sack Guide of Colo. 1881 pp 132, 148; Rep. of the Colo. Fish Comm. of the State of Colo. for the Year 1889-90 p 7; Field and Farm 1897 Jan 10:7, 1891 Jun 13:11; Sports Afield 1897 Jul p 38, 1898 Feb p 112; Outdoor Life 1902 Jan; Trans. Amer. Fish. Soc. 1913 42:188, 193. References indicating trout present: Dept. Agr. Rep. for 1869 USGPO 1870? p 604; Forest and Stream 1876 Feb 17:22; Field and Farm 1899 Jul 8:7; **W.** F. Stone History of Colorado 1918, The S. J. Clarke Publ. Co., Chicago. Vol. 1, p 221. (Map and photo from Colo. Outdoors 1965 Sep-Oct p 44-45)

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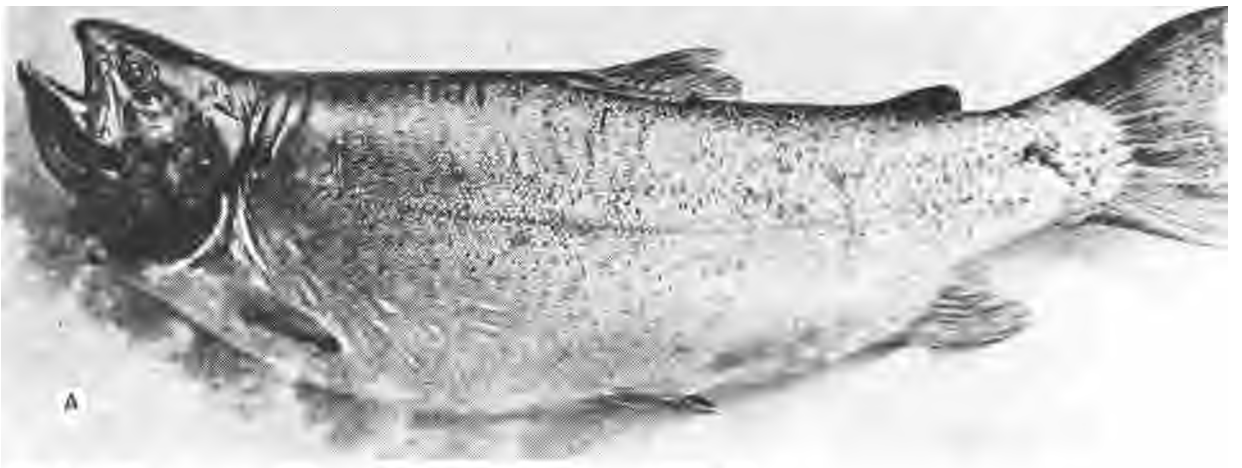
I thank the following for their contributions to this document: Lee Mills and the staff at the Denver Federal Center, Denver, Colorado, for supplying photocopies of Federal stocking records; the State Archives, Denver, for supplying copies of some early Colorado Fish Commissioner reports; the Denver Public Library, Denver, for lending their original copy of Commissioner Sisty's 1879-1880 Biennial Report; the Colorado State University Library and Inter-library Loan Departments for acquiring the 1881-1888 holdings of American Angler from Yale University Library and numerous copies of Colorado Fish Commissioner reports; Robert Behnke, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, for his encouragement and support throughout this undertaking, and for supplying a rare U. S. Fish Commissioner Report.

Additional references were supplied by Liston Leyendecker, Department of History, Colorado State University, Fort Collins; Jan Pettit, Ute Pass Historical Society, Cascade, Colorado; Howard Gary, U. S. Forest Service, Fort Collins; June Shaputis, Buena Vista Historic Society; and the State Historical Society, Denver.

I am grateful to the many colleagues and others from the Colorado Division of Wildlife, Fort Collins, who contributed information and data. Donald Horak gave support and encouragement; Wayne Seaman and William Klein commented on early manuscript drafts; Kay Pankonin, Dolores Hall, and Judi Reeve assisted with manuscript preparation; Marian Hershcopf procured and reproduced microfilm holdings of Chicago Field, and provided references and valuable information; Lyn Stevens translated articles from French to English; and Rod Van Velson obtained pertinent photographs and data from Emerald Flint Patrick.

My appreciation is extended to Nancy McEwen for editing, designing, and preparing the manuscript through many corrections, additions, and revisions; to Deborah Harris for providing an extensive and most helpful editorial review; and to Geoff Tischbein for doing a fine job of reproducing the old photographs and offering suggestions during all phases of the project.

I especially thank my family who endured the many months of my preoccupation with searching and writing; and to whom I can merely apologize and say, "It won't happen again--I am finished writing documentaries."



Frontispiece. The RAINBOW TROUT (A), now the most abundantly stocked trout in Colorado, was first introduced here from California by fish culturists in 1882. Widespread distribution of the species did not occur until the early 1900's when state and federal culturists annually collected millions of rainbow trout eggs at the State's SPAWN-COLLECTING STATIONS along the Gunnison River (B). Many privately-owned lakes containing rainbow trout were also used by government spawning crews, notably Electra, EMERALD (C), and the Grand Mesa lakes. In the late 1920's, the state also began to build and operate lakes and reservoirs principally for spawn-taking. These included Haviland, Parvin, Tarryall, and Cameron Pass, all of which were stocked heavily with rainbow trout, thereby contributing to the species extensive distribution in Colorado. (Photos A and C from Outdoor Life [A--1907 Jul p 24, C--1901 Mar]; photo B from State Fish Commissioner Biennial Report for 1905-06. Photo C as it appeared in Outdoor Life did not have information regarding the species, man, or locality. Emerald Flint Patrick, an "old-timer" from Ignacio, has identified his father, Wash Patrick, as the man in the photo. Wash was superintendent of the Emerald Lake Hatchery at that time. The fish is believed to be a rainbow trout, based on the widespread spotting pattern seen in an enlargement of the photo.)

FISH CULTURE AND STOCKING IN COLORADO, 1872-1978

Recently the U. S. Fish and Wildlife Service and several Colorado River basin states have been involved in legal actions with the Colorado River Water Conservation District, Southwestern Water Conservation District. A portion of the suit required the parties involved to document the introduction or stocking of various exotic fishes into the Colorado River system. The U. S. Fish and Wildlife Service compiled a list (Table 1) of fishes stocked into this system. Lawyers representing Colorado felt that this list was of little value to them because it contained no information about specific locations and dates.

Probably because of my interest and knowledge of early records, I undertook the search for and compilation of specific data with emphasis on catfish, bass, and northern pike (Tables 2-4). The present document is a summary of some of the data that have been amassed, with some discussion of persons and agencies involved in the introduction of exotic fishes to Colorado.

To understand this account, one needs some basic knowledge of the early history of the various agencies and their records. I have used three broad categories--private, federal, and state--each of which is discussed.

PRIVATE FISH CULTURE

Private pisciculture activity may have begun in Colorado even before the rapid immigration of miners into Colorado territory in 1859. Such activity, however, probably was primarily confined to indigenous fish species until after the advent of more rapid rail transportation in 1869 when the first intercontinental railroad in the United States had progressed westward over South Pass in Wyoming. A branch line to Denver was completed during the summer of 1870 but West Slope towns in Colorado were not connected by rail transportation until the early 1880's. As a result, settler development and consequently the introduction of exotic fish to West Slope waters lagged behind those in East Slope waters.

One of the earliest exotic fish introductions into Colorado was reported by A. H. Miles (Fig. 2), a Denver fish pond owner, who stated in an article entitled "Fish Culture in Colorado" that seven sunfish had been imported by oxcart from Ohio in 1862, and had fluorished. He noted, "it is said that Black Bass have already been carried over the Plains." Miles also mentioned that other parties had facilities for trout culture and were making preparations to begin operations (Denver Rocky Mountain News [RMN] 1872 Oct 22:2 c 2). Trout culture in Colorado had already begun before then because James M. Broadwell had been rearing cutthroat trout in his ponds along the South Platte River ten miles below Denver since 1870, and had successfully imported and hatched, early in 1872, 10,006 trout eggs from Boscobel, Wisconsin (Denver RMN 1873 Jan 19:4 c 3). Trout eggs from Wisconsin, at that time, must have been the eastern brook trout (Salvelinus fontinalis), an exotic fish to Colorado waters.

The most extensive list of early fish culturists in Colorado was originally published in the Bull. of the U. S. Fish

TABLE 1--Fish species stocked into the Colorado River System[a,b]

Family and Genus	Species	Common name
CLUPEIDAE		
Alosa	*sapidissima*	American shad
Dorosoma	*petenense*	Threadfin shad
SALMONIDAE		
Core gonus	*clupeaformis*	Lake whitefish
Onchorhynchus	*keta*	Chum salmon
Oncorhynchus	*kisutch*	Coho salmon (Silver salmon)
Oncorhynchus	*nerka*	Sockeye salmon (Kokanee salmon)
Oncorhynchus (*Salmo* *Oncorhynchus*)	*tshawytscha* (*quinant*) *chouicha*)	Chinook salmon (California salmon) (Quinant salmon)
Salmo	*aguabonita*	Golden trout
Salmo (*Salmo* (*Salmo* (*Salmo*	*clarki* *lewisi*) *clarki lewisi*) *pleuriticus*)	Cutthroat trout (Blackspotted trout) (Yellowstone lake trout) (Colorado River trout) (Red throat trout)
Salmo (*Salmo* (*Salmo*	*gairdneri* *irideus*) *shasta*)	Rainbow trout
Salmo (*Salmo* (*Salmo*	*salar* *salar (sebego)* *sebago*)	Atlantic salmon (Schoodic salmon) (Sebago salmon) (Penobscot salmon) (Landlocked salmon)
Salmo (*Salmo* (*Salmo*	*trutta* *fario*) *levenensis*)	Brown trout (Von Behr trout) (Loch leven)
Sal velinus	*fontinalis*	Brook trout
Sal velinus (*Cristivomer*	*namaycush* *namaycush*)	Lake trout
Salvelinus	*fontinalis*	Splake trout (hybrid)
Salvelinus	*namaycush*	
Thymallus (*Thymallus* (*Thymallus*	*arcticus* *montanus*) *tricolor*)	Arctic grayling[c] (Montana grayling)
ESOCIDAE		
Esox	*lucius*	Northern pike[c]
CYPRINIDAE		
Carassius	*auratus*	Gold fish
Cyprinus	*carpio*	Carp
Pimephales	*promelas*	Fathead minnow
Tinca (*Tinca*	*tlnca* *vulgaris*)	Tench
CATOSTOMIDAE		
Ictiobus	sp.	Buffalo
ICTALURIDAE		
Ictalurus	*furcatus*	Blue catfish
Ictalurus (*Ameiurus*	*nebulosus* *nebulosus*)	Brown bullhead ("Yellow cat") ("Yellow bullhead") (Horned pout)
Ictalurus		Bullheads
Ictalurus	*punctatus*	Channel catfish (Spotted catfish)
Pylodictis	*olivaris*	Flathead catfish
POECILIIDAE		
Gambusia	*affinis*	Mosquito fish
PERCICHTHYIDAE		
Morone	*crysops*	White bass
Morone (*Roccus*	*saxatilis* *lineatus*)	Striped bass (Rock fish)

TABLE 1--Continued

Family and Genus	Species	Common name
CENTRARCHIDAE		
Ambloplites	*rupestris*	Rock bass
Lepomis	*cyanellus*	Green sunfish
Lepomis (*Eupomates*	*gibbosus* *gibbosus*)	Pumpkinseed
Lepomis (*Chaenobryttus*	*gulosus* *gulosus*)	Warmouth bass (warmouth) (goggle *eye*)
Lepomis (*Lepomis* (*Lepomis*	*macrochirus* *pallidus* *incisor*)	Bluegill (Bluegill sunfish)
Lepomis (*Lepomis*	*microlophus* *heros*)	Redear sunfish (Redear)
Micropterus	*dolomieui*	Smallmouth bass (Smallmouth black bass) (Black bass)
Micropterus	*salmoides*	Largemouth bass (Largemouth black bass) (Black bass)
Pomoxis	*annularis*	White crappie (Crappie)
Pomoxis (*Pomoxis*	*nigromaculatus* *spardoides*)	Black crappie (Strawberry bass) (Calico bass) (Crappie)
PERCIDAE		
Perca	*flavescens*	Yellow perch
Stizostedion	*vitreum vitreum*	Walleye (Walleye pike)

This list is from official historical records of the U.S. Fish and Wildlife Service. Common and scientific names follow: Bailey, R. M. (Chairman, Committee on name of fishes). 1970. A list of common and scientific names of fishes from the United States and Canada. Ed. 3. Am. Fish Soc. Wash. D.C. Spec. Publ. No. 6. 149pp.

Where common and scientific names have changed over the years, synonymous names are indented and in parentheses. Synonymous common names are not necessarily those used with synonymous scientific names appearing on the same line. The list of synonyms is not complete, just those used in official stocking records.

Fish were stocked into states of the Colorado River basin, but records do not indicate if fish were stocked into the Colorado River system. All fish in the list were introduced except the Colorado River trout. Current nomenclature for this subspecies is the Colorado River cutthroat trout, *Salmo clarki pleuriticus,* according to Robert J. Behnke (1979 Monograph of the native trouts of the genus *Salmo* of Western North America. USFWS. Denver, Colo. 215pp).

Fig. 2. Early Denver area fish pond owner, A.H. MILES (1820-1913), from Cleveland, Ohio, reported that sunfish had been imported into Colo. by oxcart from Ohio in 1862. (Photo courtesy Colorado Historical Society)

Comm. for 1882 (p 397). This list (Table 5) contains the names of 48 people in Colorado (East Slope) known to have been involved with or interested in fish culture before 1882. Six of the parties owned hatcheries or had hatchery experience. Pond rearing in the Longmont area dated from 1860 (Jacob Hetzel), whereas hatchery experience dated from 1866 (Gordon Land). The names of Messrs. Miles and Broadwell are both absent, as well as those of many other early Colorado fish culturists. Searches for information about the names on the list at the Colorado State Historical Society in Denver showed many interrelations between the persons, but provided little additional documentation relative to specific introductions of various fishes.

Much information on the private sector of fish culture in Colorado was obtained from the daily Denver Rocky Mountain News (RMN), founded in 1859, and from two early weekly agricultural newspapers--The Colorado Farmer (founded in 1872) and Field and Farm (FF), founded in January 1886.

Additional materials were found in some of the earlier issues of Denver's Tribune-Republican, Times, Opinion, and Republican; the Colorado Springs Gazette; the Georgetown Miner, and in weekly sporting newspapers such as Forest and Stream (FS) and American Angler (AA) both published in New York, and from Chicago Field (CF). Many issues of Sports Afield (SA), originally published in Denver before 1893, were searched. An enormous amount of information was found regarding some of Colorado's fishes and early fish-culturists. I summarized in Appendix A data specific to some of those private culturists who operated fish hatchery facilities in Colorado.

TABLE 2--Some early stocking records for catfish in river drainages of the Western Slope of Colorado[a]

River drainage	Records
Gunnison	1891(P)? may have been a private grower (ponds in Montrose Co.)
	1898(S) an unknown number likely were planted in lower Gunnison R.--these may have been blue catfish
	1906FY(F) 100 for Haskills Lake #2 at Montrose; 100 in ice pond at Paonia
	1908 FY(F) 200 in Hammonds Lake at Paonia
	1909FY(F) 200 in Uncompaghre R. at Olathe
	1912 FY(F) 300 in Savage Reservoir near Hotchkiss
	1917FY(F) 200 in Swanson Lake near Cimarron; 495 in Park Lake near Hotchkiss; 200 in Frees Pond near Montrose
	1918FY(F) 750 in Rouse Pond at Montrose; 500 in Water Cress Lake near Paonia
Colorado R. mainstem (Grand R.)	1898(S) an unknown number likely were planted in Grand R., may have been blue catfish
	1906FY(F) 350 in Grand R. at Grand Junction
	1907FY(F) 125 in Saunders Pond near Palisades
	1909FY(F) 200 in Grand R. at Rifle
	1912FY(F) 1000 in Grand R. at Grand Junction
	1913FY(F) 200 in Nelson Lake near Grand Junction
	1917FY(F) 495 in Welsh Pond at Grand Junction
	1918FY(F) 65 in Grand R. at Grand Junction
	1919FY(F) 600 in Libbey's Pond at De Beque
Yampa	1944(S) 30,000 2-in. size in Yampa R.; 4,200 in backwaters of Yampa R.
White	1910FY(F) 200 for White R. (picked up at Rifle rail station)
Dolores	1889(P) speckled catfish(?) reared in ponds near Dolores
	1906FY(F) 200 in Dolores R.
Animas	1892(P)? some possibility that catfish were being reared in sloughs and spring ponds near Durango, owned by W. H. Wolf
	1914FY(F) 200 in Fairview Pond at Durango

[a] P = Private; S = State; F = Federal; FY = Fiscal Year.

TABLE 3--Some early stocking records for largemouth bass in river drainages of the Western Slope of Coloradoa

River drainage	Records
Gunnison	1895(S) about 500 for lower Gunnison
	1895FY(F) 200 in Lake San Cristobal near Lake City
	1897(S) about 2,600 yearling in Gunnison R. between Delta and Grand Junction
	1903FY(F) 150 in Swanson Lake, Cimarron, Colo.
	1905FY(F) 300 in Gunnison R. at Grand Junction
	1913FY(F) 225 in Gunnison R.
	1913FY(F) 150 in Redlands Pond
	1915FY(F) 32 in Gunnison R. at Grand Junction
	1916FY(F) 600 in Redlands Ponds near Grand Junction
	1919FY(F) 120 in Winters Pond at Paonia
Colorado R. mainstem (Grand R.)	1895(S) about 500 for Grand R.
	1897(S) about 2,600 Grand R. at several points between Glenwood Springs and Grand Junction
	1898(S) most of a lot of 2,450 in Grand R. at mouth of Eagle R. and below
	1910FY(F) 300 in Grand R. at Rifle
	1910(S) some at Grand Junction, likely over 1,000
	1912FY(F) 275 in Grand R. at Grand Junction
	1913FY(F) 225 in Grand R. at Grand Junction
	1916FY(F) 300 in Lyle Lake near Glenwood Springs
	1918FY(F) 200 in Terrahan L. near Grand Junction
Yampa (Bear R.)	1910(5) some of a lot of several thousand in Bear R. near Craig
	1913FY(F) 150 in Yampa R.
	1919FY(F) 500 in Yampa R. at Craig
Dolores	1912FY(F) 225 in Dolores R.
	1916FY(F) 300 in Carter's L. at Miramonte
	1918FY(F) 300 in Carter's L. at Miramonte
San Juan	1910(S) some of a lot of several thousand in the San Juan in vicinity of Pagosa Springs
An	1898(5) part of a lot of 2,450 in Animas R. at Durango
	1912FY(F) 450 in Molas L. near Silverton
	1914FY(F) 24 in Animas R. at Durango
	1917FY(F) 246 in Animas R. at Durango

[a] S =State; F = Federal; FY = Fiscal Year.

TERRITORIAL LAWS AND AN ORGANIZED BEGINNING

Colorado did not become a state until 1876, before which the territory was governed by a territorial governor and assembly, which first met in 1861. The initial laws regarding fish were quite simplistic, composed of six rather brief sections in one act. Section 1 of that Act, according to George Feltner (A Look Back--A 75-Year History of Colorado Game, Fish and Parks Division 1972, p 5), stipulated that "all persons are hereby forbidden to take trout from any waters of this Territory by means of seine, net, basket, or trap." Most other sections involved consequences for such wrongdoings.

Between 1861 and 1870, Colorado Territory fish laws were still essentially unchanged but our miners, no doubt, had been using explosives, drugs, or other means to take fish from our waters because the territorial assembly responded in 1870 as follows:

AN ACT

To provide for the Protection of Fish in Colorado Territory. [Figs. 3, 4]

Be it enacted by the Council and House of Representatives of Colorado Territory:

SECTION 1. That it shall be unlawful for any person to kill or take trout, or other fish, in any of the waters of Colorado territory, by the use of any poisonous, or deleterious, or stupefying drug, or by the use of any explosive substance.

SEC. 2. Any person or persons, company or corporation, maintaining or keeping up any dam, weir, or other artificial obstruction, upon any stream in Lake[*] and Park counties, shall erect and keep up at such dam, weir, or artificial obstruction, a sufficient sluice or fish way, for the free passaage of fish, up and down the stream.

SEC. 3. That any person being identified in exploding any torpedo, or other device, or using any poisonous, deleterious or stupefying drug, for the purpose of killing or taking trout, or other fish, from any waters of Colorado territory, or any person or persons, company or corporation, making, maintaining, or keeping up any dam, weir, or other artificial obstruction, in said counties of Lake or Park, who shall neglect or refuse to erect and keep up a sufficient sluice, or fish way, at such dam, weir, or

[*] Lake County in the early years was very large extending all the way to Utah.

artificial obstruction, shall be deemed guilty of a violation of the provisions of the foregoing sections.

SEC. 4. That any person or persons, company or corporation, convicted of violating the provisions of this chapter before any court of competent jurisdiction, in the county where such offense was committed, shall pay a fine of not less than one hundred dollars, and not exceeding three hundred dollars, for each offense, one-half of such fine to be paid over to the informer, who shall be a competent witness, and the other half into the treasury of the county in which such offense *was committed.*

SEC. 5. That each and every month that such person or persons, company or corporation, shall neglect or refuse to maintain, or keep up a sufficient sluice or fish way, as described in section two of this act, shall constitute a separate offense.

SEC. 6. This act to take effect and be in force, from and after its passage.

Approved February 11th, A.D. 1870.

Some encouragement for private propagation of fishes in Colorado began to emerge in our laws because when the territorial assembly met in February 1872, they added a Section Seven (7), which was very enticing:

No person or persons shall, at any time, with intent so to do, catch any speckled trout, with any device save only a hook and line; Provided, That nothing in this act, the original act, or any of the amendments hereto, shall be so construed as to prevent any person or persons from taking from any of the streams of said Territory, at any time, any specked trout for the purpose of propagation.

Approved February 9th, 1872.

TABLE 4--Northern pike stocked in Western Slope waters by the State of Colorado, 1956-1979[a]

River drainage					
Gunnison[b]	Colo. R. mainstem	Dolores	San Juan	Yampa	White
1967 Paonia Res. 100,000 (6 lbs)	1971 Highline Lake 325 (32 lbs)	1962 Joe Moore Res. 74,899 (2 lbs)	1962 Vallecito Res. 8,400 (28 lbs)	1970 Divide Cr. Res. 325 (250 lbs)	1970 Rio Blanca Lake 1,500 (350 lbs)
1970 Sweitzer Lake 520 (400 lbs)	1973 Williams Fork Res. 1,850 Some (?) in 1976	1967 Summit Res. 100,000 (6 lbs)	1970 Pastorius Res. 260 (200 lbs)		
1971 Fruit Growers Res. 150,000 (4 lbs)		1970 Summit Res. 1,040 (800 lbs)	1971 Pastorius Res. 50,000 (2 lbs)		
1971 Paonia Res. 25,000 (1 lb)		1971 Summit Res. 600 (400 lbs)	1971 Pastorius Res. 300 (200 lbs)		
1972 Taylor Res. 790 (4-6 in.)		1971 Narraguinnep Res. 450 (300 lbs)	1971 Jackson Gulch Res. 450 (300 lbs)		
		1971 Puett Res. 300 (200 lbs)			
		1973 Summit Res. 775 (455 lbs)			
		1973 Narraguinnep Res. 775 (455 lbs)			

[a] Data obtained from stocking records of the state's warmwater Wray and Las Animas hatcheries. Some plants made by Wray Hatchery in 1971 and 1972 were shown as transfers to SW Region hatcheries or just Southwest Region, i.e., in 1971, 1,700 northern pike (395 lbs) at Pitkin unit transferred to Cedaredge unit, which showed 1,500 fish (560 lbs) transferred to Southwest Region at Montrose, which showed 1,800 fish (420 lbs). One would have to search Kardex files at Montrose to procure information where these northern pike were stocked. Wray records for 1972 also showed 2,898 northern pike (1,525 lbs) transferred to the Southwest Region. Wray and Las Animas hatcheries show no plants of northern pike to any West Slope waters after 1973. Southwest Region likely also made some additional plants of northern pike from the Schutte Ponds (Rio Grande drainage) into West Slope waters, but Kardex records were not entirely searched to determine where these were made. Some northern pike may also have been distributed by the state's Denver Hatchery prior to its closure in 1967.

I reported in my 1978 paper Some factors historically affecting the distribution and abundance of fishes in the Gunnison River", pages 157-158 that northern pike had been stocked by the Colorado Division of Wildlife in Paonia Reservoir in 1969 and 1970 and also in the Taylor Park Reservoir in June 1972 (790 4- to 6-in. fingerlings). I, no doubt, obtained these from the Kardex records in Montrose, but no searches of other West Slope stocking localities were done then.

Fig. 3. POACHING FISH WITH DYNAMITE was the nemesis of early stream fisheries. Territorial laws prohibiting the use of explosive devices were enacted as early as 1870, but legislators failed to supply adequate funds for law enforcement. (Sketch from Colo. Outdoors 1977 p 11)

Fig. 4. PAUCITY OF LAW ENFORCEMENT PERSONNEL AND FUNDS led to an almost total destruction of trout populations in many streams by the early 1880's. Irate law-abiding sportsmen formed protective associations to assist the Fish Commissioner with enforcement. The destruction of many trout populations necessitated government involvement with hatcheries to restock these streams. (Photo from Colo. Outdoors 1953 May-Jun p 27)

Despite a favorable law, which should have immediately created considerable private incentive to procure the "free fish" and embark in fish culture, I found little evidence that it did except for one man, James Broadwell of Denver. He had been experimenting with trout breeding at his ranch along the South Platte River about

TABLE 5--Persons in Colorado known to the U.S. Fish Commission to have been involved or interested in fish culture before 1882a

Name	Post office	County	Yearb
N. A. Baker	Denver	Arapahoe	1874 H,P
Alonzo Allen	Altona	Boulder	1874
Henry Neikerk	Boulder		1881 P
C. M. Tyler			1874 P
Jacob Hetzel	Longmont		1860 P
John Renner			1878 P
Hon. L. C. Mead			1878 P
William A. Davidson	Valmont		1881 P
C. S. Pancost			1866 P
Charles N. Eames	Cottonwood Springs	Chaffee	1879 P
Philip Cook			1881
F. E. Hayden	Granite		1880 P
Wilson E. Sisty	Brookvale	Clear Creek	1861 P
Daniel Ernst	Georgetown		1881 P
A. R. Forbes			(1881)
Fred Jaenegen			1880 P
Gordon Land	Alamosa	Conejos	1866 H,P
Albert W. McIntire			1880 H,P
William A. Bell	Colorado Springs	El Paso	1874 H,P
George De La Vergne			1877 H,P
John F. Read	Walsenburgh	Huerfano	1874 P
John A. Higgins	Golden	Jefferson	1875 P
George K. Kimball			1877 P
Hon. T. C. Bergen	Morrison		1873 P
Peter Fischer			1872 P
Mrs. S. B. Millsap			1873 P
A. Rooney	"		1879
W. R. Scott			1874 H,P
Hermann Hibschle	Leadville	Lake	1880 P
Hugh C. Young	Malta	Lake	1873 P
Theodore Whyte	Estes Park	Larimer	1880 P
Col. Emil Boedicker	Loveland		1879 P
Boyd & Alford			1876 P
Matthew T. Burnett			1880 P
George W. Richart			1881 P
William C. Macomber	Stonewall	Las Animas	1879 P
R. D. Russell			1879 P
G. A. Storz			1872 P
George H. Green	Buffalo Springs	Park	1877 P
Webster Ballinger	Hamilton (?)		1877 P
N. A. Rich	Platte Station		1880 P
Hon. Benjamin H. Eaton	Greeley	Weld	1873 P
Charles Emerson			(1881)
B. S. La Grange			1876 P
Cyreneus D. Neff			1873 P
S. K. Thompson			1879
George H. West			1880 P
Charles H. Wheeler			1880

[a] From Smiley, C. A geographical catalogue of persons who stated that they were interested in fish culture (Bull. U. S. Fish Comm. 1882 p 397).

The year indicates from when each correspondent, according to his own statement, had been interested in fish culture. P indicates those who reported that they owned or leased ponds or lakes and H those who in the past had operated, or were still (1881) operating hatcheries.

ten miles below Denver and had successfully hatched trout eggs early in 1872. With notoriety given him by the Denver RMN (1873 Jan 19:4 c 3), Broadwell soon became a leading advocate for fish culture in Colorado. However, it was not until after the territorial legislators met in 1874 and again modified these laws that I found documented interest in the private propagation of fish in Colorado. This modification in 1874 created an additional Act to our original fish laws:

AN ACT

To Encourage the Propagation of Fish in Colorado Territory.

Be it enacted by the Council and House of Representatives of Colorado Territory, It shall be unlawful for any person or persons to kill or take trout or other fish from any private lake, pond or stream used for the propagation of such fish, except by the consent of the proprietor of such lake, pond or stream.

SEC. 2. Any person or persons violating section one (1) of this Act shall be deemed guilty of a misdmeanor and upon conviction shall pay a fine of not less than fifty (50) dollars and not exceeding two hundred (200) dollars, for each offense. Such fine to be paid into the County Treasury for the benefit of the Common Schools of said County. Further, that all such fines and costs shall be collected without stay of execution and such defendant may, by order of the court, be confined in jail until such fine shall have been paid.

SEC. 3. This Act shall take effect and be in force from and after the first day of April, A.D., 1874.

Approved February 13th, 1874.

Shortly after the Legislature approved the 1874 Act, Broadwell publicized his fish-breeding facilities and formally organized private fish culture interests in Colorado. Details of a visit to his facilities by prominent citizens, some of whom were members of the Colorado Stock-Growers Assoc., were reported in the RMN (1874 Mar 20:4 c 3):

A Visit to the Trout Ponds

On yesterday Alderman James M. Broadwell invited a number of prominent citizens of the city to inspect his fish ponds, situated on his ranch about ten miles down the Platte. The party started from the Broadwell house about 10 o'clock. A couple of hours were profitably spent at the rancho in examining the young fish, of which there are seventeen thousand in the hatching house, and some five or six thousand yearling and two-year-olds in the ponds. Mr. Broadwell estimates that he has lost over twenty thousand fish, that would now be two years old, by the breaking away of some of the embankments of the ponds. These fish are now scattered in the ditches leading from his springs to the Platte, and in the river. The alderman has been experimenting in this business for the past three years, and is so confident of the practicability and profit in it that he intends excavating a large area for ponds this season, and building several extensive hatching houses. It is an enterprise worthy of encouragement, and a business that will admit of unlimited expansion, as there will always be a demand for fresh fish, especially during the season of summer travel.

On returning, the party were hospitably entertained at the Broadwell house [Fig. 51. After dinner, J. L. Baily, esq., president Colorado Stock-Growers' association, was called to the chair, and J. V. Griffin was made secretary.

A committee of three was appointed to draft resolutions expressive of the sense of the excursionists. Messrs. C. C. Davis, Hary Cummings and J. 0. Bosworth were named as the committee.

The following resolutions were reported:

WHEREAS, The subject of fish culture is one of sufficient magnitude to engage the attention of capitalists and all interested in the industrial development of Colorado.

WHEREAS, James M. Broadwell, esq., has taken the lead in experimenting in trout raising; therefore,

Resolved, That having examined with much interest the hatching houses, preserves and fish ponds of Alderman Broadwell,

Resolved, That we commend in the strongest manner his efforts in this branch of business.

Resolved, That we recommend the formation of a "Fish Association" for the purpose of encouraging the breeding and raising of fish in the natural streams and artificial ponds and lakes of Colorado.

Messrs. Paul Frenzeny and J. Travernler, artists of Harper's Weekly, accompanied the party, and inspected the premises for the purpose of making sketches for the paper they represent [Fig. 6].

Fig. 5. THE BROADWELL HOUSE was one of Denver's earliest and finest hotels built by James Broadwell in 1859 at the corner of 16th and Larimer. Meetings of prominent citizens interested in fish culture were held at this hotel and resulted in the formation of the Fish Breeder's Association on July 1, 1874. (Photo courtesy Colorado Historical Society)

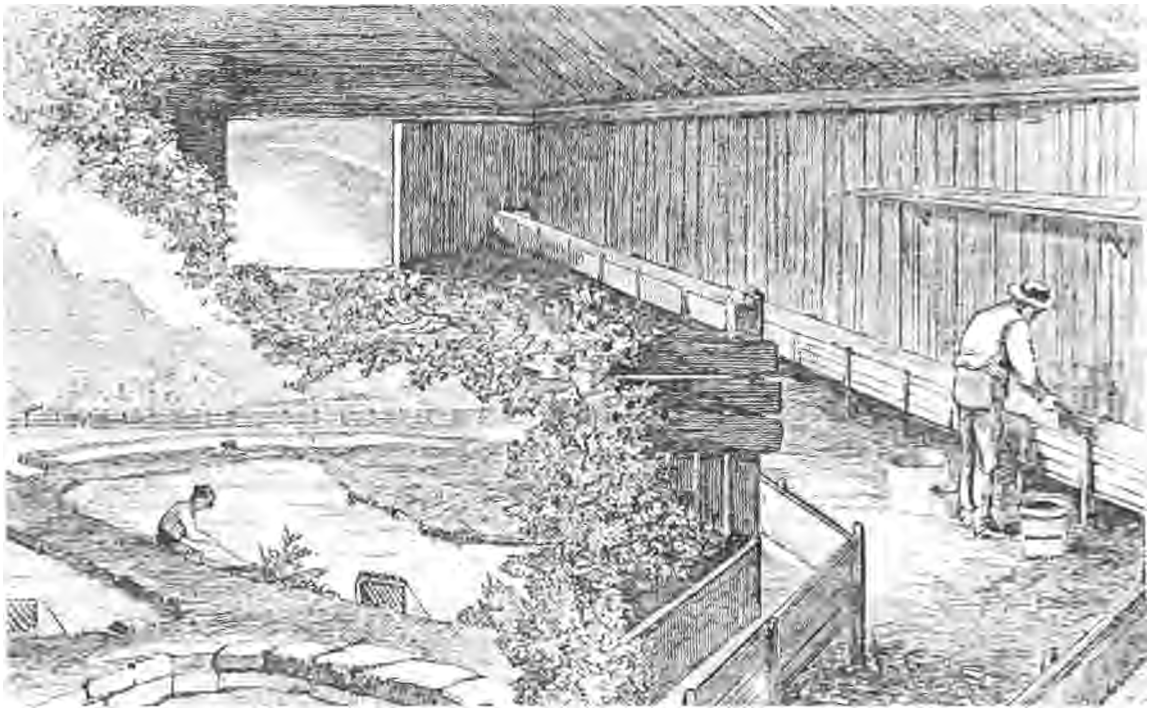


Fig. 6. This sketch and description of the James Broadwell TROUT-HATCHING FACILITY on the South Platte River 10 miles below Denver appeared in Harper's Weekly (1874 Jul 4, 18:565):

TROUT HATCHING IN COLORADO

The upper engraving on this page gives a view of the interior of a trout-hatching house on one of the Colorado streams. It does not differ in any material detail from similar establishments in other parts of the country. The spawn is deposited in long troughs, slightly inclined, through which runs a constant stream of pure spring water. When the young fish attain a certain growth they are placed in ponds arranged in a series. In the first they remain three or four months, after which they are transferred to a second, and so on from one to another until they have attained their full growth. Artificial trout-raising begins already to be a large industry in Colorado, and it is believed that in a few years that region will be able to furnish the Eastern markets with an immense supply of this delicious fish.

Although the article failed to mention Mr. Broadwell or the specific location of the site, I believe it is safe to conclude that it was the Broadwell facility on the South Platte River below Denver. The RMN (1874 Mar 20) reported that artists from Harper's Weekly had been at the Broadwell facility the day before to make sketches for their paper and none appeared in the magazine until this one did. This sketch is now believed to be the earliest visual documentation of a trout hatchery in Colorado.

About two months later Broadwell ran an advertisement in the Denver RMN (1874 May 25:4 c 3):

Denver, May 23, 1874--All persons interested in the propagation and raising of fish by artificial means in Colorado, are requested to meet at the Broadwell house on Wednesday, July 1, for the purpose of forming an organization to foster, encourage and promote this industry. This call is made because the natural supply of fish is rapidly decreasing and artificial hatching and breeding houses, ponds and lakes must be provided. It believed that systematic plans for fish culture would save to Colorado a quarter of a million dollars annually, the saving being in the money retained among us, now spent abroad and giving a large number of persons steady and paying employment. All who have made experiments, either favorable or unfavorable, in the territory, are invited to furnish the results, and communications are requested from those who have made fish culture a business either here or in the states.

James M. Broadwell

Just before this meeting, the RMN (1874 Jun 30:4 c 1) ran a similar item:

All persons interested in the propagation and raising of fish, by artifical means, in Colorado, are requested to meet at the Broadwell house, Wednesday, July 1, for the purpose of forming an organization to foster, encourage, and promote this industry. Mr. J. M. Broadwell, who, by the by, is taking the lead in pisciculture in Colorado, has received a letter from Hon. Horatio Seymour, accompanying late reports of the Fish Commissioner.

The above reference to the "Fish Commissioner" probably denotes the Federal Fish Commissioner, Professor Baird, because Colorado did not have a Fish Commissioner until 1877. The day after this meeting, the RMN (1874 Jul 2:4 c 4) informed its readers in detail:

PISCICULTURE

The Fish-Breeders in Council - Steps Taken for a Permanent Organization - Remarks by the Chairman of the Meeting.

Pursuant to call, which had been extensively circulated, a meeting of gentlemen interested in fish breeding, in Colorado, assembled at the Broadwell house yesterday, at 10 o'clock a.m. The meeting was called to order by J. M. Broadwell, esq., who, on taking the chair, made the following remarks:

Gentlemen - In view of the fact that there is urgent need for united action by the people of Colorado, in regard to artificial fish growing, I have called this meeting. I have started the business in a small way, as an experiment on my ranch down the Platte. I have made some failures in learning what I know, which is but a small proportion to what is to be learned; but have found out that fish growing is no longer an experiment, and believing great profits can be obtained from this business, I am anxious that other parties who have the right facilities should go into the same business. If we unite together we can get spawn and fish for propagation cheaper; we can hire practical, experienced men to put up hatching houses and lay out and regulate fish ponds and instruct us all in the art of breeding fish, and can get experience of the various fish commissioners of the older states; we can do more as a body, than as individuals. I am pleased to see the interest manifested, and hope that this beginning will be the foundation for a great business for Colorado. I thank you for coming out today, believing you will never regret joining in an enterprise that is so much needed. To carry out this good work it will be necessary to have a form of organization, officers to act and some funds to defray current expenses. The meeting is now open for remarks and suggestions. Hoping some gentlemen will make such suggestions as may best suit this movement I call the meeting to order, and await your pleasure.

After some general discussion, the following officers were elected to serve temporarily, until a permanent organization can be effected: President, James M. Broadwell; vice president, Dr. John Parsons; secretary, W. Holly.

On motion of the secretary, a committee of five was elected to prepare a form of organization and report on the subject of pisciculture, to be submitted at a meeting to be called for the purpose, and which shall be regarded as the annual meeting. The following were elected such committee: W. D. Arnett, L. K. Perrin, Dr. John Parsons, J. C. Feebles, and J. M. Broadwell.

Dr. John Parsons made some extended remarks on the advantage of fish growing giving his experience and summary of his researches.

Mr. Gordon Land, who has had several years experience among the fish breeding establishments in the states, and experimented for the last two years in the south park and San Luis Park,[2] being called on by the chairman, gave his views on the subject, which were listened to with profound attention.

Mr. Byers stated, at considerable length, the results of the researches of the Hayden expedition in regard to fish.

The following resolution was then introduced and carried unanimously:

Resolved, That each person present use all his influence in bringing to punishment the parties who are using seines in taking fish from the lake and streams of Colorado.

It *was* further resolved that all persons in Colorado, interested in this subject, be requested to report personally or by letter at the next meeting, and *all* who wish to use spawn or fish for breeding, *are* requested to communicate with the president or secretary.

The chairman gave a detailed and interesting report of his experiences, and the results of his experiments.

On motion, Mr. Gordon Land *was* requested to prepare an essay, to be read at the next meeting.

Twenty-two persons now signified their intentions of becoming members of the proposed association.

At the request of those met, W. D. Arnett of Bear creek read an interesting paper on the importance of the convention, and of the subject it had met to consider.

The meeting was attended by about thirty of the leading citizens of Colorado. The interest manifested was indicative of permanent and good results. We trust that the interest excited will not be allowed to die out, but will be encouraged in every possible manner. On motion the meeting adjourned to meet the first Wednesday in August at 2 o'clock p.m.

Except for Gordon Land, we do not know how many of the 17 Coloradoans shown in Table 5, who had interest in fish before 1875, were at this meeting. Unfortunately, most of the issues of Colorado Farmer are missing between 1874 and 1880. J. C. Feebles, its owner, was an elected committee official of this newly formed "fish-breeder" organization and probably published much on their activities during those years. An article from FS (1874 Dec 31, 3[21]:324) indicated that people were taking advantage of the new 1874 Act in Colorado:

[2] An item in Denver's RMN (1874 Feb 17:4 c 2) from Conejos Springs, signed Norman and Land, Fishbreeders," verified Mr. Land's early fish involvement in the San Luis Valley.

> T. C. Bergen, of Bergen Park, Jefferson county, Colorado, is constructing a fish breeding establishment at his place, with a lake containing an area of seventy-five acres. When the lake is ready it will be stocked with Bear Creek trout, and as these are already acclimated, good results may be looked for. Fish culture, at no distant day, is destined to be an extensive and profitable industry in Colorado.

In the same FS (p 324) is an undated item from Dr. W. A. Pratt, the State of Illinois Fish Commissioner:

> We are now in the season for the spawning of the trout. Many people over the state [Illinois] as well as in other states have built hatching houses and are intending hatching their own trout eggs. There seems to be a larger interest now taken in fish culture than ever before; but from all appearances Colorado Territory is taking the lead. From descriptions the water is much more abundant there than here in Illinois, or adjoining states, and to get a description of water, as I do from Colorado, would almost make one dissatisfied with his own home, especially if he is a lover of fishing or fish.

Either T. C. Bergen or J. M. Broadwell, who were originally from Illinois, probably had written to Dr. Pratt requesting fishery information and supplied him with details of the fish-breeders meeting held in Denver on July 1, 1874. Broadwell mentioned in opening statements of that meeting, "We can get experience of the various fish commissioners of the older states."

PROMINENT 19TH-CENTURY PRIVATE FISH HATCHERYMEN IN COLORADO

Several early citizens operated private fish hatcheries and were either instrumental in the development of pisciculture or were responsible for the introduction and distribution of various fishes in Colorado. I have selected 11 private hatcherymen (Figs. 7-17) from the list in Appendix A and have summarized highlights of their fish culture activities. Additional information regarding these men and their facilities is presented in other sections (primarily Appendices B and C).

Fig. 7. JAMES M. BROADWELL was responsible for the earliest known introduction of brook trout into Colorado. In 1872, he obtained 10,000 eggs from Boscobel, Wisc. and successfully hatched them at his facility on the South Platte River. He was the instigator in the formation of tle Fish Breeder's Assoc. in 1874 and expounded in press releases on the economic value of fish culture to citizens of Colorado. In the 1890s, he leased part of his facilities to the State of Colorado. (Photo courtesy Colorado Historical Society)

Fig. 8. DR. WILLIAM A. BELL imported and successfully hatched the largest consignment of brook trout eggs to enter Colorado before 1881. Two years in succession, 1874 and 1875, Bell obtained from New York 100,000 brook trout eggs for his Manitou Park fish facility. Later, he published in detail his reasons for the importation and stated the venture cost him $5,000. (Photo courtesy Denver Public Library, Western History Department)

Fig. 9. NATHAN A. BAKER founded three of Wyoming's earliest newspapers and then returned to his family's Denver homestead in 1872. He obtained the assistance of a noted pisciculturist, Gordon Land, and established a trout hatchery and fish-breeding facility at "Baker's Springs"--today a landmark in the "heart" of Denver. Cutthroat trout were bred initially, but by 1881, brook trout had also been bred at the "Springs". (Photo courtesty Colorado Historical Society)

Fig. 10. GORDON LAND, hydraulic engineer, acquired pisciculture experience "stateside" before migrating to Colorado about 1869. He "experimented" with fish in the San Luis Valley and South Park as early as 1872 and later assisted in the establishment of the Bell and Baker facilities. Although unsuccessful, Land pleaded to the Colorado legislators in 1876 to exempt fish culturists from taxation for a period of five years so as to attract people into the business. Before he was appointed Colorado's Fish Commissioner in 1889, he had built and operated several fish-breeding or hatching establishments at the following localities: Conejos Springs in the San Luis Valley, Buffalo Springs in South Park, Cataract Lake in the Blue River drainage, Chalk Creek near Buena Vista, and one somewhere in Denver. Between the late 1870's and the early 1890's, Mr. Land published several articles describing the spawning habits and migrations of cutthroat trout in Colorado. His "Singular Incidents in Trout Raising", published in The Chicago Field (1880 Feb 21), clearly documented the futility of rearing trout in ponds containing suckers and should be read by all trout-pond culturists and fishery biologists (see Appendix B p 81). Land was also an early advocate for stream improvments in Colorado. He suggested that dams be built on the smaller tributaries to create deeper water, which would not totally freeze during the winter. I consider Gordon Land to have been Colorado's best and most influential pisciculturist of the 19th century. (Photo unavailable)

Fig. 11. WILLIAM H. CUSHMAN introduced chinook salmon into Colorado in 1874, hatching the eggs in his basement at Georgetown. By 1875 he had built a large hatchery at his Green Lake facility where he later hatched and reared more chinook salmon, as well as brook trout from New Hampshire, and cutthroat trout from Colorado. (Photo courtesy Colorado Historical Society)

Fig. 12. HENRY M. TELLER, early U. S. Senator of Colorado, had fish-culture interests. In 1876 he was an advocate for establishing a State Fish Commissioner to work with the U. S. Fish Commissioner in Washington, D. C. to procure suitable fish for Colorado. He was known to prod U.S. Fish Commissioner Baird for shipments of carp and perch, and may have personally introduced the latter into Colorado in 1879. During 1889, the senator was instrumental in procuring appropriations in Congress for the establishment of the U. S. Fish Commission's hatchery near Leadville, Colo. Early in 1890 he obtained brown trout eggs from Belgium and donated them to the state for their use. He operated a private hatchery in Gilpin county during the 1890's. (Photo courtesy Colorado Historical Society)

Fig. 13. COLONEL GEORGE DE LA VERGNE operated the earliest known stone-constructed fish hatchery building in Colorado at Ivywild, south of Colorado Springs in 1879. He was responsible for the earliest introduction into Colorado of lake trout (mackinaw) during 1879 and golden orfe (ide) during 1883. He was also one of the first growers of German carp in Colorado. The Colonel gratuitously allowed Colorado Fish Commissioner Sisty the use of his facilities early in 1880 to hatch brook trout imported from Ohio by Sisty before the state had built a fish hatchery of their own. The lake trout that were reared at the state's Denver Hatchery in 1883 probably were obtained from Colonel De La Vergne. (Photo from Colorado Springs Republic and Telegraph 1891 Dec 31; courtesy Special Collections, The Colorado College Library)

Fig. 14. GENERAL JOHN PIERCE was an Ex-surveyor general of Colorado and Denver bank president who operated four private fish hatcheries during the early 1880's. Although he did not seek the Colorado Fish Commissioner position during a bitter struggle for that job early in 1885, he was appointed Fish Commissioner and served for two years without salary. He also used his own funds to purchase fish eggs and to construct a fish hatchery at Twin Lakes, near Leadville, for state use. During 1885 Pierce reported to the U. S. Fish Commissioner the presence of large spawning fish (yellowfin trout) at Twin Lakes, urged the Commission to establish a trout-breeding station there, and offered the state's Twin Lakes hatchery for federal use. Pierce introduced brown trout into Colorado by obtaining eggs from England late in 1885, which he successfully hatched at his Lake Archer Fish Co. facility in Denver. He was the first Fish Commissioner in Colorado to make a public fish exhibit using aquaria. About 30 feet of fish tanks containing various fishes reared in Colorado were displayed at the Denver Rink, corner of 16th and Tremont streets, late in January 1886. (Photo courtesy Denver Public Library, Western History Department).

Fig. 15. JOHN LAW and his partner Ex-Governor Grant operated a private fish hatchery and resort facility at Evergreen Lakes near Leadville, in the late 1880's. Brook, rainbow, and brown trout from this facility were used to form early brood stocks at the nearby U. S. Fish Commission's hatchery. Brown trout milt from Law's stock was used in 1892 to create brown x brook hybrids at the Commission's Leadville station. During 1894 the U. S. Fish Commission acquired Law's Evergreen Lakes fish facility for government use. (Photo from History of the Arkansas Valley, Colorado 1881 O. L. Baskin & Co., Chicago P 451; courtesy Colorado Historical Society)

Fig. 16. W. T. KIRKPATRICK stocked over 1,000,000 trout, which were reared at his two hatcheries at Emerald Lake near Durango, into public waters in LaPlata and Hinsdale counties free of charge, during the late 1890's. Later, he allowed Colorado's Fish Commissioner the use of his fish and facilities at Emerald Lake to collect and hatch millions of cutthroat trout eggs that were destined for stocking in public waters. (Photo from RMN 1899 Aug 13:20; courtesy Colorado Historical Society)

Fig. 17. WILLIAM RADCLIFFE was a wealthy Englishman who owned several lakes on the Grand Mesa and operated two hatcheries for fish propagation before the turn of the century. Like Kirkpatrick, Radcliffe during the late 1890's, donated many fish to the state for stocking in public waters. He also allowed the U. S. Fish Comm. to use his facilities for egg-take purposes, but this was done through a contractual agreement where the Commission men collected all the eggs, hatched, and tended them, and then received less than half of the fish for their use. Unlike Kirkpatrick, Radcliffe had seven deputized state game wardens to patrol his Grand Mesa estate from poachers, and also required that fishermen have a permit to fish his lakes. During 1899 he got involved in a suit with Delta County residents over the legality of his state game preserve license, and in July 1901, one of his guards killed a Delta County resident who had been known to poach at the lakes. Irate mobs retaliated by destroying his entire estate at Grand Mesa. Fearing for his life, Radcliffe leased his property for three years to the U. S. Fish Comm. for $1, and returned to England. Through the assistance of the British Ambassador to the U. S., Radcliffe made a claim on the U. S. Government and eventually was paid $25,000 for damages. (Sketch from RMN 1901 Jul 19:3; courtesy Colorado Historical Society)

COMMERCIAL FISHING OPERATIONS

Early fish laws in Colorado were so drastically different from modern-day laws that few people are alive today who can recall a time when commercial fishing was permitted on game fishes. Data were collected in 1900 by E. A. Tulian, the superintendent of the federal hatchery at Leadville, on Colorado's commercial fishery (Appendix D). His designation of "catfish" as an introduced species in Colorado is somewhat in error. The channel catfish was probably native to Front Range waters but introduced into West Slope waters. The legal use of seines by these private fishermen may have resulted in some stocking of personal waters and inter-drainage transfer of some species of fish.

SPORTSMEN INVOLVEMENT

Colorado's sportsmen have always been interested in fish and game activities and many local groups were formed shortly after settlements and towns developed. In the late 19th and early 20th centuries, these groups assisted state authorities in stocking fish as well as in law enforcement and the formulation of new laws for the protection of the game and fish resources. Some of these groups may have acted independently in the stocking and rearing of some fish in Colorado. For example, the Estes Park Improvement Association built a fish hatchery in 1907 (Fig. 18) for their use in stocking streams and lakes in that area. In addition, the Durango Rod and Gun Club in 1888 stocked previously barren Emerald Lakes with native trout seined from the Pine River (RMN 1899 Aug 13:20 c 1). Originally, many of Colorado's high lakes contained no trout populations. I found little evidence of any initial fish introductions by these groups, except for possibly the Colorado Game and Fish Protective Association, which apparently was involved with the state in the first introduction of exotic brook trout into Colorado River waters.

Fig. 18. ESTES PARK FISH HATCHERY was originally built in 1907 by a sportsmen group, The Estes Park Improvement Association, which had been stocking fish in waters of that area. The hatchery had a capacity of 1,000,000 eggs and was leased to the state for their use in 1908. (Photo courtesy Denver Public Library, Western History Department)

The following item that appeared in Denver's RMN (1869 Oct 8:4 c 2) gives clear evidence that interest in organized sportsmen's groups began before Colorado became a state:

> All interested in the protection of game in Colorado and the introduction of quail and other foreign varieties are requested to meet at my office on Monday evening, October 11, at 7 o'clock, for the purpose of effecting a permanent organization of a sportsmen's club.
>
> D. A. Chever, Chairman

Some details of this organization were reported in the RMN (1869 Oct 12:4 c 2):

> A meeting for the purpose of organizing a "Sportsmen's Club," was held at the office of Mr. Chever last evening. Mr. Chever was elected temporary chairman, and C. C. Davis, secretary. Remarks were made by several gentlemen, and a permanent organization was effected by the election of Dr. F. J. Bancroft, [Fig. 19] president, D. A. Chever, secretary, and C. C. Davis, treasurer. The secretary was instructed to open correspondence with parties in Chicago and other eastern cities, relative to the introduction of quails into the territory, and the treasurer, Mr. Davis, was appointed a committee to raise subscription for the purchase of the same. We hope Mr. Davis will receive plenty of encouragement in the way of cash as the object is a worthy one.

Another documentation of early sportsmen involvement appeared either in the Denver Times (1878 Dec 27:4 c 2) or in the RMN (1878 Dec 28:4 c 1):

> All persons interested in protection and propagation of trout in Colorado, are requested to meet at Dr. Van Hummell's office, No. 234 Sixteenth Street, Monday evening, December 30, at 7:30 o'clock, for the purpose of discussing suitable protective fish and game laws for adoption at the coming session of the legislature.

Some details of this meeting were given in the Georgetown Miner (1879 Jan 4:2 c 1):

> A number of gentlemen interested in sporting, met in Denver the other day to discuss measures looking to the better protection and the propagation of fish and game in Colorado.
>
> By suggestion and consent, Dr. Van Hummell acted as Chairman and D. O. Wilhelm, Secretary of the meeting.
>
> The Chairman briefly related the purpose of the meeting, which in the main was the organization of sportsmen for efficient and prompt steps looking to a revision in the present fish and game laws, which, as they are now framed, are practically of no value.
>
> It was decided by the meeting that a bill be drafted and a memorial prepared for the consideration of the Legislature touching the following points:
>
> First - The prohibition of the discharging of sawdust into the different streams throughout the State.
>
> Second - The appropriation by the State of a sufficient sum to defray the cost of the introduction and propagation of the different varieties of fish from eastern waters.
>
> Third - A severe penality for killing and seining trout; half of the fine to go to the informer and half to the Fish Commissioner's fund.
>
> Fourth - The lengthening of the close season until June 1, and extending the open season to November 1.
>
> Fifth - A general revision of the game law, more especially with reference to antelope.

A committee consisting of Dr. Van Hummell, Theo. Whyte, and Mr. Baker was selected at a second meeting on January 2, 1879, to prepare the bill that was to be presented to the legislature (Denver Times 1879 Jan 3:4 c 2). Furthermore, another meeting was scheduled for that evening at the American House according to the Denver Times item with an additional meeting at 7:30 o'clock the evening of the 4th according to the RMN (1879 Jan 4:4 c 1). Eventually, details of all of the proposed fish laws were given in the Georgetown Miner (1879 Jan 18:2) and some became law when Colorado's second General Assembly amended the fish laws on February 7, 1879.

A notable change was the inclusion in Section 1 that it was unlawful to empty or allow the emptying of sawdust into any

public waters that contained food fish, or to deposit the same within such distance that it may be carried into said waters by natural causes. Furthermore, the Fish Commissioner's expenses were increased from $100 to $1,000, the closed season was lengthened, and the open season was extended--all proposed earlier by the sportsmen's meetings.

Even though Colorado's territorial and state fish laws prohibited the use of explosives on fish as early as 1870, the legislators provided little direct appropriations to employ enough wardens or conservation officers to adequately enforce these laws. This was especially true for the more remote areas on the Western Slope. By 1881, "blasting" had almost totally destroyed the trout in the Roaring Fork tributary of the Grand River (renamed Colorado River in 1921) and had significantly reduced their numbers in the Eagle River and Williams Fork tributaries of the Grand River. Blasting was also frequently used to take many trout from the Gunnison River as Denver and Rio Grande Railroad crews were laying tracks enroute to Cimarron and on to Montrose. Many other streams were poached with explosives by other railroad crews and by members of new mining camps that had sprung into existence.

On March 14, 1881, Colorado's third General Assembly responded with an Act that granted the Fish Commissioner power to appoint deputy commissioners throughout the state and to remove the same at his pleasure. These deputies had full power and authority to enforce the fish laws of Colorado, but the Act clearly stated that such deputy fish commissioners would serve without compensation from the state. Fish Commissioner Sisty reported appointing 14 such deputies in his 1881-1883 Biennial (pp 5-6), but also stressed that, in spite of the closest watch, there were still many violations, especially in the use of explosives. The law-abiding sportsmen eventually became so provoked that they responded early in May 1882 by forming "The Colorado Game and Fish Protective Association," organizational details of which were reported in most of the newspapers. The following is from FS (1882 May 25, 18[17]:327-328).

COLORADO STATE ASSOCIATION

In response to the call issued May 4, a meeting of sportsmen convened at Denver May 17. The **Republican** of that city reports:

The room was filled with gentlemen from different sections of the State and the interest manifested was of such a nature as to show that in the organization of the proposed association there was to be an earnestness and hearty cooperation that would insure the objects and ends sought to be accomplished. Among those present were: Charles Kiessig, Leadville Rifle Club; A. W. Hogle, J. M. Fisher, George B. Dougan and D. H. Dougan, Leadville Gun Club; W. C. Sanders, C. L. Hanna, Greeley; W. E. Sisty, Idaho Springs; J. M. Roberts, F. M. Keith, American Field Club, Pueblo; T. J. Batz, W. L. Bayles, South Pueblo Gun Club; E. G. Owens, W. N. Byers [Fig. 20], W. Y. Sedan, Charles L. Dow, H. S. G. Davis, W. B. Davis, C. C. Compton, J. C. Woods, J. M. Anderson, Max Neff, Charles Roth, J. Harrison Mills, J. Cook, Jr., W. M. Anderson, John P. Lower, L. Kershaw, H. W. Baldwin and Judge Mott, of Denver.

Judge Mott stated the object of the meeting to be the organization of an association for the protection of game and fish--to see that the State laws were not violated. Fish and game could not be protected unless through a regularly organized and incorporated association. The object is to have a central ogranization at Denver, after which it is proposed to organize auxiliaries or branches in every county in Colorado. The association at Denver, however, is to be the head--in the nature of a State organization.

W. N. Byers was selected as Chairman and Jacob S. Sedan, Secretary.

The plan of organization was discussed at some length, and it was finally determined to limit the existence of the organization to twenty years; to incorporate under the laws of the State under the name of "The Colorado Came and Fish Protective Association." It was decided to chose nine trustees for the organization, to serve for "one" year. Upon motion a committee of five was appointed by the chair to select the nine directors. The chair named this committee Judge Mott and J. Cook, Jr., of Denver; Fish Commissioner Sisty, of Idaho Springs; Dr. Dougan, of Leadville, and Mr. Keith, of Pueblo. Fish Commissioner Sisty asked to be excused and State Treasurer Sanders was named in his stead.

The committee, after a brief absence, reported the following trustees: W. N. Byers, W. J. Kinsey, J. Cook, Jr., W. Y. Sedan and Bela M. Hughes, of Denver; C. L. Hanna, of Greeley; J. N. Fisher, of Leadville, and T. J. Bates and J. E. Roberts, of Pueblo.

Fig. 19. DR. F. J. BANCROFT was the first president of the earliest known organized sportsmen group in Colorado--the Denver Sportsmen's Club, established October 11, 1869. This club introduced quail to Colorado in 1870 and was involved with legislative lobbying for game and fish regulations as early as 1872. When the State Historical Society of Colorado was founded in 1879, Bancroft became its first president. (Photo courtesy Colorado Historical Society)

> Five directors were selected from Denver, in order that if a called meeting had to be held a quorum could be secured without trouble. The trustees were requested to file articles of incorporation with the Secretary of State today, so as to complete the organization as soon as possible.

FS (1882 Jun 1:348) mentioned that the first object of this new organization was to enforce current game and fish laws and secure their improvement when the Legislative Assembly met. The subsequent viability and speed with which this sportsmen organization acted is documented by the following. When Colorado's sixth General Assembly was actively in session at Denver early in 1887, the RMN (1887 Feb 9:6 c 4) contained a very terse item stating:

> A meeting of the Colorado Game Protective Association will be held this evening at 8 o'clock at the Governors Guard company rooms, 342 Fifteenth Street (old number).

The next morning the RMN (1887 Feb 10:7 c 3) notified its readers:

> At a meeting of the Colorado Game and Fish Protective association held last evening at the Governors Guards' company rooms, about thirty gentlemen were present. It was the unanimous sense of the meeting that a committee consisting of Dr. H. A. Lemen, Hon. J. H. P. Voorhies, Judge L. B. France, Hon. W. N. Byers and Captain J. S. Sedan, which was appointed, should meet members of the general assembly in the legislature at 11 o'clock to-day and advise such amendments to our game and fish laws that will prohibit hunting or killing our large game and fish for market; and further, to advise that the open season for killing large game be from August 1 to October 31, and that the fishing season for trout by rod and line be from June 1 until October 31.

Apparently several years before the above-mentioned meeting a number of protective associations, either separately or in conjunction with the Colorado Game and Fish Protective Association, had been formed in Colorado because Fish Commissioner Pierce mentioned in his 1885-86 Biennial (p 8):

> In many localities, Fish Protective Associations have been formed among the lovers of the sport, which have done more to protect the Trout than all other means; and it is to such associations and the cultivation of a decent public sentiment, that the State will have to look for a reasonable enforcement of the law.

It was not only stream blasting and sawdust that were reducing original trout populations; but also the dumping of effluents from mining camps. Arthur H. Carhart (1950 Fishing in the West MacMillian Co. Pp 42-43, 124) said:

> [p 124]...The first impact of man's use of western waters came with the gold rushes. In the lust for treasure, the miners ripped up stream beds and adjacent banks and benches. Dirt and water mixed in crude sluices and the muddy soup that poured from these dumped back into stream beds to choke out water life below. That was a relatively small-scale type of mayhem of living waters. Streams could purge themselves in a decade or so and regain reasonable health.
>
> As the placers played out, mining switched to the hard rock projects. Ore coming out of the veins had to be ground to the fineness of flour and the mineral separated from the common rock. Poisonous chemicals were mixed with this thin batter of rock flour and water to capture all the precious gold and silver in the mixture.
>
> [pp 42-43].. .Historically, the Arkansas was a green-back trout stream. Early in western settlement, the mining booms at Leadville blasted the carrying capacity of the river. Both the finely ground mill tailings and chemical pollutions from smelters were dumped into the river as a convenient way to get rid of wastes.
>
> That went far to clean out trout from the main upper Arkansas. Leadville and surrounding mining towns are near the headwaters and this flour-fine, mill-tailing stuff can get into fish gills, lodge there, and the fish suffocates. It also kills out aquatic vegetation, smears up clean gravel that has been spawning beds, and runs all the way downstream. The poisonous chemical go along with it.
>
> Thirty years ago (1919), when I first knew the Arkansas, the side streams were still supplying fair, small-fish angling with greenbacks the principal species. But the main stream was pretty barren; although mining had slumped, pollutions from that source were no longer grossly fouling the water, and the stream looked "trouty."
>
> The Fremont County Game Protective Association, with help from the state, launched a program of trying to restock the Arkansas. Literally hundreds of thousands of cutthroat, rainbow, and brook fry and fingerlings were planted to make the Arkansas live up to its superficial appearance as a "trouty" stream. Season after season, little fish were dumped in. Nobody caught any of the cutthroats or rainbows so sacrificed to hopes and ambitions. A series of trout-rearing ponds, fed by an excellent, constant-temperature spring, built by local sportsmen's money, were operated only to achieve pure futility.
>
> Then someone decided to try brown trout in the Arkansas. The browns took hold. Along the way, someone dug out the facts. While the mining wastes were no longer coming into the river, waste water, carrying silt from irrigated fields along the river,L[31] was spilling back into the stream. Fine particles of this lost soil got into the gills of cutthroats and rainbows, and finished them. The brown, with coarser gill filaments than the other trout, didn't get the breathing apparatus clogged so readily.

[3]Some return irrigation flows today contain poisonous pesticides but state and federal agencies systematically monitor streams to detect and eliminate pollution sources as well as mine tailing wastes. See G. G. Everett and W. F. Hutchinson (1963 Under the Angle of Shavano Golden Bell Press, Denver, Colo. Pp 282-287) for the rapid development of irrigation ditches in the Arkansas Valley. Between 1864 and 1888, 156 ditches had been decreed in Water District No. 11 and by 1915 there were approximately 200.

The increasing number of irrigation ditches on the Arkansas River certainly does not give the reader an adequate picture of how extensive these ditches were, especially on a statewide basis. FF (1890 Jan 25:3) however, provided some pertinent data:

> Since 1866 and up to 1889 inclusive, there has been six thousand miles of irrigating ditches built in the state. There were less than five hundred miles prior to '66. These ditches have cost from eight to sixteen hundred dollars per mile. There will be from a thousand to fifteen hundred additional miles of these canals built the present year. After the work of the present year is done Colorado will contain more than one-third of the irrigating canals of the continent.

Many of Colorado's farmers and ranchers who were building these irrigation ditches cared little about the fishes that were trapped in their fields when the irrigation season was over. Concerned sportsmen and some State legislative members began to think of ways to protect our stream fishes from these losses. Before the seventh General Assembly met early in 1889, the RMN (1888 Nov 27:4 c 1) ran an item stating:

> A meeting is called for this evening in the rooms of the Colorado Cattle Growers association, in the Chamber of Commerce building, to organize for the propagation and protection of fish. This is a state interest that deserves far more attention and support than it receives. The subject will be urged earnestly upon the consideration of the next legislature.

Details of this meeting were delineated in the RMN (1888 Nov 28:6 c 2) the next morning:

A Good Movement

A State Fish and Game Protective Association Formed.

A movement which should receive the approbation of every true sportsman in the state, and indeed, every citizen, was commenced last evening in the office of the Colorado Stockgrowers association in the Chamber of Commerce, where a number of gentlemen met for the purpose of organizing a fish and game protective association. The following were present: W. R. Scott, Charles J. Kelley, Dr. Alexander Shaw, Harry Bostwick, H. B. Cullum, Charles Lerchen, A. W. Smith, J. E. 011erstaiter and Claude King, editor of Sports Afield.

Harry Bostwick was made temporary chairman and H. B. Cullum secretary. After some preliminary discussion as to the objects to be gained by organization, the need of legislation and concerted effort to prevent the extermination of fish and game in the state, it was decided to name the association "The Colorado State Fish and Game commission." Austin Smith, C. J. Kelley, E. M. Cranston and H. B. Cullum were appointed a committee to draft constitution and by laws and submit them at the next meeting, which was fixed for Tuesday evening, December 4, at the same place.

An invitation was extended that the association make an exhibit of fish at the flower and fruit show of the horticultural society, and Messrs. Scott and Lerchen were appointed to confer with Dr. Shaw. After some other minor work had been done the meeting adjourned.

It is the intention of the commission to ask the legislature to pass restrictive laws regarding the slaughter of fish and game, to have the streams of the state restocked and to endeavor to preserve to sportsmen at least all that Colorado has left of fish and game.

Two additional organizational meetings of this commission were held the evenings of December 4 and 11, 1888. From details published in the RMN (1888 Dec 5:8 c 2, Dec 11:2 c 4, and Dec 12:8 c 1), I have extracted the highlights of the Colorado State Fish and Game Commission. Judge Hallett presided over the meeting on the 4th, which manifested a great deal of interest with more than 50 people in attendance. The membership fees were $5.00; life membership, $25.00; and honorary membership, $50.00. Thirty-four of the people present on the 4th payed their dues and became members. Annual meetings were to be held in Denver on the first Tuesday in December at 7:30 p.m. It was proposed that a fish exhibit be made at the Flower and Fruit Show in January 1889.

The aims of the commission were to: secure a state membership of 2,000; raise funds to be used as rewards for the detection of law breakers; secure legislation toward the stocking of streams with fish; provide screens; and suppress duck snaring and illegitimate trout fishing. It was claimed that many fish were seined, sent to New Mexico, and reshipped from there as New Mexico trout.[4]

The committee that was appointed to draw up a constitution and bylaws presented its report, which was adopted, with a few ammendments. The objectives of the commission's constitution were to establish legislation for the protection of fish and game in Colorado and to assist state and county officials in the enforcement of fish and game laws. Officers and an executive committee were elected as follows: President, I. B. Porter; Vice-president, R. R Wright, Jr.; Secretary, H. B. Cullum; Treasurer, S. M. Wood; Executive Committee--Austin W. Smith, Hon. Earl W. Cranston, Hon. John L. Jerome and L. L. Higgins. The executive committee decided to incorporate under the state laws.

[4] Duck netting operations in northern Colorado earlier had been brought to the attention of the fifth General Assembly by J. P. Lower, one of the most ardent advocates of the passage of new game laws in 1885 (Denver Tribune-Republican 1885 Jan 17:8 c 3 and Jan 28:3 c 2). He was an original member of the Colorado *Game* and Fish Protective Association.

Fig. 20. WILLIAM N. BYERS founded Denver's RMN in 1859 and was an avid sportsman, mountain guide, and sportswriter. He was an early member of the Denver Sportsmen's Club and president of the Colorado Game and Fish Protective Association, which assisted Colorado's Fish Commissioner in stocking and law enforcement. During 1882 Byers personally planted the earliest known consignment of brook trout to be introduced into the Colorado River drainage. He was a prolific contributor to FS, which kept eastern sportsmen informed of Colorado's game and fish activities, and prompted frequent trips by them to Colorado. (Photo courtesy Colorado Historical Society)

A three-person committee on permanent organization recommended that the board of directors of the commission be fixed at 49, in order to have a representative from each county in the state. A list of names of eligible persons from each county was submitted, but not all of them had yet agreed to be a director or were as yet members, and consequently, it was recommended that the executive committee correspond with these parties.

The meeting on December 11 was attended by a large number of people, many of whom became members. Before this meeting, FF (1888 Dec 8:5) mentioned that "the Colorado State Fish and Game Commission had about 500 paid-up members." The early viability of this organization is suggested by what shortly transpired.

When the Colorado Horticulture and Forestry Association held its eighth annual meetings at Gettysburg Hall in Denver on January 10, 11, and 12 of 1889, a fish display was on exhibit as had been earlier proposed by the Colorado State Fish and Game Commission. The RMN (1889 Jan 11:9 c 3) noted that in one tank there were three kinds of carp--the big fat German leather carp, the mirror carp (without scales), and the scale carp. In this same tank were some yellow catfish and an American carp. In one tank were California rainbow trout. Pickerel and other fish were with the black bass in another aquarium.[5]

Latecomers to the fish exhibit were Eastern brook trout, two-year-old "landlocked" salmon, and two or three English trout. It was mentioned of this last variety[6] that General Pierce (former Colorado Fish Commissioner) had the young shipped to Colorado 3 years before and "they are being introduced into the streams hereabout" (RMN 1889 Jan 12:9 c 3).

Before the seventh General Assembly met in 1889, the Colorado State Fish and Game Commission carefully framed a bill that proposed to screen only the headgates of the main irrigation ditches, and these only for a short period in each year, namely, from the 1st of August to the 15th of September, as this was the time when the trout were descending the rivers in quest of winter quarters (SA 1889 Feb 14, 2[3]: 46). This Screen Bill, later known as House Bill 254, was presented to the house by Representative Metcalf, a member of the Legislative Committee for Fish, Forestry, and Game, but it was defeated on its third reading (RMN 1889 Mar 26:7 c 3). In April 1889, an Act was signed by Governor Cooper dictating that it would be the duty of the Governor, the State Fish Commissioner, and the President of the Colorado State Fish and Game Commission to determine three locations in different sections of the state at which the Superintendent of Hatcheries could establish hatching stations. Sites at Twin Lakes, Gunnison, and San Luis Valley were selected but funds were insufficient to activate the San Luis Valley site. The Twin Lakes Hatchery had been built in 1885 but had not been in use for lack of funds.

Apparently internal strife between members of the Commission occurred as a result of a quickly called meeting held at Denver on the evening of May 24, 1889, when only 12 members were present and several changes were resolved in this large organization. According to the RMN (1889 May 25:3 c 1) the most important resolution of the evening was:

> That the executive committee be requested to have the lawyer withdraw any steps which might have been taken to prosecute cases of men fishing with hook and line.

W. N. Byers, in an editorial in SA (1889 Jun 20, 11[12]:220), noted that the resolutions adopted by the above meeting would be accepted all over the state as a license to fish even in the closed season. Byers continued:

[5] It is unknown if these pickerel were true pickerel or sauger. The "American carp" probably were goldfish while the "yellow catfish" probably were brown bullhead.

[6] These English trout no doubt were brown trout.

In heaven's name what was the Commission organized for?...I desire to offer thus publicly a reward of ONE HUNDRED DOLLARS for the prosecution and conviction of any member of the so-called Colorado State Fish and Game Commission for violating the law which provides for a close season for trout up to July 1. This is to apply to any such offense in 1889, within the close season. The money will be paid immediately upon official notice of such conviction in the District Court. I want to see the law "judicially determined" if the Fish and Game Commission does not. If the Commission (?) shall hold another meeting, I suggest that it amend its title so that it will read "The Fish Destructive Association". Then the kid-gloved gentry, who are driven by "necessity" to fish for something to eat, can close their offices, and banks, and great financial marts, and sally forth without fear or conscience to join the festive dynamiter in depopulating our beautiful mountain streams of their fairest treasures. The Secretary of the late Commission will please strike my name from the roll of members.

Early in September 1889, the Rocky Mountain trap shooters held a tournament at Denver. Many members of various western clubs competed for some large purses ($1,000). The RMN (1889 Sep 4:3 c 1) mentioned that:

For a long time past the sportsmen of the Rocky Mountain region have felt the necessity for a general organization which could speak with authority in their name. The presence of so many in this city at the tournament has given an opportunity of carrying those desires into a practical form. Last evening a meeting was called at the Albany Hotel at which were present representatives of the various clubs. After considerable discussion, the Rocky Mountain Sportsmen's Association was brought into existence. This association includes Colorado, Wyoming, Utah and New Mexico, and is to be composed of regularly organized gun or fish clubs. Individuals are not eligible to membership and each club must consist of not less than five members. Each member of the clubs joining shall pay an initiation fee of 25 cents and 25 cents annual dues. It is expected that the membership will be at least 1,000 at first, and this will be considerably increased as sportsmen throughout the distant districts become acquainted with the advantages to be derived from membership. At the present time it is impossible to tell how many clubs will join the association during the present month, as there are many which are scarcely aware that this body is being formed. It is expected, however, from expressions of opinion which have been made in the past, that every club in the region embraced will become a member.

The object of the organization as stated in the constitution adopted last night is to secure legislation for the proper protection of fish and game and to encourage the formation of clubs for the prosecution of field sports proper. This association will control the annual tournaments of the gun clubs, hereafter. The officers consist of a president, vice-president, secretary, treasurer and a board of five directions, one each from Colorado, Utah, Wyoming and New Mexico, and one at large.

The election resulted as follows: President, C. M. Hampson, Queen City Gun Club of Denver; vice-president, A. A. Holcomb of the Cheyenne Gun Club; secretary and treasurer, Claude King of the Queen City Gun Club and editor of Sports Afield. Directors - S. H. Hotchkiss of the Queen City Gun Club of Denver, A. M. Bradley of the Salt Lake Gun Club, Salt Lake; Ralph E. Twitchell of Santa Fe Gun Club, Santa Fe, N. Mexico; John Schunemann of the Cheyenne Gun Club, Cheyenne, and D. H. Dougan of the Leadville Gun Club as delegate at large.

The meeting adjourned without the place of the next annual meeting being named, that matter being left to the direction of the board of directors, to whom it also entrusted the drawing up of proper by-laws.

Between September 1889 and January 1891, both the Colorado State Fish and Game Commission and the Rocky Mountain Sportsmen's Association appear to have assisted state authorities with law enforcement. SA (1890 Mar 27, 4[7]:126) said that they had been officially requested by the Colorado State Fish and Game Commission to announce that the closed season on wild fowl in the state began on the 22nd of the present month, and the same did not expire until the 1st day of the next September. Early in 1891 the Commission investigated alleged wholesale slaughter of game in Routt County and the subsequent shipping of this game through Wyoming and back into Colorado or to eastern sites (SA 1891 Feb 15, 6[2]:30-31). Regarding the Rocky Mountain Sportsmen's Association, SA (1890 Nov 20, 5[11]:462) reported its president was not only willing but eager to do all that could reasonably be expected of him to prevent certain existing and known abuses.

When the eighth General Assembly convened in Denver early in 1891, two mass meetings of sportsmen were organized and held at the Albany Hotel under the auspices of the Rocky Mountain Sportsmen's Association with the intent of preparing a number of bills for the betterment of the game laws. Details of these meetings were reported in the RMN (1891 Jan 21:3 c 1 and 1891 Jan 28:3 c 3). According to SA (1891 Feb 15, 6[2]:30) the bills had been well and carefully drawn up, and awaited only the action of the Colorado legislature. Messrs. W. N. Byers, C. M. Hampson, Gordon Land, L. B. France, Amos Steck, Casimiro Barela, W. R. Scott, H. M. Orahood, and others were said to be entitled to the gratitude of the Commonwealth for their unselfish interest in such a good cause. Many of the bills that the Association drafted became law.

In 1892 when the Rocky Mountain Sportsmen's Association met for their annual tournament at Denver, November 10-12,

meetings were held to debate the best methods to revise the game laws of the state. The following persons were appointed a committee to formulate and present to the legislature amendments to the state game laws: F. A. Williams, L. Butterfield, Gordon Land (fish commissioner since 1889), L. B. France, and Milward Hewitt. Five additional men were selected from different portions of the state to act as advisory aid to the law committee. Mr. Sibley moved that Article 1 of the Constitution be amended to read, "The name of this association shall be tne Colorado Fish and Game Protective League." The motion was unanimously carried and the secretary was directed to notify their members in the neighboring states and territories. Further details of the 1892 meetings can be found in the RMN (1892 Nov 10:5 c 3, Nov 11:2 c 6, and Nov 13:24 c 1-3).

It would be redundant to describe any of the great number of additional sportsmen's clubs that evolved in Colorado . Obviously, sportsmen were very active and extremely well-organized by this time.

FEDERAL INVOLVEMENT

U. S. COMMISSIONER OF FISH AND FISHERIES

Primarily predicated by Congressional approval to investigate diminution of valuable food fishes of the coast and the lakes of the United States, the position of Commissioner of Fish and Fisheries was created on February 9, 1871. President Grant signed into law a joint resolution dictating this for the protection and preservation of the food fishes of the coast of the United States (Congressional Globe 1871 41st Congress, 3rd Session, Part 3-Appendix p 398). Five days later the President nominated for Commissioner, Spencer F. Baird (Fig. 21), a foremost naturalist who was then assistant secretary of the Smithsonian Institution, and who earlier had been the principal brain trust for the joint resolution.[7]

In 1872, Congress at the insistence of the American Fish Cultural Association [8] requested the U.S. Fish Commissioner to take charge of increasing valuable food fishes throughout the country by creating fish-breeding and hatchery facilities with an additional $15,000. The Commissioner responded before the year's end by employing Livingstone Stone, one of the best private fish-culturists belonging to the American Fish Cultural Association, to establish a salmon-breeding facility on the McCloud River near Baird, Shasta County, California. This station was the Commission's earliest source of chinook salmon eggs. About 5 miles from the salmon station, Stone eventually put in ponds for cultivating rainbow trout. Here also was the Commission's earliest source of rainbow trout eggs.

Even though propagational activities by the U.S. Fish Commission during 1872 only included work on American shad, chinook salmon, Great Lakes whitefish, and the importation of European salmon eggs, Colorado Territory was not slighted. Federal records document that 2,000 "shad" were stocked in the Platte River near Denver and the RMN (1872 Jul 9:2 c 1) verified it.

DUTIES AND POLICY OF THE COMMISSIONER

Section 2 of the February 9, 1871 joint resolution stated that it shall be the duty of said commissioner:

> To prosecute investigations and inquiries on the subject [of the diminution of valuable fishes], with the view of ascertaining whether any and what diminution in the number of the food fishes of the coast and the lakes of the United States has taken place; and if so, to what causes the same is due; and also whether any and what protective, prohibitory, or precautionary measures should be adopted in the premises; and to report upon the same to Congress.

Regarding the additional task of artificial propagation of fishes in the United States undertaken by the Fish Commission, mention was made in the U. S. Fish Comm. Rep. for 1884 (p 1157) that the policy of the United States Commissioner was to carry out the idea:

[7] Further details of Baird and the fate of the Fish Commission can be found in Scientific Monthly (1923 Aug pp 97-107) and Colorado Outdoors (1972 Jan-Feb pp 35-38).

[8] The American Fish Cultural Association was a small, organized group of eastern private fish culturists led by Seth Green of New York. This Association was founded in 1870 and evolved into the American Fisheries Society.

Fig. 21. SPENCER F. BAIRD was the first U.S. Commissioner of Fish and Fisheries serving without salary between 1871 and his death on August 19, 1887. During Baird's headship, the U. S. Fish Comm. introduced several exotic fish to Colorado, either independently or in conjunction with private culturists or Colorado's Fish Commissioner. The Commission stocked American shad in the South Platte River near Denver in 1872; they sent chinook salmon eggs to a Georgetown culturist during 1874, with follow-ups in 1875 and 1876; they provided the German carp that Colorado's Commissioner Sisty distributed to various applicants during 1879; and they shipped Atlantic salmon eggs (1881) and rainbow trout eggs (1882) to Sisty and other Colorado applicants. After his death, high commendation of Baird was given by the New York Times (1887 Aug 20:5 c 2) which said, "The service he rendered [as Commissioner of Fish and Fisheries] in increasing the food supply of the world would alone justify a national monument to his memory." (Photo from Colorado Outdoors 1972 Jan-Feb P 35)

> that it is better to expend a small amount of public money in making fish so abundant that they can be caught without restriction, and serve as cheap food for the people at large, rather than to expend a much larger amount in preventing the people from catching the few that still remain after generations of improvidence.

Apparently to facilitate the above policy, the U. S. Fish Commission had significantly expanded their facilities by 1884 since they were rearing 21 varieties of fishes plus oysters, clams, and lobsters in 13 hatching stations throughout the United States. Fish eggs for artificial rearing were obtained primarily from wild spawning stocks at the Commission's field collection stations. Frequently, more eggs were taken than were deemed necessary to maintain the donor stocks. These surplus eggs were eyed at Commission hatcheries and were then sent to private culturists or fish commissioners throughout the U. S., or even to **culturists in foreign countrie3. Others were hatched and reared for a short time before being stocked (introduced)** in waters thought desirable (often times undesirable) for a particular species. Before the advent of modern motorized hatchery tank trucks, the U. S. Fish Commission transported and distributed most fishes in specially-btilt railroad aquarium cars (Fig. 22).

FEDERAL RECORDS

Because Congress generally required federal agencies to report on their specific activities annually (usually on the basis of a July 1 to June 30 fiscal year), records of the U. S. Fish Commission activities usually were ptblished. Because this agency's records and those of its successors were published in many different documents, they are often hard to locate. Of particular concern was the recovery of the federal fish distribution records to Colorado. Between 1872 and 1903, these records are found in the U. S. Comm. of Fish and Fisheries, Commissioner's Rep. for a particular year. I refer to these as U. S. Fish Comm. Reports. Some additional federal distribution records in this historic period can be found in the Bull. of the U. S. Fish Comm. for a particular year.

The publications containing federal fish distribution records for 1904-1939 are various Fisheries Documents and Administrative Reports bound with the Fish Commission Reports for particular years. Records for the 1939-40 fiscal year, however, were published in Administrative Report No. 42 (pp 555-603) bound with the U. S. Bureau of Fisheries Report. Between 1941 and 1962, they are found in a series called

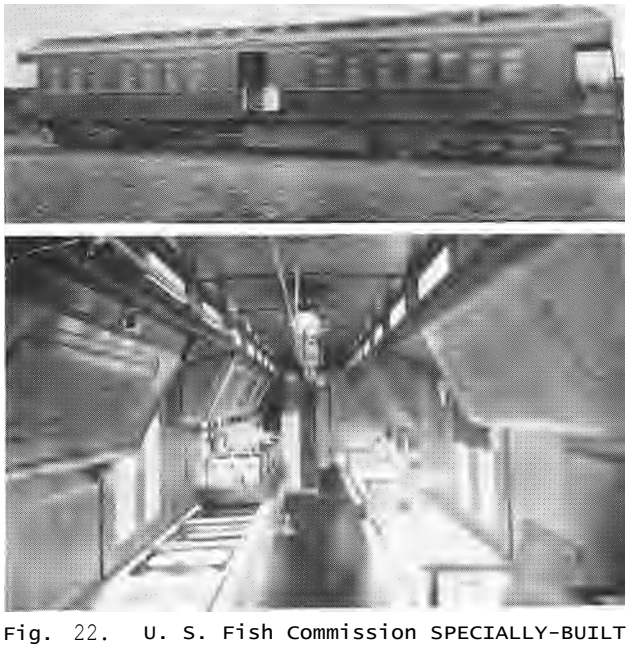


Fig. 22. U. S. Fish Commission SPECIALLY-BUILT RAILROAD CAR #3, which contained aquaria and fish tanks, was used for transporting fish throughout the county. (Photos from U. S. Fish Comm. Rep. for 1898 Pp xxxi, xxxiv)

Statistical Digest, whereas since 1963, they have been published in a document titled Fish Distribution Report, numbered consecutively from Number 1.

My compilations indicate that federal distribution records are available for all years since 1872 except for fiscal years 1911 and 1920, which presumably never were published. The published federal records show no specific locations of stocking in Colorado after 1919, only the numbers for each of the various species stocked.

In various tables and appendices, I have cited many U. S. Fish Commission Reports, Bulletins, and State Fish Commissioner Reports for a particular year. In this instance the year is not meant as the year of publication (usually the format of other reference materials). Many of the U. S. Fish Commission Reports were so voluminous and detailed that several years elapsed before they actually were published.

FEDERAL HATCHERIES IN COLORADO

Several years before any firm commitments were made, the U. S. Fish Commission began thinking of Colorado as a site for an additional fish propagating station. The U. S. Fish Comm. Rep. for 1884 (p xvii), stated that:

> ...efforts are constantly being made to induce the Commission to increase the number of propagating stations in order to hasten the accomplishment of the results desired; but it has been necessary to proceed very carefully with such measures, and only in proportion to the increase of appropriations made by Congress. There is no doubt that a number of new stations might be established to advantage, and it is hoped that the means will be allowed at no distant time for doing so.

Suggestions were to establish a hatchery on the Columbia River or start a joint hatchery between British Columbia and the United States to enhance Columbia River salmon, and establish a station in Colorado or elsewhere in the Rocky Mountain Region for possible cultivation of Rocky Mountain trout. Urged by Colorado Fish Commissioner Pierce's reports in June 1885 of large trout[9] at Twin Lakes near Leadville and tendering the U. S. Commission's use of the state hatchery there (with Governor Eaton's approval), the U. S. Fish Commissioner responded in his 1885 Report to Congress (p xxvi):

> Mr. Pierce was informed that the establishment of a trout-breeding station in Colorado would be considered a very important auxiliary to the work of this Commission, and that as early as practicable a reconnaissance of the lakes, their location and surroundings, would be made with a view to active operations. The actual equipment of the station when once erected would be inexpensive, as the necessary apparatus is now on hand. The matter remains in abeyance for future consideration.

It was not until late in 1888 that the U. S. Fish Commission thought seriously about establishing a government hatchery in Colorado, and at least one other site, Gunnison, was investigated in addition to that near Leadville. The Gunnison Review Press (1888 Sep 25) remarked that John Gay of the U. S. Fish Commission had come from Washington to investigate the possibility of establishing a government fish hatchery. His plan was to breed home trout[10] and distribute their eggs in the waters of this state and other states; and in return, procure (for Colorado) eggs of the eastern brook trout and the rainbow trout of the Pacific Slope. Colorado, it was stressed, was greatly indebted to Senator Teller for inducing Mr. Gay to visit the state for this purpose.

Gunnison's elation was short lived, however, and probably best described by the remarks made in the Review Press (1889 Feb 9):

> Gunnison has lost another golden opportunity. Leadville has secured the location of the fish hatchery. Evergreen lakes have been selected and Senator Teller has asked Congress to appropriate 15,000 dollars to put up the buildings. When it was proposed by Capt. Mullin to put a

---

[9] Pierce said that these trout were rarely less than 2 and ranged up to 10 pounds in weight. David Starr Jordan, an early expert on taxonomy of cutthroat trouts, mentioned in the Bull. of the U. S. Fish Comm. for 1889 (p 13) that greenback trout in Twin Lakes seldom exceeded 3/4 pound. Consequently, these larger trout were probably yellowfin trout, the only other variety known to exist there. One of the earliest mentions of the presence of large trout in Twin Lakes was by Bayard Taylor (Colorado: A Summer Trip 1867 Putnam and Son, N. Y. pp 130-131). Mr. Leonhardy, who was an early settler along the shores of Twin Lakes, had tempted Taylor's party in July 1866 with descriptions of 6- to 8-pound trout, but none were actually caught then. Taylor, a world-renowned traveler, was guided by W. N. Byers of the RMN on a 3-week trip through the mountains. These large fish were also reported in the RMN (1866 Jul 13:1 c 1).

[10] Salmo clarki pleuriticus was the only trout originally indigenous to the Gunnison River. I have stated in my reports on this drainage that the largest cutthroat trout mentioned in Gunnison newspapers was 7.5 pounds before large rainbow trout began entering the creel in the late 1890's. Some issues of 1894 Gunnison newspapers were missing from the holdings at Western State College when I searched in the late 1960's. FF (1894 Jul 7:7) stated that a 12 pound 3 ounce blackspotted trout, 31 inches in length, had been caught in the Gunnison River at the mouth of Cebolla River a few weeks previously. The largest known pleuriticus or any native trout ever taken in Colorado was caught in 1884 by Mr. Rye Hamill of Denver at the mouth of the Eagle River. It was caught on an ordinary trolling line, weighed 26.5 pounds, and was 40 inches long (AA 1884 Dec 20:391). According to the RMN (1884 Sep 30:8 c 4) the fish was caught by Tom Crippen and weighed 26 pounds.

price upon the land that Major Gay had in view for a site here our chance was killed deader than giant powder would kill a trout.[11]

Other than close proximity to the headwaters of some major drainages in Colorado and the presence of both private and state-operated fish hatcheries, clear reasons why the federal government selected Evergreen Lakes near Twin Lakes for its new hatchery site are not known. Certainly, at that time it could not have been the presence of an abundance of wild fish. SA (1889 Jan 31, 2[2]:29) reported that Senator Poole had urged the Senate and House of Representatives of the United States to pass an act ceding Twin Lakes to the State of Colorado for the purposes of culture, propagation, and protection of fish. It was stated that Twin Lakes were the breeding place from which the whole system of water of the Arkansas Valley derived its supply of trout, but that the laws failed to protect said lakes from destructive depredations, thereby almost destroying the trout both in these lakes and in the tributaries to the Arkansas River.

Additional details of this new government hatchery site and the fish to be reared there were reported in FS (1889 Apr 11, 32[12]:240 c 2) as follows:

> Government Fish Hatchery in Colorado.--Work will soon begin on the new station at Leadville, Colorado, the site of which was selected in October last, by Col. John Gay, inspector of U. S. Fish Commission stations. The location of the hatchery is in the vicinity of the Evergreen Lakes and near the fish-cultural establishment of Dr. John Laws.[12] The appropriation for the buildings and appurtenances is $15,000, which will be available July 1. The permanent structures will be of red sandstone. There are numerous springs near the hatchery, but the main supply of water will be obtained from Rock Creek and, to insure the purity of the water, the Government obtains a reservation including the sources of the creek, measuring a half mile in width and extending from the hatchery site to the summit of Mount Massive, where the elevation exceeds 14,000 feet. Colonel Goodwell has aided the project materially by relinquishing his right to certain placer claims situated upon the site chosen and by urging members of Congress to make the necessary appropriation. The Colorado hatchery will be sufficiently large to furnish trout fry for the whole Rocky Mountain region. The species[13] which will receive attention principally are the Rio Grande trout, the Utah trout, and the red-throated trout. Doubtless brook trout, rainbow trout, lake trout and land-locked salmon will continue to be bred, as they have shown their ability to exist and thrive even at considerable elevations in this State.

Under the direction of John Gay assisted by William P. Sauerhoff, an expert carpenter, construction of a "temporary hatchery" was begun on September 9, 1889, and was ready for reception of eggs about the middle of October 1889. On September 21, 1889, E. M. Robinson was appointed superintendent and shortly thereafter brook trout eggs from John Law's private fish stock at Evergreen Lakes were procured and successfully hatched in the temporary hatchery.

On October 14, 1889, a contract was let to L. G. Hunt of Pueblo for $12,672 to construct the permanent fish hatchery, which was completed by October 1890. Shortly before this, Congress had appropriated an additional $20,000 for the construction of primary dwellings including a stable and wagonhouse, and for the procurement of equipment needed to complete the Leadville station (Fig. 23). H. D. Dean was appointed superintendent on April 15, 1891, succeeding E. M. Robinson, who had resigned to take charge of a private fish-culture establishment. E. A. Tulian replaced Dean in 1895 and operated the Leadville station until April 1904. A detailed description of this station was written by Virginia McMechen for SA (1902 Feb, p 154-156). The Leadville station was the only station operated in Colorado by the U. S. Fish Commission until a branch hatchery was

Fig. 23. U. S. FISH COMMISSION HATCHERY near Leadville. (Photo from SA 1902 Feb)

[11] In August 1889, Gunnison's hope was restored because it had secured the location of one of the principal fish hatcheries and distribution stations provided for at the recent session of the state legislature (Gunnison Review Press 1889 Aug 17).

[12] FS (1889 May 9:322) reported that Dr. John Law had received 35,000 brook trout eggs from Wisconsin and succeeded in hatching 95 percent of them in his establishment. According to another issue, the owners had expended about $10,000 in their propagation and rearing plant and were apparently making a success of the enterprise (FS 1889 Jul 11:508 c 1). Ex-Governor James B. Grant was a partner with Dr. Law in this establishment (Frank Hall 1891 History of the State of Colorado The Blakely Printing Co. 3:437-438).

[13] Taxonomy and descriptions of these fishes had been given some attention in T. Bean's supplement "Salmon and Trout of North America" published the week previously (FS 1889 Apr 4, 32[11]:219-222). Taxomonic expert, D. S. Jordan, apparently was still preparing for his summer exploration of Colorado and Utah during 1889, which was the best early account of fishes in Colorado waters.

established in Creede in 1929. The Creede substation was operated by the federal government until 1965 and it was then used for a short time by the state to hatch cutthroat trout eggs. Also currently in operation is Hotchkiss National Hatchery, which was established in 1967 after reconstruction of the older, state—operated Chipeta rearing—unit facility.

INVOLVEMENT WITH PRIVATE CULTURISTS OR OTHER AGENCIES

Probably the earliest involvement concerning an exotic salmonid species introduction into Colorado by the U. S. Fish Commission was chinook salmon eggs that were first sent to W. H. Cushman of Georgetown in October 1874. The U. S. Fish Commission was also involved with private Colorado culturists and the Colorado Fish Commissioner in the earliest shipments of exotic Atlantic salmon eggs to Colorado in 1881 and exotic rainbow trout eggs during 1882 (U. S. Fish Comm. Rep. for 1880, pp XL, 648-649; and U.S. Fish Comm. Rep. for 1882 p 855).

Much of the U. S. Fish Commission's early involvement in Colorado was concerned with the procurement of fish eggs for rearing at their Leadville station. Although this station's broodfish were sometimes used for this purpose, eggs were more frequently obtained from fish spawned at various public or privately—owned lakes and ponds within Colorado, or from other federal and state hatcheries (Appendix E).

U.S. FOREST SERVICE

The U. S. Forest Service appears to have been involved in the hatching, rearing, and distribution of fishes in Colorado at least during some periods between 1920 and 1944 (Table 6). Specific details regarding their hatcheries, rearing sites and numbers of each species stocked were either not documented or very skimpy in the Colorado Yearbooks, which were the most consistent source of annual Forest Service activity in Colorado. Species data are almost totally lacking.

Probably the most detailed fish—related account of any specific year's activity for the U. S. Forest Service in Colorado was published in the U. S. Fish Comm. Rep. for 1929 (pp 815-817). This report summarized for each species the numbers of fish planted by the forest officers in 11 national forests within Colorado during 1928. The only species that was not mentioned in Table 6 was silver salmon (coho salmon), 20,000 of which were stocked in the Gunnison National Forest that year. Krueger, supervisor of that forest, reported (ibid. p 817) that:

> "Salmon trout" [likely Coho] introduced into Mirror Lake in 1925 had made exceptional growth because they averaged 10 inches in length by 1927, but their slow growth since then indicated that the supply of food was inadequate.

Furthermore, in writing of Grand Mesa Forest, Supervisor Peck stated that the new fish hatchery at Alexander Lakes had been built and would be ready to receive eggs in the fall of 1929. He also reported that 3,000,000 eggs of rainbow, yellowfin, and blackspotted trout were taken at the Grand Mesa Lakes the preceding spring and over 1,000,000 eggs of eastern brook trout were taken in the fall.

TABLE 6--Fish distributed by U. S. Forest Service in Colorado between 1920 and 1939a (From the Colorado Yearbook)

Year	Number stocked	Colorado Yearbook Year	Colorado Yearbook Page
1920	4,293,400	1921	15
1921	4,949,000	1922	34
1922	3,738,000	1923	34
1923	4,198,000	1924	37
1924	3,527,700	1925	35
1925	15,513,620	1926	33
1926	3,411,550	1927	35
1927			
1928	3,630,675	1928-1929	33
1929	3,532,500	1930	34
1930	5,348,000	1931	31
1931	6,558,800	1932	45
1932	6,144,000	1933-1934	64
1933	8,012,750	1933-1934	52
1934	4,954,400	1935-1936	59
1935	2,567,450	1935-1936	69
1936	7,663,000	1937-1938	84
1937	8,383,000	1937-1938	84
1938	8,500,000	1939-1940	68
1939	8,500,000	1939-1940	68

[a] The Colorado Yearbook 1939-1940 p 68 noted that the U. S. Forest Service maintained hatcheries at several points in the state but only annual distributions between 1928-1939 were summarized. The first mention of Forest Service hatcheries was in the 1930 yearbook, p 39, with none after 1940. At no time were the data itemized for specific hatcheries or species, but mention was made in the Colorado Yearbook 1937-1938 (p 73) that stocking was principally with trout, including blackspotted, rainbow, brook, Loch Leven, brown, mackinaw and other less common species. The figures presented were said to be in addition to fish planted by the state and other agencies. Fish stocking by the Forest Service after 1939 did not contain details as to specific numbers and the last mention of their involvement was in the 1943-1944 Colorado Yearbook (p 401) where it was stated that they purchased a large proportion of the fish from state hatcheries. The above figures were not included in "Federal" stockings in Table 11.

STATE INVOLVEMENT

THE STATE FISH COMMISSIONER--DUTIES AND REPORTS

The earliest predecessor to the present Division of Wildlife was the State Fish Commissioner, a position created by the first Colorado State Legislature in 1876. The following appeared in Section 10 of the Colorado Fish Laws, approved March 10, 1877:

> It shall be the duty of the governor, immediately upon the taking effect of this act and every second year thereafter, to appoint a person skilled in fish culture and the habits and natures of food fishes, to be state fish commissioner and shall hold his office for the term of two years; said commissioner shall have supervision of all fish cultural matters of a public nature, and shall receive and provide for the proper care and distribution of such food fishes or ova of the same as shall come into the possession of the state. He will determine the necessity for fish ways, the location, form and capacity thereof, giving notice for their construction and maintenance. He shall receive compensation for time actually engaged in services of the state, not exceeding in any one year the sum of $100.00, together with the additional sum of $100.00 which can only be expended for express charges and such other expenses as may be incident to the proper care and distribution of such fish as may come into the possession of the state. All accounts to be approved by the Governor.

On March 19, 1877 (archives executive records), Governor John Routt appointed **William (Wilson) E. Sisty (Fig. 24) our first Fish Commissioner, a job Sisty retained until Governor Benjamin H. Eaton appointed General John Pierce as Fish Commissioner April 7, 1885. By state law, the fish commissioner was to report to the governor on his activities because Section 11 of the 1877 Fish Laws proclaimed:**

> The fish commissioner shall annually, before the first day of December, make to the governor a report of the transactions of the year, and set forth in said report any and all information he may have obtained in regard to the varieties of fish adapted to the waters of this state, and the methods of culture of the same, and the waters to which they are adapted, together with any information that may aid in promoting the culture of edible fish in the state, and the governor shall embody the same in his report to General Assembly. [State law in 1879 revised the fish commissioner report to biennial rather than annual.]

Searches of the Division of Wildlife libraries in Denver and Fort Collins during 1980 revealed no such commissioner reports on file. Colorado State University Library (Harmony Storage Branch) had most of these reports, as did State Archives, but none before 1881. Denver Public Library had the **1879-80 Report (combined annual and biennial type), and later the annual report for 1877 was located in the Georgetown Miner (1877 Dec 15:1) and FS (1878 Jan** 24, 9[251:469):

> Fish Commissioner's Report
>
> The state fish commissioner has made his report to the governor as follows:
>
> State of Colorado
> Office of the Fish Commissioner
> Brookvale, November 28, 1877
>
> To His Excellency, John L. Routt, Governor of the State of Colorado:
>
> Sir: - In compliance with the law, I herewith submit the following report for your consideration:
>
> I am in correspondence with parties in the eastern states in regard to the food fishes deemed most suitable to the waters of the state, and hope to do with the very limited amount of funds placed at my disposal, all that can be done the coming year by way of their introduction into the lakes and streams of Colorado.
>
> I have adopted measures to have proper fishways errected wherever I had a knowledge of the existence of artificial obstructions in the streams. I have also caused to be prosecuted and fined several parties for a refusal to comply with the law, and hope to have many obstructions removed from the streams by the coming summer, thereby giving to the fish free passage to the upper waters of the different streams.
>
> Respectfully,
> Wilson E. Sisty
> Fish Commissioner

Fig. 24. WILLIAM E. SISTY was Colorado's first Fish Commissioner. He served in that capacity, without salary from 1877 to 1885. He was credited with procuring land near Henderson, where Colorado's first state hatchery was built in 1881. Sisty was responsible for several fish introductions to Colorado: German carp in 1879, Atlantic salmon in 1881, and crappie and rainbow trout in 1882. During 1879 he unsuccessfully attempted to introduce lake whitefish and may have joined with Senator Teller to import perch. (Photo courtesy Colorado Historical Society)

FS remarked, "Commissioner Sisty's report will do very well for a beginning. It is business-like and concise. When he has any results to promulgate he will doubtless make them known at the proper time. As the report now stands, it is the shortest on record." Unfortunately, Commissioner Sisty's report for 1878 has not been found, but some information regarding state involvement in that year is presented in Appendix F. A file of all published state fish commissioner reports, except for 1878, is now held at the Division of Wildlife Library in Fort Collins. Apparently, the Fish Comm. Rep. for 1917-18 was never published due to Commissioner Frazier's untimely death in 1918.

HATCHERIES AND FISH CULTURE APPROPRIATIONS

From Governor Routt's message (Appendix F), it was apparent that Commissioner Sisty in his 1878 report had requested appropriations for building a state hatching house. The legislature, however, failed to grant him his request, but increased his expenses from $100 to $1,000 in 1879. Sisty expended an enormous amount of effort in the 1879-80 Biennial documenting what other states had accomplished with hatcheries and apparently shamed our legislators into appropriating funds during 1881 to build a fish hatchery in Colorado.[14] The amount allotted by our state legislature, however, was small even for those times--$2,750 for the purchase of a site and the erection of suitable buildings and ponds with an additional $2,500 to cover procurement of eggs and distributing and operating expenses. Consequently, Sisty expended much time during 1881 in examining various sites throughout Colorado listening to propositions from parties desiring the establishment of the first state hatchery in their particular locality, an event probably best documented by an item that appeared in the Salida Mountain Mail (1881 Jul 28):

The State Hatchery

Last Tuesday Mr. A. Sangendorf of Colorado Springs, representing Gov. Pitkin; Mr. R. Bercheredt, the commissioner appointed under a recent act of the Leg. and W. E. Sisty, State Fish Com., visited the springs on Mr. Ira Kings and Mr. Bale's ranches to see if they were suitable for the establishment near them of a state fish hatchery. It was the verdict of all three of these gentlemen that both places were excellent sites for the purpose mentioned. Mr. Sisty said that he had already visited and examined several springs in the state, but that he had not seen one anywhere that would compare with either of these.

These gentlemen left by Wednesday night's train for the purpose of making a personal examination of several other proposed sites, and if they find a better place there is where the hatchery will be located. If they do not find a better place it is only fair to presume that one of the sites near Salida will be chosen.

In this connection we desire to call attention to the fact that the appropriation made for the purchase of a site and the erection of suitable buildings and ponds was rather small, being only $2,500, we believe. Other localities have agreed to donate springs and a sufficient tract of ground to have the hatchery located with them. This may have some weight with the commissioners when they come to make the location, and we suggest to the people of this locality that if they think that the location of this installation would be of any advantage to them that it would be a good idea to be ready to make some propositions to the commissioners.

The proposition that Colorado accepted late in the summer of 1881 was a donation by Wilson Waddingham of 11.28 acres of land containing a large number of springs at a site near Henderson, about 8.5 miles north of Denver close to the South Platte River. The first state-operated hatchery was constructed here, late in the fall of 1881, at a cost of $1,890. It was most frequently called the "Denver Hatchery" (Figs. 25,

Fig. 25. Frame residence and hatchery at the STATE'S DENVER FACILITY near Henderson in the late 1890's. I found no photos of the original hatchery, which was constructed in 1881 and remodeled by Commissioner Gordon Land in 1889-90. The facility was expanded in 1899 and new troughs of Calif. redwood were installed (Denver Times 1899 Aug 6:9). This issue had photos of the new facilitiesand the interior of the old. (Photo from State Biennial for 1897-1898)

[14] The rapid depletion of trout in streams due to unscreened irrigation ditches, blasting, and pollution also influenced them.

26). The structure was crudely built of pine planks with wood flooring and a corrugated iron roof.

Fig. 26. THE DENVER HATCHERY in the early 1920's after reconstruction with cement bricks and new steel troughs. (Photo from State Biennial for 1918-1922)

From Sisty's 1881-82 Biennial, one can surmise that immediately upon completion of the hatchery building late in December 1881, 100,000 eastern brook trout eggs from Plymouth, Massachusetts, arrived. These were placed in the hatching troughs and within a few weeks, 200,000 more brook trout eggs were added. Sisty also reported that he received "10,000 California brook trout" eggs during 1882, but failed to mention exactly when and from whom he received those eggs. Some California breeders were selling eastern brook trout eggs at that time. In the state Biennial, Sisty combined all egg lots in computing an extraordinary 99 1/8% hatching success during 1882, and this combining has led some Biennial readers to conclude that all eggs hatched during 1882 were those of eastern brook trout. To the contrary, the federal records (U. S. Fish Comm. Rep. for 1882, p 855) show clearly that 10,000 trout (Salmo irideus = rainbow trout) eggs were shipped from the U. S. trout-breeding station on the McCloud River, California, to W. E. Sisty of Colorado on April 13, 1882. Livingston Stone, who operated that station for the government, mentioned Sisty's acknowlegment of those eggs in the 1882 federal report (p 853):

> I received 10,000 California trout eggs on the 23d of April, and found, upon opening them and placing them in the hatching-troughs, that they were in very good condition. I will be pleased to report to you the success I have in hatching them.

Documents and information that give more details (not found in Sisty's reports) on the site, location of the springs, and fishes present before any state importation or rearing began are presented in Appendix G. Involvement of sportsmen in the distribution of some fishes, egg shipments received during the first few years, and growth and spawning habits of the trout are also documented.

As Colorado's population grew, the demand for more fish increased and our state legislature usually responded by increasing fish-culture appropriations (Table 7). Some of these funds were earmarked for construction of new hatchery facilities (Fig. 27) throughout Colorado and as its population grew there were also

Fig. 27. TWO 19TH-CENTURY STATE HATCHERIES--LaPlata (A) and Gunnison (B). Both units were operational by 1893. LaPlata was located near Hermosa north of Durango and was terminated when the Durango Hatchery (C) was established in that city in 1903. (Photos A and B from State Biennial for 1897-1898, C from Biennial for 1907-1908)

corresponding increases in the game and fish laws. From a simple, 11-section fish law that could be typed on a single piece of paper in 1877, the game and fish laws had, by 1908, increased to 168 sections requiring 30 printed pages.

Many of these laws tended to reduce the private fish-culture involvement by making it more costly and difficult. The following five changes or regulations exemplify this point: (1) A private party could no longer get "free fish" from public waters for propagational purposes, (2) Those who operated private fish reserves were charged a fee by the state, (3) No state hatcheries could continue to sell fish or eggs to private culturists at state costs, (4) Interstate transport of game and fish required permits, (5) Restrictions were placed on hotels and restaurants for serving game and fish for human consumption.

This deemphasizing of raising fish for food and profit did not, however, lessen the demand for sport fishing in either public or private waters. The state clearly was burdened with meeting this demand in public waters and, of course, responded by either building many new hatcheries or by leasing privately-owned hatcheries for state use. At least 70 such

TABLE 7--Annual state appropriations for fish culture activity in Colorado before 1891

Year	Name of Fish Commissioner	Commissioner salary	Commissioner expenses	Hatchery contruction	Hatchery supt. salary	Hatchery distrb. & op. exp.	Total appr.
1877	W. E. Sisty	$100	$100				$200
1878	W. E. Sisty	100	100				200
1879	W. E. Sisty	100	1,000				1,100
1880	W. E. Sisty		1,000				1,100
1881	W. E. Sisty	500	500	$2,750 Denver Hatchery		$2,500	6,260
1882	W. E. Sisty	500	500		$1,000	1,000	3,000
1883	W. E. Sisty	500	500		1,000	1,500	3,500
1884	W. E. Sisty	500	500		1,000		2,000
1885	Gen. John Pierce[a]	500	500	Twin Lakes branch?	1,000		2,000
1886	Gen. John Pierce	500	500		1,000		2,000
1887	G. F. Whitehead	500	500		1,000		2,000
1888	G. F. Whitehead	500	500		1,000		2,000
1889	Gordon Land	500		Gunnison branch			7,700
1890	Gordon Land	500					5,600

[a] In his Biennial of 1886 (p 20) Commissioner Pierce noted that hatchery expenses (superintendent, one assistant, feed for fish, care of horse, repairs, and incidentals) amounted to the entire $2,000 per annum whereby, he preferred working for nothing rather than stopping the work there because of the value of the hatchery to the state. Despite this, the State Legislature failed to appropriate additional funds for Commissioner Whitehead who explained to the Governor on page 18 of the 1887-88 Biennial that he had neither the means nor the leisure of his predecessor John Pierce and that if any officials in Colorado earned their salaries, the Fish Commissioner was one of them. Additional appropriations were allocated, but much of the money was apparently used to establish the branch hatchery at Gunnison in 1889. General Pierces mention of working for nought could easily be construed as a slight exaggeration since careful scrutiny of his November 30, 1886 Biennial and the two subsequent Biennials revealed some discrepancies, which could indicate that he had obtained minimal compensation by taking some eggs or fishes for use in his four private hatcheries and ponds. By no means, however, was their value near that of his due salary. On pages 4 and 5 of Pierces Biennial, 10,000 lake trout and 8,000 land locked salmon (Atlantic salmon) were reported hatched in 1886 and distributions of 8,000 and 5,000, respectively shown, with the remainder to be retained as breeders. Pierce again (p 11) noted for these two species Have put some in Twin Lakes and am trying or reserving some in ponds." He explained on page 9 that he had received eggs from California, Maine, Michigan, Massachusetts, and England, the loss of which, in transportation was less than one percent but no hatch or distribution of any English fish was documented by Pierce. Yet, earlier in 1886, his Lake Archer Fish Company had exhibited incubating English trout eggs at the Third Annual Poultry Show in Denver (FF 1886 Jan 30:11). When Commissioner Whitehead took over on April 7, 1887, he found at the Denver Hatchery (only state facility in operation) approximately 7,000 breeding brook trout, 1,000 rainbow trout breeders, a small number of German carp, 20,000 rainbow trout fry, and a trifle over 300,000 eastern brook trout fry. There was no mention of any lake trout, Atlantic salmon or English trout. Gordon Land however, later remarked on page 10 of his 1889-90 Biennial that the European brook trout, Salmo fario, (= brown trout) had shown excellent growth in Chalk Creek, in Chaffee County, and in the ponds of General John Pierce, in west Denver. It is unknown whether these fish were from the English eggs referred to in Commissioner Pierces 1886 Biennial. The above evidence is purely circumstantial, and considering that his Denver hatchery operation expenses noted above were about equal to the rather scanty total appropriations, Pierce would have had little state money available to procure many eggs of any species. I would prefer to believe that not only did Pierce donate his salary, he may have even used his own funds to procure eggs of some of the fishes that he stocked when Fish Commissioner for the State of Colorado. With no appropriations for construction, what funds other than his own could Pierce have used to construct in June 1885, a state hatchery at the foot of the lower Twin Lake?

hatcheries or production units have been operated in Colorado since 1881 (Table 8). Of 15 hatcheries operated in 1916, only 6 (Denver, Durango, Steamboat Springs, Glenwood Springs, Del Norte, and Buena Vista) were owned by the State of Colorado with the remainder privately owned. Leases or agreements were obtained from private hatcheries before they were operated by the state.

STATE PERMITS AND PRIVATE PONDS

Historically, many of Colorado's private fish culturists began building and stocking "U-catch-em" or "catch-out" ponds where fish were sold to the public on a "pay-for-what-you-catch" basis. Here the operator (culturist?) periodically stocked his ponds **with catchable-size fish from his own or nearby fish-rearing facilities. Small ponds with minimal water supplies near large residential areas or adjacent to well-traveled highways were the most desirable sites, but ponds in more remote areas were also developed and utilized by various fishermen clubs or just a few individuals. State agencies managing fishery resources usually require that such businesses obtain permits or licenses, and in Colorado, such regulations have existed since 1899.**

Some startling statistics gathered in the early 1950's on privately-owned fish businesses were revealed in a survey of nine western states--California, Oregon, Washington, Nevada, Colorado, Utah, Wyoming, Montana, and Idaho (Prog. Fish Cult. 1954 Oct p 147-152). Of 628 "fish-breeder permittees" mailed questionnaires, 297 (47.3%) were in Colorado, but only 56 (18.9%) responded. Some 27.8% of the responding businesses had been established in the 5 years previous to the survey, but 58.3% had been operating for more than 10 years. Two Colorado respondents had been in business for 40 years. Thirteen respondents operated hatcheries with egg production slightly over 10,000,000. Catchable-size rainbow trout (1,031,000) were produced by 11 Colorado respondents.

STATE FISH CULTURE--THEN AND NOW

Figures 28-37 show important "Then" and "Now" state fish-culture functions. The buildings and there types of construction are first shown, followed by comparisons of such things as egg and fry handling, feeding, loading, and distribution. Nearly all photos in these figures originally appeared in articles in the Division of Wildlife's magazine, Colorado Outdoors (or its predecessors).

TABLE 8--Chronological list of fish hatcheries and production units operated by the State of Colorado

Hatchery or production unit	First year in operation	Last year operated
Denver	1881	1967
Twin Lakes	1885	1895
Gunnison	1890	1913
Hetzer Lake	1891	1891
Douglas County	1893	1894
LaPlata	1893	1903
Emerald Lakes	1898	1921
Grand Mesa	1899	1940
Steamboat Springs (Routt)	1902	1944
Durango	1903	Present
Grand County	1906	1942
Glenwood Springs	1906	Present
Del Norte	1908	1944
Marvine	1908	1915
Estes Park	1908	Present
Collbran	1910	1910
Molina	1911	1915
Boulder	1912	1916
Buena Vista	1913	1962
Antonito	1914	1929
Aspen	1914	1925
Bellvue (Ft. Collins)	1914	Present
Cherokee Park	1914	1915
Georgetown	1914	1916
Pitkin	1914	Present
Walden	1915	1962
Cedaredge	1919	1970 or 71
Trappers Lake	1919	1944
Humphrey Lakes (Haypress Lake?)	?1926	
Electra Lake	?1926	
Parvin Lake	1926	1946
Haviland Reservoir	?1928	1944
Tarryall Reservoir	1930	1947
Cameron Pass Reservoir		1936
Rye		1956
Las Animas	?1932	Present
La Jara	1933	1977
Colts Ponds		1946
Hershman Ponds		1946
Pass Creek Reservoir Ponds		1944
Tucker Park Reservoir		1943
Loveland Light Plant Ponds		1944
Morrison-Bear Creek Ponds		1942
Glenhaven and Grove Ponds		1942
Wagon Wheel Gap Ponds (Rio Grande Ponds)	?	1966
Monument Lake	?1939	1954
Wray	1939	Present
Coaldale Ponds	?1943	1958
Crystal River (Carbondale)	1943	Present
Bell-Aire	1944	1975
N. Fork Thompson	1946	Present
Little Hills	1946	1953
Boulder Ponds	1948	1956
Poudre Ponds	1948	Present
Chipeta Unit	1949	1965
Dolores	1949	Present
Chalk Cliffs	1950	Present
Finger Rock	1950	Present
Rifle Falls	1955	Present
Mt. Shavano	1956	Present
Roaring Judy	1963	Present
Watson Lake	1965	Present
Creede	1966	
Bellvue Research	1968	Present
Schutte Ponds	1968	?1976
Boulder BD Fish Club	1969	Present
Hartman BD Fish Sta.	1973	Present
Southwest Region	1976	Present
Northwest Region	1977	
Southeast Region	1978	

Fig. 28. Some FISH HATCHERIES operated by the state before 1914. All, except possibly Buena Vista, were large, barn-like frame buildings. Most appear to have been fairly-well maintained except for Denver, which was the oldest. (A) Buena Vista, (B) Denver, (C) Durango, (D) LaPlata, (E) Grand County, (F) Glenwood, (G) interior of Routt County, (H) Gunnison, (I) Delnorte, (J) Routt County. (Photos from various state Biennials: A--1923-26; B--1918-22; C--1903-1904; D and H--1897-1898; E and F--1905-1906; G and J--1901-1902; and I-1907-1908)

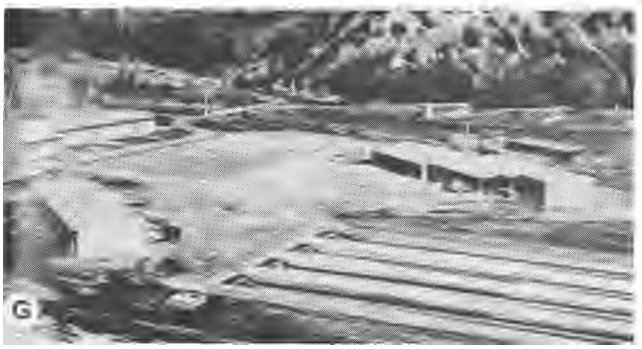
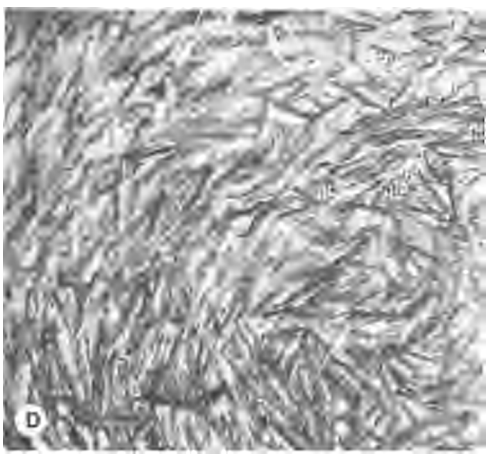


Fig. 29. FISH-REARING FACILITIES operated by the state today are primarily constructed with steel and concrete, and are equipped with sophisticated culture contrivances. The old frame-constructed hatcheries have all disappeared, or have been remodeled several times in the last 60 years.

The Denver hatchery was reconstructed with cement blocks during the early 1920's (A). The hatchery (B, C) was built by Game and Fish Department employees for $18,000 and contained steel hatching troughs. Outside, dirt ponds were replaced with concrete retaining ponds. It functioned so well that during the ensuing 10-12 years, several duplicates of it were built in Colorado (Bellvue, Buena Vista, Cedaredge, Durango, and La Jara).

Buena Vista Hatchery (D) and Bellvue hatchery (E) as they appeared about 1926. Of the six hatcheries of this design built in Colorado, only the Durango and Bellvue hatcheries are currently in operation. The aerial view (F) shows the older Bellvue hatchery (2) and the newer Bellvue Research hatchery (1) both in operation today.

Rifle Falls hatchery (G) is the largest fish-rearing facility in Colorado and one of the largest in the world. At an initial cost of nearly $1,000,000, the facility began operating in 1955 and produces tons of fish annually. (Photos from: A--Biennial for 1918-1922; B, D, and E--1923-26 Biennial; C--Colo. Outdoors 1974 Nov-Dec p 19; F--Colo. Outdoors 1971 Jul-Aug p 17; and G--Colo. Outdoors 1955 Jan-Feb p 3)



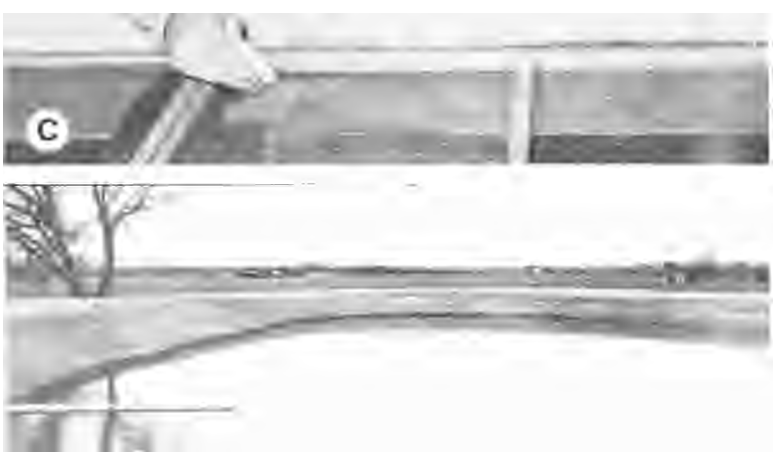


Fig. 30. HANDLING OF EGGS AND FRY IN EARLY HATCHERIES. Eggs were incubated on small wooden-framed screen trays that were placed in long troughs inside the hatchery (A). A considerable quantity of spring water flowed through and over the egg-tray masses during incubation. If fungus problems developed, more fungicide was required than is used today. Both the trays and troughs required frequent maintenance because of wooden construction. Covers were placed over the troughs during incubation to maintain a darkened area, which was supposed to simulate the light conditions of natural stream gravel. The covers had to be removed when dead eggs were ritualistically removed.

Dead eggs were recognized by their white, opaque appearance. Tools most frequently used for this time-consuming task of removing dead eggs were "wide-mouth" bulb syringes and tweezers (B,C).

The resultant fry (D) usually were reared for a short time in the hatching troughs and then either stocked in dirt ponds (E) or in Colorado's streams and lakes. Before the early 1920's, seldom were any fish reared beyond 2-inch size, except for those intended for "brood-fish" establishment or replacement. In the early 1920's, a program began that involved rearing trout in natural or artificial ponds along some streams in Colorado. State hatcheries supplied most of the fish and the fish feed, while interested sportsmen fed the fish. The program was generally unsuccessful because freshets destroyed many of the ponds. Most state fish facilities began rearing trout to "catchable-size" in the late 1930's.

(Photos from: A--Colo. Conservation Comments 1951 Oct p 17; B and C--Colo. Outdoors 1959 Jul-Aug p 8; D--Colo. Outdoors 1964 May-Jun p 64; and E-Colo. Outdoors 1965 Mar-Apr p 26.)

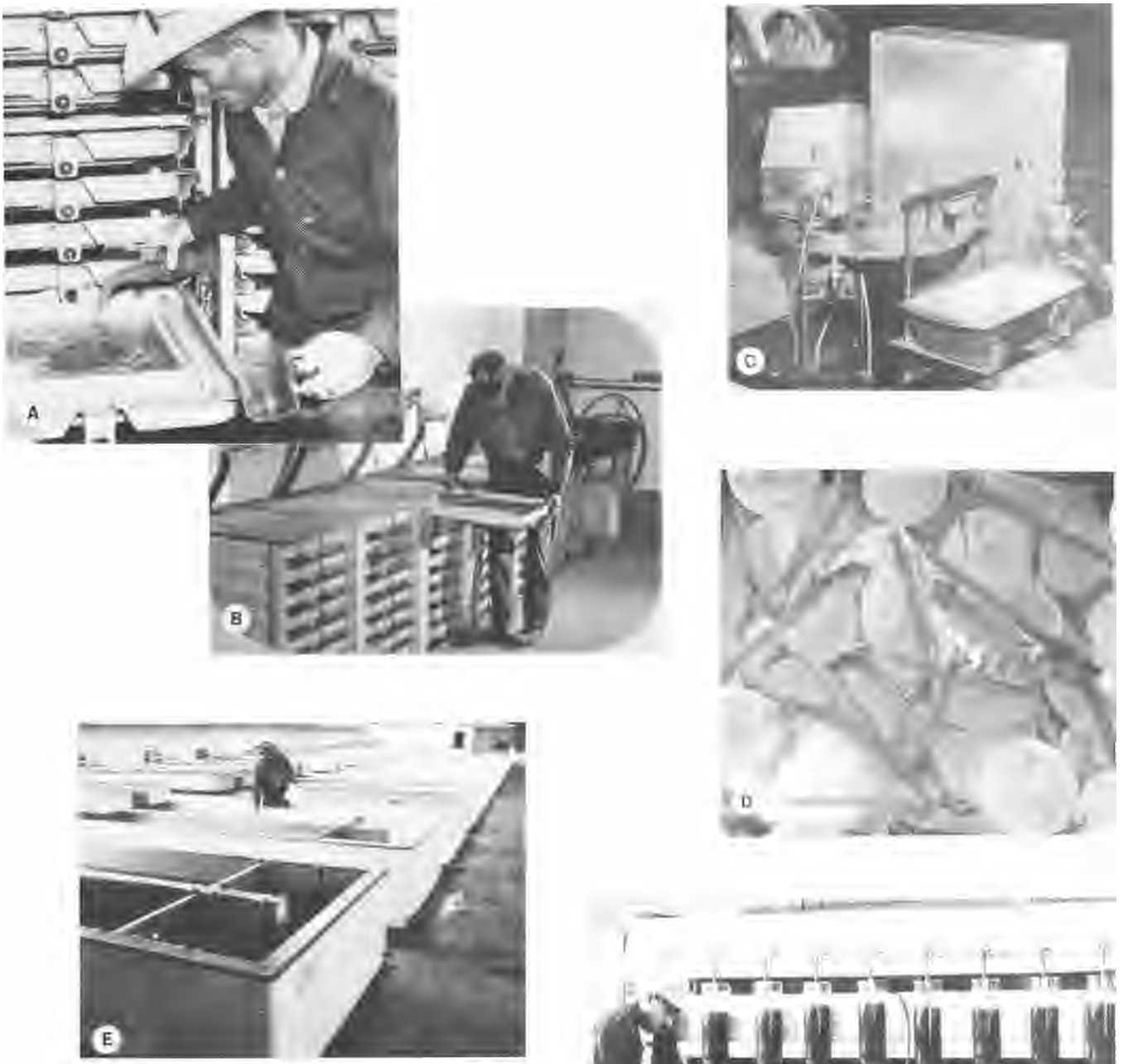


Fig. 31. MODERN METHODS FOR HANDLING EGGS AND RAISING FRY (trout and walleye). Eggs are carefully measured into the incubators where the hatching takes place (A, B). Fish egg prices range from $0.50 per 1000 for walleye to more than $3.50 per 1000 for trout eggs. Heath incubators require less spring water, little space, and reduced fungicides.

An electronic egg-picking machine (C), used to separate dead eggs from live ones, was perfected in the late 1960's by Neil Van Gaalen, superintendent at Colorado's Glenwood Springs hatchery. His machine, or a similar one, is used at all state-operated hatcheries. Operation is detailed in Progressive Fish Culturist (1969 Jul p 182).

Rainbow trout eggs begin hatching (D) after 20-25 days of incubation at 11-12 C. Other trouts take longer to hatch.

Trout fry are usually reared indoors in plastic troughs or cement nurse tanks (E) until of 2-inch size, when they are moved outside to nurse basins or raceways.

Walleye eggs are incubated in Bell jars (F) at the State's Wray and Las Animas hatcheries. Each jar has water entering from a rubber hose placed inside, near the bottom. The flow is regulated to deliver an amount that keeps the eggs circulating (rolling) but not so great as to cause the eggs to overflow. Without motion, the eggs clump due to their adhesiveness and die. Walleye eggs hatch much faster than trout, but the fry are seldom held for much rearing because of cannibalism.

(All photos except C from Colo. Outdoors: A--1967 Sep-Oct p 39; B and D--1976 Mar-Apr p 19; E--1975 Jul-Aug p 14; F--1954 Jul-Aug p 16.)

Fig. 32. CARP WERE USED FOR FEED IN EARLY REARING FACILITIES. Commercial fishermen seined carp (A), loaded them in trucks (B), and delivered them to state hatching and rearing facilities where large quantities were frozen and stored.

Carp-oatmeal mixtures were cooked in a large cast iron pressure tank (C), passed through a grinder into pails, allowed to cool (D), and then loaded into pickup trucks (E). Many of the state's fish rearing facilities had raceways similar to those at Carbondale, which required a well-coordinated, sure-footed person to disperse the feed with a long handled spoon (F). Younger fish, reared in troughs inside the hatcheries, were fed finely-ground raw liver, or mixtures of liver and meal. (Photos from: A and B--Colo. Outdoors 1960 Jul-Aug p 13; C--Colo. Conservation 1952 May-Jun p 13; D, E, and F--Ia. Conservation Comments 1944 Dec 15 No. 4.)

Fig. 33. Fred Mitchell of the state's Denver hatchery in 1958 shows the "DRY-FOOD PELLET" USED FOR FEEDING TROUT (A). For several years before this, Wayne Seaman, state fish manager, and Eugene Cook, fish culture superintendent, experimented and developed the pellet-type formula. These pellets were manufactured from dried skim milk, whitefish meal, cottonseed meal, brewer's yeast, wheat flour middlings, liver meal, distiller's solubles, vitamins A and D, oils, and salt. With the new food, the carp pressure-cooking units were eliminated and big savings in salaries, utilities, refrigeration, maintenance, and transportation costs were realized (Denver Post 1958 Apr 6:68)

Sometimes the fish are still fed by hand (B, C), but frequently machines are used to disperse pellets quickly and uniformly (D).

A research effort continually conducts nutritional studies of fish diets to improve health and growth rate of fish in Colorado's hatcheries (E). Analyses are made on feeds obtained from commercial vendors to assure high quality. Cost-analysis records are kept for all state fish facilities and are published annually.

(All photos except A from Colo. Outdoors: 8--1975 Jul-Aug p 12; C--1956 Ma n p 15; D--1977 Mar-Apr p 15; E--1974 Nov-Dec p 27; A--Denver Post above, courtesy Colorado Historical Society)

Fig. 34. SEINING AND LOADING FISH THEN. Crew seines a raceway preparing to load the old glass fish tank (A). Crew dips fish from the seine (B) and loads large cans of water (C). Can of fish was lifted and emptied into the tank of the distribution truck (D). Using a crew of six men, about 1,000 pounds of fish were loaded onto distribution trucks in approximately 30 minutes. (Photos from: A--Colo. Conserv. Comments 1948 Mar p 5; B--Colo. Conserv. 1950 Dec p 4; C--Colo. Outdoors 1964 May-Jun p 66; D--Colo. Conserv. Comments 1949 Jun p 5.)

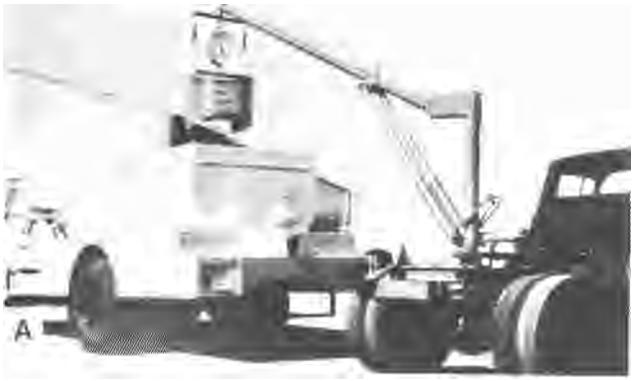


Fig. 35. SEINING AND LOADING FISH NOW. Since 1966, culturists at many of Colorado's hatcheries have been using hydraulically-operated fish loaders (A). The prototype was designed and built by Leo J. Burggraff, then a shop foreman at the DOW headquarters in Denver.

Two men seine and load fish in the loader's basket (B, C); one of the men measures the weight and verbally relays information to a third man who records data and operates the hydraulic boom and catch release (D, E). The three men can put 1,000 pounds of trout on a distribution truck in 7 minutes.

(All photos from Colo. Outdoors: A--1966 Jul-Aug p 25; B and D 1977 -Apr p 14-15; C and E--1967 Sep-Oct p 38.)

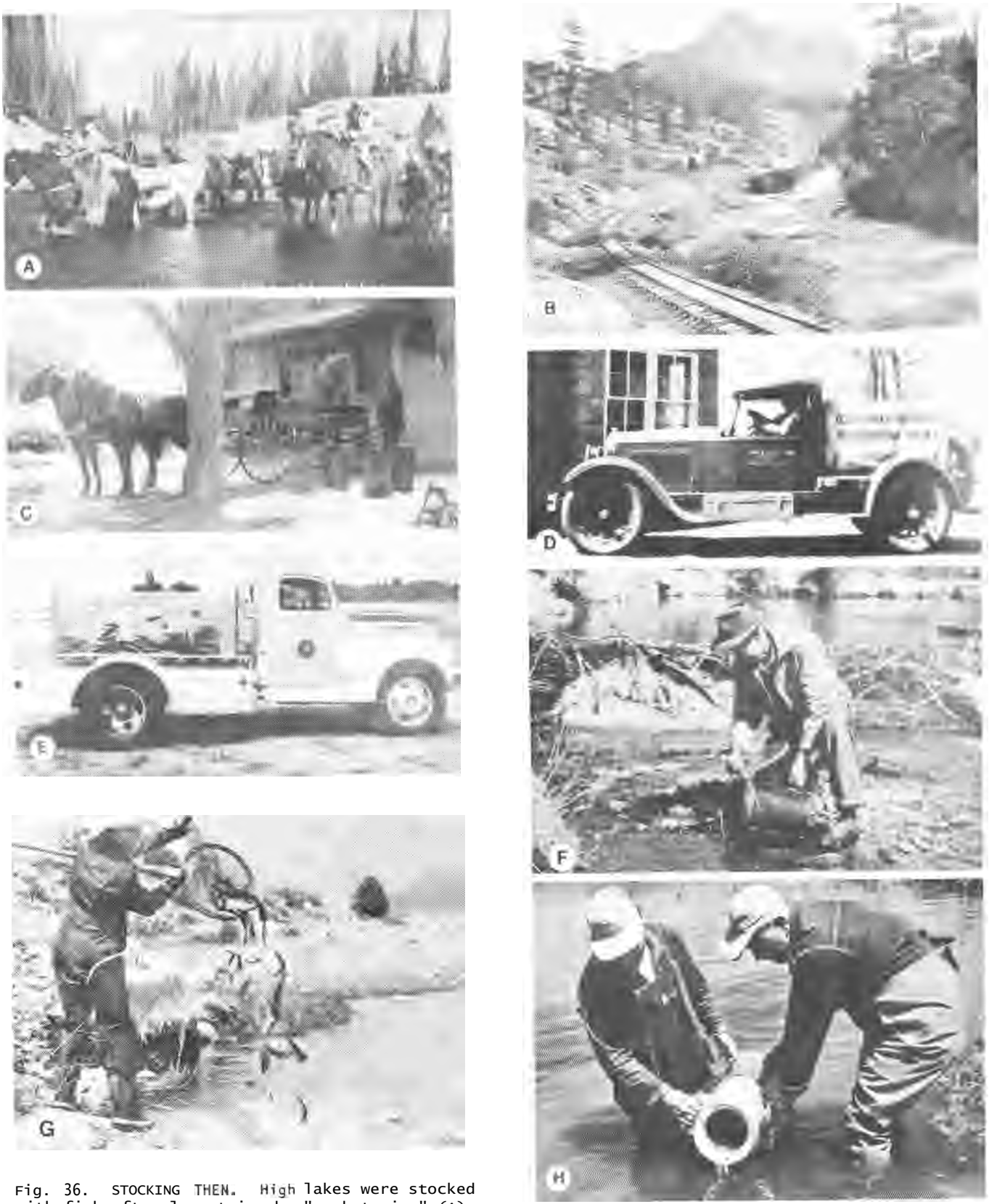


Fig. 36. STOCKING THEN. High lakes were stocked with fish after long trips by "pack trains" (A). Streams along the old rail routes received the greatest stocking (B). The more remote areas were stocked from horse-drawn wagons (C) and trucks (D and E). The glass aquarium truck prompted "fish-truck followers." Fish were stocked from buckets, hand nets, and cream cans (F, G, and H).

(All photos except B, C, and D from Colo. Outdoors: A--1966 Sep-Oct p 26; E--1952 Jul-Aug p 31; F--1955 Jul-Aug p 7; G--1967 Sep-Oct p 39; H--1954 Jul-Aug p 17. Photo B from Outdoor Life 1901 Aug; C from State Biennial for 1897-1898; and D from Colo. Conserv. 1952 Mar-Apr p 31.)

Fig. 37. STOCKING NOW. Modern trucks have greater fish-hauling capacities, lighter weight (better mileage) because of fiberglass tanks, and are equipped with sophisticated aeration and water-pumping systems (A). Most trucks carry extension tubes for use at stocking sites that are shallow or have soft bottoms (B).

A one-ton truck with one 500-gallon tank (C) has a capacity for 1/2 ton of catchable fish. It replaces the previously used three-ton truck. The trailer has a capacity of 1/2 ton of catchable fish and can also be pulled with a 1/2 ton pickup.

The three-quarter-ton truck with one 250-gallon tank (O) has a total capacity of 500 pounds of catchable fish and is designed for lake or stream plants. It replaces the previously used two-ton truck.

A two-ton truck with two 500 gallon tanks (E) has a total capacity of one ton of catchable fish. It is primarily designed for lake plants and doubles the previously used three-ton truck capacity.

High lakes are stocked directly from fixed-wing aircraft or helicopters (F, G).

(Photo A from Colo. Conserv. 1952 Mar-Apr p 31; B-E from Colo. Outdoors: B--1971 May-June p 4; C, D, and E-1975 Jan-Feb p 39; F and G--Division of Wildlife photos, F by Tom Powell, G by Don Domenick)

STOCKING RECORDS

State stocking records were not as consistent in their format as were the federal records. Some state reports itemized fish distribution localities and others did not. Many reports documented species distributions and some did not--especially those in the late 1930's when the state and nation were experiencing an economic depression.

State stocking records are summarized for a given hatchery (Table 9), category (Table 10), and species (Table 11). A question mark (?) appearing on any of these summaries indicates that stocking was done, but numbers were unknown (or unavailable). No reports were published by the state for 1917-18, or by the federal government for 1911 and 1920, but it seems likely that fish were stocked during those years.

The reader is also warned that the annual stocking totals for a given fish in a particular year by the state and federal agencies may not necessarily be separate entities. In many instances, the figures shown may actually be the same fish with both agencies reporting. It was impossible to eliminate such occurrences from the records because in some instances eggs of fish received by Colorado were not distributed at least until the following year and could not be identified from a federal source.

NOMENCLATURE PROBLEMS AND MIXED SPECIES

Anyone searching early fish records is confronted with different common and scientific names for a given species, some of which have already been presented in Table 1. Probably the most confusion in the early literature was involved with names such as bullhead, catfish, pike, pickerel, and walleye. I can add little clarification here except to say that I believe many of the early references to "wall-eyed pike" before 1899 were actually sauger. Sisty's 1879-80 Report mentioned that a reason for depletion of one of the very best food fish (wall-eyed pike) was seining in the Platte and Cache la Poudre rivers, the St. Vrain, Big Thompson, and Boulder creeks during all seasons possible. Sauger were known to have been native to the Platte River system in Nebraska and also to the North Platte in Wyoming. The early disappearance of "pike perch or wall-eyed pike" as well as a "white fish" in eastern Colorado streams was mentioned by Colorado Commissioner Pierce in his Biennial Report of 1886 (p 17).

Most of the early federal records used the name Esox lucius to denote northern pike, but some eastern states (New York, in particular) used Esox lucius to denote pickerel (Bull. of the U. S. Fish Comm. for 1887 p 423). The term "pickerel" appears to have been used erroneously by W. F. Stone (History of Colorado 1918, S. J. Clarke Publ. Co., Chicago, v 1, p 221) in a description of the fish found in streams such as the Larimer, Poudre, and North Platte northwest of Denver about 1870. Here "pickerel" seemed to denote the sauger rather than true pickerel or northern pike. Esox lucius was also used in an article in SA (1892 June 9[1]:32) to describe fish taken in the San Juan River, but I feel that these fish were indigenous squawfish rather than northern pike. believe that the references for "pickerel" in Colorado cited in Table 12 were one of the true pickerels or sauger, but certainly not northern pike. The name "yellow cat" in federal records usually denoted brown bullhead, but I was unsure of such synonymous usage in state records or newspapers.

One of the vaguest common names used, at least before 1920, was that of "catfish" in the federal records. Between the fiscal years 1906 and 1919, from two to five distinct fish species, which may have included two or three species of bullheads, could have been distributed under the single name "catfish." Ictalurus punctatus, which included names such as spotted cat, blue cat, and channel cat according to federal species cultivated list, were not reared at any federal hatcheries between 1909 and 1918 fiscal years. They were, however, reared and distributed during fiscal years 1906-1908, but it is unknown whether any of these were distributed in Colorado.

Between 1906 and 1918, a common federal practice was to seine the flooded areas of the Mississippi and Illinois rivers to rescue and return to these rivers such fishes as basses, crappies, sunfishes, pike and pickerel, catfishes, and yellow perch. However, apparently to meet the ever-increasing demand by applicants for pond fishes, some of these seined fishes, especially the basses, crappies, and catfishes were used for general distribution. No doubt sorting by species was difficult, if not impossible, therefore distriburions probably contained mixed species. Such a stocking category was never reported in the federal records and only one such lot (a mixed largemouth and smallmouth bass plant in 1893) is known to have entered Colorado. In recent years, several mixed species lots have been distributed by state salvage crews (Table 11).

TABLE 9--Total salmonid distribution from the hatcheries operated by the State of Colorado before 1917

Hatchery	Distribution by year[a]						
	1882	1883	1884	1885	1886	1887	1888
Denver	283,000	?	?	120,000	323,000	363,500	426,000
Twin Lakes				20,000			
Totals	283,000			140,000	323,000	363,500	426,000
	1889	1890	1891	1892	1893	1894	1895
Denver	300,000+	478,000+	?	?	?	?	14,825+
Douglas County		--	--		?	?	
La Plata		--	--		?	?	59,000
Gunnison		0	?b	?	?	?	45,000
Twin Lakes		50,000+	75,000	500,000	?	?	60,000
Hetzer Lake		--	150,000		--		--
Totals	300,000+	528,000+	685,000	1,784,500	890,000	1,887,000	178,825+
	1896	1897	1898	1899	1900	1901	1902
Denver	?	273,500	627,000	384,000	641,000	1,300,000	1,474,100
La Plata	7	89,000	350,000	493,000	605,000	491,000	895,000
Gunnison	120,000	77,000	380,000	591,000	1,181,000	1,050,000	1,250,000
Routt	--	--	--	--	--	--	395,000
Emerald Lakes			400,000	540,000	1,005,000	140,000	160,000
Grand Mesa			--	210,000	805,000	205,000	--
Totals	?	439,500	1,757,000	2,218,000	4,237,000	3,186,000	**4,174,100**
	1903	1904	1905	1906	1907	1908	1909
Denver	869,000	1,402,100	1,177,500	1,276,000	1,114,500	1,483,000	1,184,000
Durango	786,000	2,570,000	2,209,000	1,500,000	1,355,500	2,104,000	892,000
Gunnison	627,000	740,000	715,000	1,300,000	447,000	985,000	621,000
Routt	265,500	1,040,000	--	255,000	466,000	427,000	655,000
Emerald Lakes	75,000	268,000	400,000	425,000	250,000	80,000	310,000
Glenwood Springs	--	--	--	1,055,000	1,293,000	2,321,000	1,677,500
Grand County		--	--	268,000	317,000	567,000	330,000
Del Norte				--	--	381,000	705,000
Marvine					--	428,000	442,000
Grand Mesa						300,000	--
Estes Park						447,500	--
Totals	2,622,500	6,020,100	4,501,500	6,096,000	5,243,000	9,523,500	6,816,500
	1910	1911	1912	1913	1914	1915	1916
Denver	1,892,000	1,415,100	2,576,000	1,792,000	4,023,500	4,493,000	4,224,000
Durango	908,000	1,249,000	1,355,000	1,064,000	2,170,000	1,975,000	2,338,000
Gunnison	651,000	545,000	1,030,000	321,000	Now Pitkin	--	--
Routt	625,000	1,740,000	1,075,000	780,000	1,125,000	1,638,000	400,000
Emerald Lakes	300,000	618,000	520,000	--	430,000	360,000	227,500
Glenwood Springs	1,031,000	1,963,000	1,628,000	1,133,000	2,766,000	3,198,000	2,222,000
Grand County	700,000	605,000	460,000	315,000	Now Gd. Lake	--	--
Del Norte	699,200	1,495,000	1,076,000	895,400	1,418,000	1,637,000	1,732,000
Marvine	320,000	319,000	200,000	330,000	480,000	250,000	--
Grand Mesa	--	--	--	--	790,000	400,000	--
Calhran	190,000	--	--	--	--	--	--
Molina	--	350,000	440,000	400,000	250,000	420,000	--
Boulder	--	--	300,000	100,000	--	629,000	335,000
Estes Park		764,279	620,000	530,000	1,406,000	1,310,000	1,197,000
Buena Vista		--	--	150,000	--	1,112,000	1,358,000
Antonito		--		--	840,000	--	--
Aspen					324,000	975,900	615,000
Ft. Collins (Bellvue)					644,000	850,000	1,197,000
Cherokee Park					100,000	100,000	--
Georgetown					100,000	630,000	337,000
Pitkin					1,623,000	1,510,000	1,180,000
Grand Lake					564,000	545,000	962,000
Walden					--	314,000	286,000
Totals	7,316,200	11,263,379	11,280,000	7,730,400	19,053,500	22,346,000	18,610,500

[a] ? = hatchery operated but numbers distributed unknown; -- = hatchery not operated.

FF (1891 Jan 10 p 7) reported the Gunnison hatchery at a full quota of 300,000 (distribution unknown).

TABLE 10--Stocking by the State of Colorado for cold- and warmwater categories of fishes before 1979

Year	Coldwater	Warmwater	Year	Coldwater	Warmwater	Year	Coldwater	Warmwater	Year	Coldwater	Warmwater
1879			1905	4,501,500		1930	26,083,146	59,500	1955	14,746,992	6,451,530
1880			1906	6,096,000		1931	18,102,064		1956	14,269,410	7,183,685
1882	283,000	161	1907	5,243,000		1932	20,522,991		1957	14,662,052	3,012,251
1883			1908	9,523,500		1933	19,109,734		1958	14,379,132	13,332,769
1884		1,500	1909	6,816,500		1934	21,529,140	449,470	1959	17,273,789	1,387,324
1885	140,000	20,500	1910	7,316,200	+2,000	1935	19,103,825	300,400	1960	15,478,065	8,585,995
1886	323,000	+10,000	1911	11,263,379		1936	22,220,620		1961	17,284,292	7,395,656
1887	363,500		1912	11,280,000		1937	+22,000,000		1962	15,833,937	9,711,231
1888	426,000		1913	7,730,400		1938	13,066,398	+139,750	1963	16,383,555	6,665,350
1889	+300,000		1914	19,053,500		1939	10,652,752	270,500	1964	17,048,797	13,478,470
1890	+528,000		1915	22,346,000		1940	7,190,755	263,392	1965	14,803,552	9,892,644
1891	685,000		1916	18,598,000		1941	7,051,294	400,388	1966	18,355,278	10,985,477
1892	1,784,500		1917			1942	5,150,381	554,000	1967	20,900,217	12,385,102
1893	890,000		1918			1943	5,111,047	362,204	1968	24,868,795	18,890,445
1894	1,887,000	1,000	1919	10,389,000		1944	3,092,953	386,065	1969	31,487,323	23,935,523
1895	+178,825	1,000	1920	13,076,500		1945	3,896,963	154,431	1970	26,570,486	19,020,528
1896			1921	12,011,000	403,500	1946	4,613,188	228,280	1971	23,446,303	19,289,328
1897	439,500	5,200	1922	16,871,000	363,000	1947	4,312,761	237,542	1972	23,775,967	14,776,680
1898	1,757,000	2,450	1923	15,617,000	635,000	1948	4,765,496	721,088	1973	23,153,374	31,499,543
1899	2,218,000		1924	14,648,400	253,000	1949	4,399,973	565,085	1974	19,882,749	24,695,513
1900	4,237,000		1925	16,129,100	435,000	1950	6,540,334	586,734	1975	21,768,069	23,845,801
1901	3,186,000		1926	22,419,630	239,000	1951	9,378,444	251,265	1976	22,323,183	41,614,359
1902	4,174,100		1927	24,094,100	180,000	1952	11,721,315	+750,348	1977	23,331,863	36,240,193
1903	2,622,500		1928	25,677,570	236,000	1953	10,865,358	4,329,346	1978	22,415,677	27,991,253
1904	6,020,100		1929	25,583,172	150,000	1954	10,163,392	6,017,003			

TABLE 11--State and federala stocking in Colorado before 1979

Year	State	Federal	Year	State	Federal	Year	State	Federal	Year	State	Federal
COLDWATER FISH DISTRIBUTION			1904	1,814,100	1,711,920	1932	6,607,660	2,728,490	1960	980,157	1,436,395
			1905	1,499,000	2,775,770	1933	5,724,550	3,706,460	1961	1,227,767	1,191,060
			1906	732,500	2,429,289	1934	8,738,300	7,382,029	1962	1,300,885	683,769
Brook trout			1907	1,825,000	1,900,011	1935	7,289,250	5,088,400	1963	993,777	630,400
			1908	3,721,500	2,923,400	1936	6,687,090	4,519,610	1964	699,245	235,380
1880			1909	1,884,500	1,917,930	1937		3,811,300	1965	565,195	174,330
1882			1910	2,490,000	3,034,185	1938	?	3,670,455	1966	447,455	
1883			1911	5,339,849	NRb	1939		2,068,995	1967	828,053	
1884			1912	4,400,000	1,562,500	1940		1,710,280	1968	1,195,452	
1885	120,000		1913	3,226,000	2,590,500	1941	?	1,825,060	1969	372,702	2,000
1886	295,000		1914	5,673,000	2,294,200	1942	?	1,653,175	1970	593,740	
1887	343,500		1915	8,539,000	3,158,300	1943	?	2,385,715	1971	559,187	
1888	404,000		1916	7,482,000	2,841,000	1944	349,789	1,194,910	1972	376,666	5,000
1889			1917	NR	3,221,800	1945	205,082	893,410	1973	665,846	8,000
1890	?	151,800	1918	NR	3,479,000	1946	143,445	520,635	1974	334,315	
1891		63,000	1919	4,266,000	1,723,000	1947	426,901		1975	561,562	
1892		22,750	1920	7,144,500	NR	1948	402,481	800,650	1976	420,376	9,225
1893	365,000	41,600	1921	6,086,000	2,031,050	1949	165,168	541,420	1977	652,676	9,750
1894	1,101,000	49,200	1922	8,951,000	2,908,550	1950	193,858	1,955,810	1978	269,054	3,367
1895	106,800	263,750	1923	7,031,000	3,361,050	1951	692,141	832,890			
1896	100,000+	270,300	1924	7,567,000	3,132,780	1952	725,161	898,105			
1897	?	323,000	1925	5,559,000	4,526,536	1953	2,069,558	881,345		Dolly Varden	
1898	671,982	652,600	1926	7,917,500	2,781,500	1954	1,488,188	913,030			
1899	?	719,300	1927	8,412,000	1,756,000	1955	547,957	1,605,020	1968		318,000
1900	?	266,000	1928	9,149,000	4,548,100	1956	1,422,436	927,398	1969	22,721	
1901	?	893,000	1929	6,719,695	2,831,300	1957	925,014	1,253,340	1970	206,412	
1902		830,500	1930	11,419,940	4,041,300	1958	732,322	130,337			
1903	168,000	1,815,900	1931	6,626,600	2,663,500	1959	731,152	427,770			

[a] Only records of U.S. Fish and Wildlife Service or its predecessors. U.S. Forest Service data in Table 6.

[b] NR = No records were published.

TABLE 11--Continued

Year	State	Federal
	Lake trout	
1886	8,000	10,000
1899		10,000
1901		21,250
1903		7,400
1904		24
1905		1,900
1908	50,000	50,000
1909		48,000
1910		24,700
1916		25,000
1917	NR	50,000
1918	NR	50,000
1919		20,000
1921		24,000
1922		25,000
1923		170,000
1924		17,500
1925	40,000	
1926		101,000
1927		6,000
1928		166,000
1930		135,000
1931		236,000
1932		100,000
1933		72,000
1934		11,000
1937		46,780
1939		21,760
1940		21,700
1941	10,856	42,900
1947	11,000	
1950		
1951	10,134	6,200
1953	71,780	
1960	34,325	60,000
1961	52,809	
1962	121,322	2,432
1963	92,159	
1964	117,254	
1965	757	
1966	55,000	
1967	3,700	
1968	264,190	
1969	23,236	
1970	15,761	
1971	214,135	
1972	177,550	
1973	511,026	65,000
1974	151,763	210,250
1975	164,157	20,007
1976	139,857	14,107
1977	179,439	486,000
1978	170,454	62,879
	Splake and Brookinaw	
1958	7,200 S	
1959	36,205 S	19,920 S
	5,640 B	
1960	1,153 S	
1961	121 S&B	
	Brown trout	
1889		
1890		20,000
1891		100,000
1892		39,743
1893		23,450
1894		15,950
1895		870
1897		500
1898		8,000
1899		24,000
1902		3,000
1918	NR	56,000
1919		60,000
1921		34,000
1922		20,000
1923		12,150
1924		311,000
1925		44,000
1926	315,000	174,000
1927	261,000	408,680
1928	600,000	206,000
1929	1,722,380	172,970
1930		1,327,000
1931		573,600
1932		224,890
1933		1,659,000
1934	1,680,980	2,681,980
1935	1,528,100	302,000
1936	592,000	329,520
1937	?	137,250
1938	?	585,200
1939	?	402,800
1940	?	90,885
1941	?	148,070
1942	?	20,840
1943	?	150,500
1944	537,505	65,680
1945	371,738	31,505
1946	1,130,527	63,810
1947	1,000,476	
1948	737,510	117,635
1949	443,106	44,874
1950	182,742	32,140
1951	627,071	323,070
1952	669,506	517,980
1953	661,025	314,305
1954	365,117	367,560
1955	408,592	43,300
1956	154,181	109,668
1957	337,472	14,100
1958	673,066	27,500
1959	611,405	31,400
1960	389,529	40,800
1961	664,246	98,000
1962	775,881	110,720
1963	550,442	
1964	388,972	182,300
1965	378,530	132,825
1966	541,936	
1967	718,465	
1968	768,541	3,040
1969	413,330	
1970	471,790	
1971	184,813	
1972	71,720	
1973	193,077	3,000
1974	122,688	5,175
1975	223,318	5,000
1976	156,395	6,000
1977	675,756	4,000
1978	407,731	1,000
	Rainbow trout	
1882	?	15,000
1885		10,000
1886	15,000	
1887	20,000	5,000
1888	22,000	
1889	?	
1890	?	
1891	?	20,000
1892	?	
1893	75,000	
1894	196,000	11,000
1895	12,025+	60,570
1896	?	10,430
1897	?	14,000
1898	685,018	7,000
1899	?	
1900	?	8,500
1901	?	17,000
1902	?	165,200
1903	1,182,000	27,900
1904	662,500	45,216
1905	403,000	13,020
1906	977,500	173,855
1907	614,000	276,500
1908	1,321,000	356,500
1909	1,765,000	348,700
1910	1,593,700	509,240
1911	1,881,719	NR
1912	1,975,000	886,230
1913	1,323,000	247,900
1914	6,280,200	363,154
1915	5,236,000	355,400
1916	5,172,000	224,850
1917	NR	227,500
1918	NR	125,000
1919	1,574,000	117,000
1920	1,508,000	NR
1921	2,293,500	262,500
1922	3,297,000	112,600
1923	3,156,000	89,000
1924	2,620,200	7,000
1925	3,958,600	25,536
1926	7,835,370	179,570
1927	10,210,500	470,000
1928	8,752,450	548,750
1929	8,343,450	460,000
1930	5,174,406	1,257,500
1931	6,407,714	1,493,800
1932	9,593,156	892,310
1933	7,956,562	1,319,300
1934	8,494,060	1,598,490
1935	7,282,775	1,573,000
1936	11,944,850	1,349,544
1937	?	1,198,600
1938	?	1,296,080
1939		1,154,860
1940	?	1,078,605
1941		1,161,045
1942	?	926,625
1943		910,810
1944	1,638,921	934,570
1945	2,233,989	746,795
1946	1,743,814	845,295
1947	1,496,246	408,950
1948	1,381,782	801,285
1949	1,843,083	944,798
1950	2,910,098	764,520
1951	5,038,927	1,299,050
1952	6,212,249	516,635
1953	5,338,756	593,905
1954	6,352,508	1,114,450
1955	9,566,183	1,848,600
1956	11,644,549	1,716,195
1957	9,722,934	1,459,545
1958	9,438,565	2,124,808
1959	12,273,540	1,280,075
1960	10,151,413	1,827,895
1961	10,345,780	1,721,266
1962	10,478,773	1,742,316
1963	10,113,607	1,870,383
1964	10,981,345	544,485
1965	9,707,560	816,095
1966	12,189,659	2,627,053
1967	12,628,097	2,248,647
1968	17,313,585	2,401,132
1969	23,678,010	3,873,438
1970	18,350,232	1,954,242
1971	15,708,025	1,737,844
1972	16,353,584	2,916,656
1973	1,550,070	1,736,244
1974	10,898,381	1,566,673
1975	12,778,479	1,747,285
1976	13,722,218	3,097,989
1977	16,597,233	6,170,040
1978	15,111,906	1,632,193
	Steelhead trout	
1901		47,800
1902		10,000
1903		29,000
1904		48,000
1905		1,050
1920	77,000	NR
1923		50,000
1924	55,000	28,000
1926		24,150
1927		
1930		350,000
1931		200,000
1932		150,000
1933		180,000
1934		50,000
1940		20,580
1973		42,000
	Kamloops trout	
1952	247,000	
1953	92,080	
1961	165,072	
1962	29,380	
1963	113,000	
1964	2,400	
	Rainbow x cutthroat	
1894	20,000	
	Cutthroat trout (native, blackspotted and yellowstone)	
1885	20,000	
1890	50,000	12,000
1891	225,000	
1892	400,000+	13,000
1893	450,000	53,500
1894	590,000	10,100
1895	60,000	1,475
1896		8,600
1897		42,200
1898	400,000	199,000
1899	?	63,000
1900	?	415,000
1901	?	1,170,000
1902	?	785,000
1903	1,262,500	1,651,900
1904	3,543,500	3,637,100
1905	2,649,500	3,625,050
1906	4,386,000	3,968,250
1907	2,804,000	3,936,000
1908	4,431,000	3,569,640
1909	3,167,000	3,259,835
1910	3,232,500	503,460
1911	4,041,811	NR
1912	4,905,000	4,316,800
1913	3,180,900	7,021,000
1914	7,100,300	2,622,500
1915	8,571,000	3,614,000
1916	5,944,000	1,743,500
1917	NR	1,856,000
1918	NR	1,119,000
1919	4,549,000	464,500
1920	4,347,000	NR
1921	3,631,500	865,500
1922	4,623,000	349,000
1923	5,430,000	385,000
1924	4,406,200	771,800
1925	6,079,000	751,517
1926	6,351,760	266,500
1927	4,794,000	332,000
1928	7,176,120	254,000
1929	8,797,647	146,125
1930	9,488,800	65,800
1931	5,067,750	448,300
1932	4,322,175	660,700
1933	5,428,622	759,000
1934	2,612,500	979,400
1935	2,987,700	816,800
1936	2,945,680	1,200,000
1937	?	515,000
1938	?	1,566,950
1939	?	1,094,580
1940	?	1,139,820
1941	?	935,050
1942	?	795,720
1943	?	1,098,210
1944	563,438	678,169
1945	1,052,108	642,415
1946	1,595,402	610,620
1947	1,389,138	11,000
1948	2,243,723	648,670
1949	1,948,616	973,835

TABLE 11--Continued

Year	State	Federal
1950	3,253,636	4,305,420
1951	2,854,771	728,420
1952	3,566,534	906,715
1953	2,224,311	863,260
1954	1,493,315	73,620
1955	602,428	61,350
1956	182,602	73,460
1957	765,600	79,771
1958	637,773	96,140
1959	1,341,042	13,600
1960	1,201,728	183,135
1961	890,859	138,938
1962	877,436	249,124
1963	1,437,304	776,658
1964	1,412,524	1,538,657
1965	1,308,890	1,050,515
1966	1,816,050	1,008
1967	1,748,602	
1968	980,127	
1969	980,045	18,511
1970	1,208,704	
1971	970,130	1,200
1972	921,799	1,000
1973	1,405,391	
1974	1,520,026	29,208
1975	852,587	44,400
1976	914,747	20,439
1977	1,727,870	18,000
1978	1,192,889	9,410
Yellow-fin trout		
1894		700
1896		7,700
1897		7,930
1898		7,500
Greenback native		
1977	25,320	
1978	57,060	
Rio Grande native		
1977	5,039	
1978	776	
Golden trout		
1932		
1934	3,300	
1935	16,000	
1936	51,000	
1958	10,100	
1961	10,000	
1965	4,420	
1966	38,178	
1967	400	
1972	67,336	
1976	19,500	
1977		1,310
1978	31,655	92,375
Atlantic salmon		
1881		15,000
1886	5,000	14,000
1900		5,000
1902		5,000
1903		4,500
1905		50
1907		14,500
1908		8,400
1911		NR
1912		4,900

Year	State	Federal
Chinook salmon		
1874		22,900
1875		200,000
1876		250,000
1931		450,000
Coho salmon		
1925	492,500	
1927	416,600	
1930		200,000
1963	85,761	10,000
1966	18,000	
1967	70,000	
1969	155,249	
1970	281,787	61,054
1971	204,368	
1972	163,912	
Kokanee salmon		
1951	153,818	
1952	297,780	
1953	191,848	
1954	464,190	
1955	3,342,832	172,150
1956	863,981	
1957	2,911,032	
1958	2,800,106	655,280
1959	2,274,405	333,000
1960	2,719,760	230,000
1961	3,927,630	375,000
1962	2,270,260	180,000
1963	2,997,505	
1964	3,347,057	
1965	2,838,200	
1966	3,163,000	
1967	4,898,900	
1968	3,205,500	
1969	5,328,530	
1970	5,412,060	
1971	5,605,645	
1972	5,629,400	
1973	6,805,964	
1974	6,848,076	
1975	7,183,966	
1976	6.941,090	
1977	3,444,730	
1978	5,148,532	
Grayling		
1899		20,000
1900		20,500
1902		100,000
1903		40,000
1904		50,000
1908		50,000
1911		NR
1912		75,000
1914		45,000
1915		48,000
1917	NR	110,000
1941	28,830	15,100
1944	3,300	
1945	27,948	
1951	1,232	
1952	2,565	
1953	216,000	
1954	74	
1955	279,000	
1964	100,000	
1966	86,000	
1967	4,000	
1968	1,141,400	
1969	513,500	
1972	14,000	
1973	22,000	

Year	State	Federal
1974	7,500	
1975	4,000	
1976	9,000	
1977	23,800	
1978	25,620	
Lake whitefish		
1907		950,000
Mountain whitefish		
1951	350	
1952	520	
1956	1,661	
1970	30,000	
Other salmonids		
1969		150,412

WARMWATER FISH DISTRIBUTION

American shad		
1372		2,000
1883		250,000
Gizzard shad		
1951	2,000	
1960	6,437	
1961	1,600	
1962	151	
1966	1,620	
1968	118	
1969	9,321	
1970	7,920	
1975	800	
Carp		
1879	457	1,323
1830	?	616
1881		20
1882		720
1883		655
1884	1,500	680
1885	500	5,550
1886		560
1888		480
1890		100
1891		5,255
1892		1,435
1893	?	136
1394		30
1964	22,775	
1966	1,025	
1967	2,350	
1968	2,145	
1969	3,569	
1970	5,550	
1971	50	
1972	3,000	
1973	2,510	
1975	2,145	
1976	1,414	
Goldfish		
1885		12
1891		103
1892		129
1893		43
1894		24
1895		100

Year	State	Federal
Golden ide		
1892		70
1894		125
Tench		
1891		60
1895		85
1973	86	
Bullhead		
1947		43,932
1949	218	
1950	5,285	
1951	1,083	
1952	11,962	
1953	23,319	
1954	35,819	
1955	17,327	
1956	34,879	
1957	54,346	
1958	222,829	17,120
1959	99,114	
1960	6,302	
1961	53,292	
1962	18,176	
1963	24,773	
1964	55,907	
1965	23,731	
1966	11,883	
1967	5,630	
1968	82,648	
1969	11,674	
1970	8,720	
1971	2,920	
1972	2,862	
1973	363	
1975	17	
1976	930	
1977	600	
1978	4,950	
Brown bullhead		
1958	15,523	
1962	1,260	
Catfish		
1836		
1888		
1898		
1906		1,250
1907		1,050
1908		350
1909		950
1910		300
1911		NR
1912		4,500
1913		275
1914		500
1915		250
1916		800
1917	NR	1,985
1918	NR	3,620
1919		4,500
1920		NR
1922	21,000	2,225
1923		3,750
1924		9,710
1926		800
1928		8,000
1929		2,400
1930		1.200

TABLE 11--Continued

Year	State	Federal
1931		2,550
1933		128
1934	?	
1935	85,240	
1936		23,000
1939		1,600
1940		8,400
1941	?	13,690
1942		750
1943	?	2,500
1944	54,200	2,300
1945	6,500	2,200
1946	3,000	1,500
1947		3,675
1948	140,000	4,430
1949	3,414	
1950	1,682	1,650
1951	9,720	38,600
1952	49,962	100,000
1953	8,380	10,085
1954	130,970	3,000
1955	94,259	39,790
1956	120,405	41,133
1957	62,434	54,051
1953	135,347	40,155
1959	162,454	104,480
1960	198,839	16,790
1961	512,833	14,445
1962	291,615	8,265
1963	82,129	5,775
1964	360,891	113,523
1965	309,500	107,273
1966	338,327	34,735
1967	263,991	11,875
1968	386,954	101,282
1969	1,190,630	60,910
1970	132,256	25,490
1971	944,392	327,965
1972	866,046	487,879
1973	2,025,429	143,032
1974	1,653,538	1,038,320
1975	1,392,378	321,327
1976	1,670,569	1,919,763
1977	636,610	1,365,524
1978	927,482	534,171
	Sacramento perch	
1964	3,484	
1966	22	
1974	436	
1978	63	
	Yellow perch	
1895		100
1910		200
1911		NR
1912		750
1915		300
1917	NR	600
1918	NR	225
1920		NR
1921	193,000	
1922	302,000	
1923	203,000+	900
1924	253,000	1,450
1925	370,000+	
1926	169,000+	300
1929		1,000
1930		5,425
1932		2,875
1934	18,300+	
1935	14,750	
1940		
1942		200
1943		
1944	10,000	
1945	15,250	

Year	State	Federal
1947	19,000	
1948	10,800	
1949	25,920	
1950	38,016	
1951	36,451	
1952	75,169	
1953	99,568	
1954	5,405	
1955	67,927	
1956	11,954	
1957	38,957	
1958	128,158	
1959	51,242	
1960	17,497	
1961	15,850	
1962	82,945	
1963	173,137	
1964	4,300	
1965	36,832	
1966	6,174	
1967		
1968	4,389	
1969	11,444	
1970	16,344	
1971	8,840	
1972	3,332	
1974	6,580	
1975	600	
1976	4,437	
	Walleye	
1899		
1900		
1949	8,356	
1950	167,807	
1951	49	
1952	108,491	
1953	3,766,479	
1954	5,257,768	
1955	6,077,935	
1956	5,994,460	
1957	2,299,267	
1958	12,554,956	
1959	557,723	
1960	8,131,448	
1961	6,455,154	
1962	8,243,618	
1963	5,967,045	
1964	12,182,000	
1965	7,438,592	
1966	9,104,705	
1967	8,551,500	
1968	18,161,480	
1969	20,278,204	
1970	14,726,910	
1971	16,464,540	
1972	11,870,600	7,500
1973	28,187,753	
1974	20,527,500	
1975	20,446,300	
1976	37,079,000	
1977	33,191,840	
1978	25,780,400	
	Northern pike	
1956	750,052	700,000
1959	6,352	
1960	8,215	
1961	420	
1962	609,457	
1963	6,759	
1964	493,936	
1965	793,245	
1966	20,401	
1967	2,224,388	2,000,000
1968	312	2,500,000
1969	1,593,779	800,000

Year	State	Federal
1970	3,426,570	1,900,000
1971	1,594,347	1,735,000
1972	1,711,577	15,000
1973	1,025,007	
1974	1,833,901	2,000,000
1975	1,691,052	2,300,200
1976	2,269,272	2,338,050
1977	2,251,920	2,500,000
1978	964,000	1,056,716
	Crappie	
1882	100	
1886	10,000	
1893	Both species	100
1895		25
1903		225
1911		NR
1912		700
1914		300
1915		275
1916		300
1917	NR	300
1918	NR	1,200
1919		800
1920		NR
1922		50
1923	600+	1,400
1925		
1926	?	330
1927		1,300
1923		1,200
1929		720
1930		7,500
1931		5,400
1932		5,375
1934	4,000	
1935	35,250	
1936		4,000
1938		4,750
1939		3,000
1940	?	5,040
1941		9,400
1942		17,500
1943		900
1944	143,325	
1945	49,370	200
1946	89,730	
1947	51,811	black 3,420
		white 50
1948	37,852	
1949	42,655	
1950	95,080	
1951	13,759	
1952	83,206	
1953	220,146	
1954	48,763	
1955	30,948	
1956	108,400	
1957	238,858	
1958	52,597	
1959	138,658	
1960	75,836	
1961	65,145	
1962	24,262	
1963	229,607	
1964	13,672	
1965	9,775	
1966	94,776	
1967	7,823	
1968	23,708	
1969	97,306	
1970	37,808	
1971	50	
1972	11,706	
1973	2,824	
1974	44,869	
1975	17,601	
1976	1,440	
1977	22,323	
1978	38,920	

Year	State	Federal
	Bluegill or bream	
1911		NR
1912		1,150
1914		300
1917	NR	2,300
1918	NR	2,100
1919		100
1920		NR
1934	39,750	
1935	17,000	
1940		
1942		
1943		
1944	148,125	36,725
1945	54,255	38,930
1946	89,730	23,040
1947	129,064	280,215
1948	219,549	62,070
1949	469,900	207,050
1950	95,700	288,440
1951	99,566	119,285
1952	288,552	271,940
1953	95,288	59,890
1954		63,980
1955		55,610
1956		74,010
1957		112,250
1958	62,000	103,250
1959		42,050
1960	67,371	99,786
1961	96,886	96,125
1962		90,900
1963	59,796	132,790
1964	42,851	70,412
1965	331,772	75,475
1966	402,012	62,800
1967	14,213	46,322
1968	37,779	9,585
1969	396,651	26,650
1970	60,208	8,005
1971	228,334	20,308
1972	41,838	15,140
1973	29,409	41,970
1974	482,585	4,110
1975	10,032	604,091
1976	252,353	60,246
1977	19,517	60,246
1978	113,548	100,300
	Sunfish	
1920		NR
1921		600
1922		1,600
1923		475
1924		2,515
1926		1,800
1927		3,900
1928		555
1929		1,500
1931		4,260
1932		53,500
1933		6,060
1937		190
1938		5,750
1939		16,800
1940		8,400
1941		4,500
1942		24,150
1943		17,040
1954	393,978	
1955	40,564	
1956	126,293	
1957	301,845	
1958	83,721	
1959	284,279	
1960	53	
1961	19,680	
1962	271,251	
1964	142,809	

TABLE 11--Continued

Year	State	Federal
1965	105,676	
1966	99,667	
1967	1,030	
1968	158,860	
1969	227,182	
Green sunfish		
1947		14,000
1955		
1966	30,000	
1967	157,524	
1970	179,760	
1973	82,980	
1974	6,000	
1975	51,091	
1976	18,928	
Redear sunfish		
1945		13,750
1955	130,000	193,000
1961		10,000
1962		19,700
Hybrid sunfish		
1953	10,525	
1963	67,502	
Warmouth		
1895		25
Largemouth bass		
1879		
1882	41	
1893		±300
1894	1,000	647
1895	1,000	150
1897	5,200	
1898		400
1899		550
1900		1,040
1902		75
1903		1,300
1905		1,000
1907		1,875
1908		625
1909		1,750
1910		5,640
1911		NR
1912		4,592
1913		1,840
1914		504
1915		622
1916		7,150
1917	NR	6,126
1918	NR	2,125
1919		4,120
1920		NR
1921	210,000	9,725
1922	40,000	6,790
1923	+91,000	10,250
1924		12,715
1925		
1926		7,010
1927		14,200
1928		3,695
1929		12,917
1930		6,800
1931		12,325
1932		4,450
1933		7,750
1934	16,220	
1935	148,150	
1936		15,000
1937		2,550
1938		55,025
1939		29,900
1940	?	5,710
1941	?	4,240
1942	?	8,250
1943	?	5,895
1944	30,415	87,895
1945	29,056	9,665
1946	45,820	5,005
1947	37,667	705,310
1948	326,100	145,735
1949	14,622	63,980
1950	182,918	424,595
1951	86,457	107,785
1952	77,242	190,620
1953	101,893	114,580
1954	111,943	265,070
1955	114,152	162,360
1956	30,197	120,862
1957	5,032	17,180
1958	45,133	107,145
1959	64,750	80,674
1960	69,544	16,705
1961	37,894	92,925
1962	48,225	52,835
1963	12,273	17,965
1964	106,953	151,870
1965	65,375	11,670
1966	50,743	38,354
1967	138,268	297,435
1968	30	277,510
1969	84,638	249,990
1970	382,190	208,265
1971	664	6,197
1972	234,752	302,500
1973	76,678	286,170
1974	27,134	105,650
1975	81,393	80,000
1976	197,679	224,552
1977	13,293	33,000
1978	143,928	318,506
Smallmouth bass		
1893		±300
1911		NR
1913		500
1914		300
1915		400
1917	NR	200
1918	NR	250
1919		900
1920		NR
1933		60
1940		
1943		
1947		3,079
1956	49	
1960	191	
1961	44	
1962	45	
1963	17,313	
1964	13,655	4,800
1965	5,976	
1966	13,178	
1967	1,637	
1968		1,760
1969	23,286	
1970	7,725	57,000
1971	11,069	9,300
1972	25,880	14,036
1973	64,300	151,150
1974	105,600	105,000
1975	118,648	158,000
1976	116,237	106,000
1977	104,090	102,000
1978	12,962	60,000
Rock bass		
1896		100
1897		200
1905		200
1908		85
1911		NR
1916		200
1917	NR	1,200
1918	NR	
1919		1,090
1920		NR
1923		1,000
1926		800
1927		300
1929		40
1936		5,600
1939		645
1940		8,700
1941		
1943	15,000	
1954	103	
1955	625	
1956	5,000	
1957	75	
1958	14,934	
1959	6,549	
1960	4,086	
1961	5,773	
1963	14,500	
1964	6,187	
Stripped bass		
1969	3,100	
1971	21,966	
White bass		
1948	32	
1950	246	
1951	1,309	
1952	352	
1953	1,448	
1954	1,325	
1955	67	
1958	132	
1959	203	
1960	173	
1961	165	150
1962	576	
1963	141	
1964	50	
1965	187	
1966	160	
1968	144	
1969	4,739	
1970	5,355	
1971	1,202	
1972	87	
1974	445	
Freshwater drum		
1951	952	
1955	676	
1957	68	
1960	3	
1965	169	
1968	3,135	
Minnows		
1952	54,000	
1954	18,500	
1955	3,000	
1957	5,575	
1958	7,030	
1959	16,000	
1961	113,000	
1962	111,650	
1963	10,000	
1964	29,000	
1965	754,194	
1966	784,100	
1967	82,012	
1975		500
Fathead minnow		
1976		1,000
Golden shiner		
1953	280	
Sucker		
1972	2,000	
1973	444	
1976	600	
Mixed species		
1893		600[c]
1934	350,000[d]	
1967	1,584[e]	
1968	28,743[f]	
1970	16,565[f]	
1971	10,954	
1972	3,000	
1973	1,760	
1974	2,650	
1975	11,454	
American eel		
1970	27	
Miscellaneous		
1966	26,684	
1974	4,275	
1975	22,290	
1976	1,500	1,000
1978	5,000	
Crayfish		
1954	2,675	
1955	4,050	
1956	1,996	
1957	5,794	
1958	10,404	
1961	12,920	
1962	9,000	
1963	375	
1965	8,895	
1970	6,620	
Bullfrogs		
1951	36	
1952	62	
1954	9,754	
1965	8,725	
1967	101,250	

[c] Large and smallmouth bass.
[d] Catfish and perch.
[e] Crappie, perch, bass, and bluegill.
[f] Bluegill and crappie.

TABLE 12--Earliest known dates and locations for various fishes introduced into Colorado

Common name	East Slope						West Slope					
	Locality and/or drainage	Year	State	Fed.	Private	Ref.	Locality and/or drainage	Year	State	Fed.	Private	Ref.
Brook trout	S. Platte drainage, 10 mi. below Denver	1872			x	1	Grand River (Colo. R.)	1882	x		X?	2
Brook x lake trout	Wellington L. hatchery near Buffalo	1892			x	3	Island L., Grand Mesa	1959	x			4
Dolly Varden?		1890?			x	5	Frying Pan River?	1892?			X?	5
Dolly Varden		1968		x		6	No records found					
Rainbow trout	State hatchery to 3 or 4 localities	1882	x	X	X	7	All major streams?	1882	x		X?	7
Kamloops trout	Parvin Lake	1952	X			8	Granby Reservoir	1951?	x			9
Rainbow x cutthroat	Twin Lakes	1894	X			10	Black Lake, Summit Co.	1892?	X		X	11
Steel head	S. Platte R. near Buffalo	1901		X		12	Eagle and Fryingpan rivers	1901		x		12
Brown trout	Denver area, eggs	1885	X?		X?	13	Black L, Summit Co.	1888			X	14
Brown x brook trout	? (from Leadville Hatchery)	1893		x		See Appen. E-4	No records found					
Golden trout?							Island Lake	1931?	?	?	?	15
Golden trout	Eggs at Leadville Hatchery; unknown if any were stocked, but natural hybrid of Golden trout reported in N. Platte drainage recently	1908		X		16	Gwendolyn Lake	1932	x			17
Lake trout	De La Vergne Hatchery near Colo. Springs	1879			X	18a						
	State pond, Denver	1883	x			18b	Hartman Ponds, Gunnison	1893?			x	20
	Private ponds, Denver	before 1886			X	19	Lake Koppin near Cimmaron	1899		X	x	21
Grayling	Fry at Leadville Hatchery	1898				22	Eagle and Fryingpan rivers	1899		X		23
	Platte and Rio Grande rivers	1899				23						
Lake whitefish	Lake Archer, Denver (was unsuccessful)	1879	x			24	Lake San Cristobal	before 1881			X	26
	Cheesman Res. and Twin Lakes	1907				25						
Bear Lake (Bonneville) Cisco	Twin Lakes	1971	X			27	No records found					
Mountain whitefish	Cache la Poudre, 30 mi. above Bellvue	1956	x			28	Native to West Slope (Yampa and White rivers)					28
Chinook salmon	Green and Clear lakes near Georgetown	1874		X	X	29	No records except possibly Lake San Cristobal where salmon(?) were stocked	before 1881				26
Kokanee salmon	Skagway Reservoir	1951	x			30	Granby and Green Mt. Res.	1951	x			30
Coho salmon	Records not specific	1925 (possibly)	x			31	Mirror Lake, Gunnison Co., Steamboat Dist.	1925	X	X		31
Atlantic salmon	Ponds near Morrison	1881		X	X	32	No records except possibly Lake San Cristobal where salmon(?) were stocked	before 1881			X	26
	Twin Lakes	1886	x			33						
Brook x rainbow	Not specific (headwater streams adjacent to Denver)	1899	x			34	Lake near Durango (?)	before 1914?			X	35
Snake River cutthroat	North Michigan Lake	1968	x			36	State annual records not specific	after 1968				
Yellowfin cutthroat	Native to Twin Lakes only					37	Grand Mesa Lakes	before 1899?	?	?	?	38
	Native to Twin Lakes and Arkansas drainage					39	Island Lake	1931?	?	?	?	15
Lahontan cutthroat	Eggs at Leadville Hatchery (unknown if any stocked)	1931		x		40						
	North Michigan Lake	1969	x			36	No records found					
Yellowstone cutthroat?	Colo. hatcheries (?)	1905? 1906? 1907?	X? X? X?	X? X? X?		41 41 41	Records not specific Records not specific Records not specific					
Yellowstone cutthroat	Colo. hatcheries to streams in different parts of the state	1912	x	X		42	Records not specific	1912	x	X		42
Lake Ohrid trout	Parvin Lake, Big Creek Res., and Turquoise Lake	1969	x	X		43	No records found					
Carp?	Marston Lake, Denver	1872			x	44						
German carp	Many front range areas	1879	x	X		45	LaPlata Co. (2 applicants)	1882		x	x	46
American shad	Platte River at Denver	1872		X		47	No records found					

TABLE 12--Continued

Common name	East Slope: Locality and/or drainage	Year	State	Fed.	Private	Ref.	West Slope: Locality and/or drainage	Year	State	Fed.	Private	Ref.
Goldfish	Marston Lake	1872?				44	Ponds near Grand Junction	1912			X	50
	Ponds near Colo. Springs?	1879			X	48						
Red goldfish	Lakes in Boulder & Weld Co.	1897			X	49	No records found					
Tench?		1880?				48	No records found					
Tench	San Luis Valley	1890	X	X	X	51a						
Golden Orfe (Ide)	Ponds near Colo. Springs	1883			X	51b						
Golden Ide		1892		X		52	No records found					
Largemouth bass		1872?			X	53a	Lower Gunnison & Colo. R.	1895	X			54
		1880	X			53b	Lake San Cristobal	1895		X		55
Smallmouth bass		1893		X		56	Piedra R. near Arboles	1913		X		58
	Canon City area	1913			X	57						
Crappie	Denver Hatchery pond	1882	X			59	Yampa R. backwaters	1944	X			60
Yellow perch		1879?	X?		X?	61	Butterfield L., Montrose; Summit Res., Cortez	1922	X			63
	Denver area	before 1891			X	62	Lucas L., Glenwood Springs	1922	X			63
Wall-eyed pike?	Platte, Poudre, St. Vrain, Big Thompson & Boulder Creek. Lakes near Greeley	1879?	X		X	64a						
Pike?	Platte near Denver	1874			X	64b						
	Denver Hatchery	1899	X			65						
Wall-eyed pike?	Sunnyside L., Kiowa Co.	1900	X			65						
	Lakes & reservoirs of eastern Colo.	before 1914			X?	66						
Walleye	Nee Grande & North Sterling Reservoirs	1949	X			67	Harts Basin Res., Gunnison drainage	1950	X			68
Channel catfish	Native to Arkansas R. & Platte (?)					69	Uncompaghre ponds, Montrose County?	1891?			X	70
							Durango area ponds	1892?			X	71
							Colo. & Gunnison R.	1898	X			72
Bullhead?		1886?	X?			73	Ponds in Montrose area	1886			X	75
(Yellow cat)?	State Hatchery	1888/1889	X?			74						
Black bullhead	Native to Platte, Republican & Arkansas					76	Ponds in Grand Junction & Montrose areas	before 1914			X?	76
Speckled cat?	Sloan's Lake, Denver	before 1888			X	77	Ponds near Dolores	1889?			X?	80
	Ponds in Pueblo area	1888			X	78						
	Otero County	1889			X	79						
Rock bass?	Pond near Ft. Collins	1883			X	81	No records found					
		1890			X	82	No records found					
		1891?				83	No records found					
		1896		X	X	84	No records found					
Pickerel?	4 lakes in Denver area?	1885			X	85	No records found					
Grass pickerel	Palmer L., El Paso County				X	86						
Warmouth	Stevens L. near Cucharas	1895		X		87	No records found					
Bluegill	Chew's Pond near Pueblo	1912				88	Shane's Pond near Dolores	1917		X		89a
Sunfish?	Ponds near Denver	1862			X	89b						
Redear sunfish		1945				90	No records found					
Northern pike	Bonny & North Sterling Res.	1956	X	X		91	Vallecito Res., Durango	1962	X			92
White bass	Bowles L., 14 mi. south of Denver	1888?			X	93	Colo. R. below Grand Valley Reclamation Dam	1953?	X			94
Striped bass	Research Center in Ft. Collins; Wray Hatchery	1968	X			95	No records found					
	N. Sterling Res.	1969	X			96	No records found					
White perch		before 1965	X			97	No records found					
Sacramento perch	Nee Gronda & Two Buttes Res.	1964	X			98	No records found					
Freshwater drum	Bonny Res.	1951	X			99	No records found					
Gizzard shad	Once possibly native to Arkansas drainage					100	No records found					
	Lower Arkansas drainage	before 1947			X?	101	No records found					
	Jumbo Reservoir	before 1951			X?	102	No records found					
	Known to have been distributed from Wray Hatchery	1951	X			103	No records found					
	Some eastern Colo. Res.	before 1952	X			104	No records found					

TABLE 12--Continued

Common name	East Slope						West Slope					
	Locality and/or drainage	Year	State	Fed.	Private	Ref.	Locality and/or drainage	Year	State	Fed.	Private	Ref.
Golden shiner		before 1952			X?	105	No records found					
		1953	X		X	106	No records found					
American eel	Probably native to Rio Grande & Platte drainages					107	Animas R. near Durango	1888			X	108
	Native to Arkansas drainage					109						
Mississippi silversides	Quincy Res.	1975				110	No records found					
	Carbody Res.	1976				110	No records found					
Threadfin shad	Valmont Res. near Boulder	1976				111	No records found					
American smelt	Clear Creek Res., Arkansas drainage	1970				112	Williams Fork Res.	1960?	X			113
(now believed to have been Pigmy smelt)	Quincy Res.	1977				114						
	Rampart Res.	1978				114						
Spottail shiner	Quincy Res.	1975&1978				115	No records found					
Blue catfish?		1888?	X?			116	Colo. & Gunnison R.	1898?	X			119
Blue catfish	Rio Grande near Alamosa	before 1914			X	117						
		before 1952				118						
Flathead catfish		before 1952				120	No records found					
Pumpkinseed	Two Buttes Res.	before 1952				121	No records found					
Log perch	Two Buttes Res.	before 1952				122	No records found					
Alewife	No records found						Williams Fork Res.	1970	X			123
Mosquitofish	Boulder area ponds	1975?			X	124	No records found					
Tilapia	San Luis Valley	1975?			X	124	No records found					
	Longmont area(?)	1975?			X	125	No records found					
Grass carp	Cherry Creek Res.	1965	X?			126	No records found					
Longnose dace	Native to Platte, Arkansas, & Rio Grande drainage					127	North Beaver Creek, Gunnison drainage	1966	?	?	?	128
Fathead minnow	Native to Platte & Arkansas drainages					129	Colo. R. near Hot Sulphur Springs	1938	?	?	?	130
Red shiner	Native to Platte & Arkansas drainages					131	Colo. R. near Grand Junction & Dolores R.	1952	?		?	132
Sand shiner	Native to Platte & Arkansas drainages					133	Dolores R.?	1952?		?	?	134
Plains mountain sucker	Native to Platte R. drainage					135	Gunnison R. at Delta?	1889?	?	?	?	136
White sucker	Native to Platte & Arkansas drainages					137	S. Mesa Lake area of Colo. R. headwaters?	1926?	?	?	?	138
							Dry Creek, Uncompaghre drainage	1941	?	?	?	138
Longnose sucker	Native to Platte R. drainage					139	Gunnison R. drainage below Delta	1941	?	?	?	140
Green sunfish	Native to Platte, Arkansas, & Rio Grande drainages					141	Colo. R. near Clifton	1952				142
Plains killifish	Native to Platte & Arkansas drainages					143	Gunnison R. below Delta	1966?	?	?	?	144
Creek chub	Native to the Platte drainage					145	Colo. R. near Hot Sulphur Springs	1938	?	?	?	146
Redside shiner	No records found						Yampa River	1967	?	?		147
Notropis sp.	Irrigation ditch east of Ft. Collins	1967	?	?	?	147	No records found					

TABLE 12--Continued

1. Rocky Mountain News, 1873 Jan. 19, p. 4, col. 3 (see Appendix B,

2. Forest and Stream 1882 June 29, 18(22):425 (see Appendix G p. 97).

3. Forest and Stream 1892 Feb. 11, 38(6):129; Sports Afield 1892 Jan. 8(2):56.

4. Kardex STATE regional stocking records--Montrose office.

5. Field and Farm 1889 Oct. 5, p. 7; Forest and Stream 1892, 39:250.

6. Propagation and distribution of food fishes for the fiscal years 1967 and 1968. 1970. Fish Distribution Report 3, p. 53. (CSU call #I 49/69)

7. Biennial Report of the Fish Commissioner of the State of Colorado for the two years 1881 and 1882, p. 4; also see Forest and Stream 1882 June 1, 18(18):348 and 1882 Nov. 9, 19(15):291, in Appendix G, pages 96 and 97.

8. State stocking records.

9. Beckman, W. 1952. Guide to the fishes of Colorado, p. 19.

10. Biennial Report of the State Fish Commissioner and Game Warden for 1893-1894, p. 8.

11. Biennial Report of the State Fish Commissioner of the State of Colorado for the years 1891 and 1892, p. 14.

12. U. S. Fish Commissioner Report for 1901, p. 88. Eggs at Leadville in 1900--see U. S. Fish Commission Report for 1900, p. 81.

13. Rocky Mountain News 1886 Jan. 27, p. 6 (see Appendix G, p.102).

14. Field and Farm 1888 Dec. 15, p. 7.

15. Carhart, A. H. 1932. Colorado. Coward-McCann, Inc. He caught "Golden trout" (p. 248), but later (Fishing in the West, 1950, the MacMillian Co., N.Y., p. 108) refers to these same Island Lake fish as yellow-fin trout.

16. Field and Farm, 1908 Sept. 19, p. 8; U. S. Fish Commission Report for 1908, p. 14 of Bureau of Fisheries Document No. 644. Recently a natural hybrid (Golden X rainbow X cutthroat) was reported from the outlet stream to Roxy Ann Lake in the headwaters of the North Platte drainage, Jackson County, by C. B. Schreck and R. J. Behnke, 1971 (J. Fish. Res. Bd. Canada 28(7):994).

17. Green, Wm. 1937. Colorado trout. The Colorado Museum of Natural History Popular Series No. 2, p. 21; also Report of the Game and Fish Dep. of the State of Colorado, Dec. 1, 1926 to June 30, 1931, p. 19.

18a. Colorado Springs Gazette. 1879. Mar. 27, p. 4 (see p.70 of Appendix B).

18b. Denver Republican 1883 April 2, p. 8 (see p.98, c.2 Appendix G).

19. Bulletin of the U. S. Fish Commission for 1886, Vol. 6, p. 134.

20. Gunnison Tribune 1893 Oct. 28.

21. U. S. Fish Commission Report for 1899, pp. CX and XVI.

22. U. S. Fish Commission Report for 1898, p. XC.

23. U. S. Fish Commission Report for 1899, p. CXI.

24. Biennial Report of the Fish Commissioner of the State of Colorado for the two years 1879-80, pp. 6, 7, and 10. (See p.70 Appendix B)

25. U. S. Fish Commission Report for 1907, p. 18 of Bureau of Fisheries Document No. 630.

26. Crofutt, George. 1881. Crofutt's grip-sack guide of Colorado. The Overland Publ. Co., Omaha, Nebraska, pp. 115-116.

27. Finnell, L. 1973. Fryingpan-Arkansas fish research investigations, Proj. Rep. No. 2, p. 51.

28. L. B. France in Forest and Stream 1891 July 30, 37(2): 251 mentions C. williamsoni were found in Colorado only in Yampa River tributaries and the White River on the Western Slope. Mountain whitefish were later introduced to the East Slope (see Colorado Outdoors, July-Aug. 1958, p. 27; also Klein, W. D. 1955. Whitefish possibilities, in Eastern Slope streams. Colo. Dep. Game and Fish Spec. Rep. 36, 3 p.)

29. U. S. Fish Commission Report for 1873-74 and 1874-75, pp. XL and 442. See also U. j. Fish Commission Report for 1881, pp. 829-834 and 859 of "A statistical review of the production and distribution to public waters of young fish," by the U. S. Fish Commission, from its organization in 1871 to the close of 1880 by Charles W. Smiley. See also references under W. H. Cushman in Appendices A and B.

30. Colorado Outdoors, May-June 1952, pp. 8-9.

31. Report of the Game and Fish Department of the State of Colorado Dec. 1, 1926 to June 30, 1931, p. 19. U. S. Bureau of Fisheries Report for 1928-29, pp. 816-817. See also old hatchery records.

32. U. S. Fish Commission Report for 1880, pp. XL, 648-651.

33. U. S. Fish Commission Report for 1885, p. 151; Report of the State Fish Commissioner of Colorado for 1886, p. 4.

34. Field and Farm 1899 June 3, p. 7; also Denver Times 1900 June 3, p. 4.

35. Ellis, M. 1914. Fishes of Colorado. The University of Colorado Studies, XI(1):77.

36. Trojnar J., and R. Behnke. 1974. Management implications of ecological segregation between two introduced populations of cutthroat trout in a small Colorado Lake. Trans. Amer. Fish. Soc. 103(3):425. Also Hazzard, L. K. and Ray McDonald. 1981. Colo. Outdoors, July-Aug., p. 2.

37. Forest and Stream 1889 Sept. 19, 33(9):167 and 1890 Jan. 30, 34(2)129; Proceedings U. S. National Museum for 1889 (1890) 12:453-454; Bull. U. S. Fish Commission for 1889 (1891) 9:11; Ellis, 1914, Ibid, p. 83.

38. Jaffe, Siegfried. 1902. Sur l'introduction et al multiplication en Europe de la truita or nageores jaunes (Salmo mykiss macdonaldi, Jordan et Evermann). Bull. Soc. Nat. Acclim. France, Vol. 49, pp. 422-423. (Mentions eggs of the yellow-fin were sent to him from Grand Mesa, Colo. in 1899.) See Appendix B, p. 79.

39. Forest and Stream 1890 Jan. 23, 34(1):8; same reference by Gordon Land appeared in Sports Afield 1890 Feb. 13, 4(4):68-69 and in Field and Farm 1890, Mar. 8 , p. 6. See Discussion in Appendix B, pp. 83-85.

40. U. S. Fish Commission Report for 1931, pp. 641 and 670, (51,000 eggs from Pyramid Lake, Nevada were sent to Leadville).

41. Early U. S. Fish Commission records do not distinguish "yellowstone cutthroat" from the general term "black-spotted trout." Yellowstone cutthroat eggs were likely first taken in 1901 (?) by federal employees of the Spearfish Station of South Dakota--see U. S. Fish Commission Report for 1901, p. 72. Spearfish station transferred some "blackspotted" to the Central Station in 1902 (U. S. Fish Commission Report for 1902, p. 38) to Bozeman Station in 1905 (U. S. Fish Commission Report for 1905, p. 11) and to other stations (7) in 1906 (U. S. Fish Commission Report for 1906, p. 16). The Colorado Fish Commission received from unidentified federal sources black-spotted trout in both 1905 Fish Commission Report for 1905, p. 10) and in 1906 (U.S. Fish Commission Report for 1906, p. 8). It is inconclusive whether any of the above were true yellowstone cutthroat as also the "blackspotted trout" sent to the Colorado Commission in 1907 and 1908. The 1910 and 1911 shipments to the Colorado Commission by the U.S. Fish Commission may have been yellowstone cutthroat because the 1910 FY Propagation and Distribution Report, p. 10, stated that emphasis was to be placed on black-spotted trout from Yellowstone Park as a source of supply for the Leadville, Spearfish, and Bozeman stations.

42. Biennial Report of the State Game and Fish Commissioner of the State of Colorado for the years 1911-12, p. 15.

TABLE 12--Continued

43. Klein, W. 1972. Results of stocking Lake Ohrid trout. In Colorado Fisheries Research Review 1972. Colo. Div. Game, Fish and Parks, p. 16. According to an article "Introduction of Salmo letnica in the U.S.A." Annonymous (undatid) 15. 2-3, about 50,000 fingerlings from Mount Shavano Hatchery were stocked in Turquoise Lake while Watson Lake Hatchery stocked 32,000 in Big Creek Reservoir and 5,000 in Parvin Lake.

44. Field and Farm 1888 Nov. 10, p. 7. These may have been goldfish, crucian carp, or a hybrid--see U.S. Fish Commission Report for 1904, pp. 539-542. See also Field and Farm 1890 June 21, p. 7, but particularly Chicago Field 1878 Aug. 17, 10(1):4(col. 2); 1880 April 24, 13(11):168(col. 2) and 1880 July 3, 13(21):327.

45. Biennial Report of the Fish Commission of the State of Colorado for the two years 1879-80, pp. 5-6 and 11; U. S. Fish Commission Report for 1882, pp. 944, 950,and 951; see Appendix B, p.70.

46. U. S. Fish Commission Report for 1882, p. 922.

47. U. S. Fish Commission Report for 1873-74 and 1874-75, ji. 332. Also see U. S. Fish Commission Report for 1881, p. 843 and the Rocky Mountain News 1872 July 9, p. 2.

48. Biennial Report of the Fish Commissioner of the State of Colorado for the two years 1879-80, p. 6. (see p.70 of Appendix B)

49. Field and Farm 1897 June 19, p. 7.

50. Ellis, M. 1914. Fishes of Colorado, The Univ. of Colorado Studies, XI(1):36.

51a. Field and Farm 1890 Nov. 29, p. 7; 1890 Dec. 6, p. 5 and 1891 Jan. 31, p. 7; see alsoJ. Wildl. Manage. 1947 July 11(3):199.

51b. Colorado Springs Gazette 1883 Sept. 19, p. 1 (see p.72 Appendix B)

52. U. S. Fish Commission Report for 1892, p. LXXVI.

53a. Rocky Mountain News 1872, Oct. 22, p. 2, col. 2.

53b. Biennial Report of the Fish Commissioner of the State of Colorado for the two years 1879-80, pp. 5, 6, 7.

54. Biennial Report of the State Fish Commissioner of the State of Colorado for the years 1895 and 1896, p. 6.

55. U. S. Fish Commission Report for 1895, p. 69.

56. U. S. Fish Commission Report for 1893, p. 135.

57. Ellis, M. 1914. Fishes of Colorado, The Univ. Colorado Studies, XI(1):102.

58. U. S. Fish Commission Report for 1913, p. 87.

59. Biennial Report of the Fish Commissioner of the State of Colorado for the two years 1881 and 1882, p. 5.

60. Report of fish planted for year 1944. Colo. Game and Fish Dep., p. 25.

61. Letter from Senator Teller to Commissioner Sisty that appeared in The Miner (newspaper) of Georgetown, 1879 Jan. 4, p. 2. See Appendix F, p. 95.

62. Field and Farm 1886 May 22, p. 3; 1891 Sept. 5, p. 7; 1891 March 28, p. 7 and 1893 Sept. 16, p. 10. See also Colorado Farmer 1891 April 28, p. 8 (col. 4).

63. Biennial Reports of the State Game and Fish Commissioner of the State of Colorado for the years 1918-1922, p. 31.

64a. Biennial Report of the Fish Commissioner of the State of Colorado for the two years 1879-80, p. 4. Report of the State Fish Commissioner of Colorado for 1886, p. 17. Colorado Farmer 1879 Sept. 4, p. 5 and 1881 April 21, p. 4, col. 4. Field and Farm 1889 Oct. 5, p. 7; 1890 April 19, p. 7; 1896 May 9, p. 4;and 1899 July 9, p. 7. These fish may have been sauger (?) which I feel were native (see Discussion p. 40).

64b. Rocky Mountain News 1874 May 19, p. 4, col. 1.

65. Biennial Report of the State Game and Fish Commissioner of the State of Colorado for the years 1899 and 1900, pp. 38 and 49. Field and Farm 1900 Dec. 1, p. 6.

66. Ellis, M. 1914. Fishes of Colorado, The University of Colorado Studie , XI(1):103-104.

67. Colorado Conservation May-June 1954, pp. 15 and 16.

68. Lemons, D. 1953. Western Slope warmwater survey. Colo. Dep. Game and Fish Proj. 120, p. 3.

69. Forest and Stream 1882 Jan. 12, 17(24):471 (Appendix G, p. 96); U. S. Fish Commission Report for 1884, pp. 665-667 (Appendix B, p. 66). Report of the State Fish Commissioner of Colorado for 1886, p. 17. See also Ellis, M. 1914. Fishes of Colorado, The Univ. Colo. Studies XI(1):18, 119.

70. Field and Farm 1891 July 25, p. 12.

71. Field and Farm 1892 July 30, p. 7 and 1896 May 9, p. 4.

72. Biennial Report of the State Forest, Game and Fish Commissioner of the State of Colorado for the years 1897 and 1898 pp. 32-33. These may have been blue catfish(?). See also Field and Farm 1898 March 12, p. 7 and 1906 July 14, p. 8.

73. Report of State Fish Commissioner of Colorado for 1886, p. 17.

74. Field and Farm 1889 July 6, p. 7; also see 1889 April 27, p. 7 and Report of the State Fish Commissioner of Colorado for 1888, p. 8.

75. Field and Farm 1889 July 20, p. 7.

76. Ellis, M. 1914. Fishes of Colorado, The Univ. Colo. Studies XI(1):16-17, 119.

77. Field and Farm 1888 Nov. 10, p. 7 and 1888 Dec. 15, p. 7.

78. Field and Farm 1888 Dec. 15, p. 7.

79. Field and Farm 1889 May 29, p. 7.

80. Field and Farm 1890 Feb. 22, p. 6.

81. U. S. Fish Commission Report for 1884, p. 668.

82. Field and Farm 1890 Sept. 13, p. 7.

83. Field and Farm 1891 Sept. 5, p. 7 and 1891 Oct. 17, p. 7.

84. Field and Farm 1896 May 9, p. 4 and U. S. Fish Commission Report for 1896, pp. 73 and 90.

85. Report of the State Fish Commissioner of Colorado for 1886, pp. 16-17. Also see Report of the State Fish Commissioner of Colorado for 1888, p. 8; and Field and Farm 1888 March 24, p. 4; 1889 May 25, p. 13; 1889 June 8, p. 7. Rocky Mountain News June 14, 1888, p. 6, col. 3-4.

86. Beckman, W. 1952. Guide to the fishes of Colorado, pp. 27-28. Also see Field and Farm 1889 April 13, p. 7; Everhart and Seaman. 1971. Fishes of Colorado, p. 36.

87. U. S. Fish Commission Report for 1895, pp. 53 and 71.

88. U. S. Fish Commission Report for 1912, p. 96. These fish considered bluegill by Ellis, M. 1914. Fishes of Colorado, The Univ. Colo. Studies, XI(1):99.

89a. U. S. Fish Commission Report for 1917, p. 84.

89b. Rocky Mountain News 1872, Oct. 22, p. 2, col. 2.

90. Propagation and distributions of food fishes calendar years 1944-1948. 1952. Statistical Digest 24, p. 72.

91. Everhart, W., and W. Seaman. 1971. Fishes of Colorado, pp. 35-36. Finnell, L., and T. Lynch. 1957. 1956 Creel census report. Colo. Dep. Game and Fish, p. 14. Seaman, W. 1947. Colo. Game and Fish Dep. 1956 Fish Distribution and Production Rep., p. 9. Woodling, J. 1980. Game fish of Colorado. Colo. Div. Wildl., p. 19.

TABLE 12--Continued

92. Darrah, K. 1979. Northern pike stocked from Las Animas Hatchery, 1957-1979. Colo. Div. Wildl. correspondence to R. A. Jones, Dec. 5, 1979, 2 p. Also see Imler, R. 1977. Coldwater reservoirs. Final Rep. F-52-R, Colo. Div. Wildl., p. 32.

93. Rocky Mountain News 1888 May 30, p. 8 c. 1; June 14, p. 6, c. 3.

94. Lemmons, D. 1953. Western Slope warmwater survey. Colo. Dep. Game and Fish Proj. 120, p. 8.

95. Colorado Outdoors. July-August 1968, p. 3.

96. Gregory, R. 1970. Warmwater fisheries investigation. Job Prog. Rep., Job 7, F-34-R-5, pp. 45-47.

97. Colorado Outdoors. March-April 1965, p. 29. (Obtained from Connecticut by trading kokanee).

98. Colorado Outdoors. January-February 1965, p. 14 and 1964 wildlife conservation officer creel census report and fish hatchery production and distribution report. Colo. Game, Fish and Parks, p. 16.

99. Colorado Conservation May-June 1952, p. 10. Colo. Game and Fish Dep. total fish distribution, all species, all sizes 1951, p. 11 (Las Animas Hatchery distribution). Everhart, W. and W. Seaman. 1971. Fishes of Colorado, p. 73.

100. Ellis, M. 1914. Fishes of Colorado. The Univ. of Colo. Studies XI(1):128.

101. Andrews R., and T. Lynch. 1947. The use of the shocking device in the Lower Arkansas Valley. Colo. Game and Fish Dep., 2 p. (Numerous 6-12 in. specimens.)

102. Evans, R. 1952. Food and growth studies of the major game fishes in Jumbo Reservoir. Colo. Dep. Game Fish and Parks, Job Prog. Rep., pp. ii and 27 (present in Jumbo before 1951).

103. Colorado Game and Fish Department total fish distribution, all species, all sizes 1951, p. 12. (Verbal communication in 1979 with R. A. Jones of Colo. Div. Wildl. indicated the 1951 shad were thought to have been procurred by seining below N. Sterling Res.).

104. Beckman, W. 1952. Guide to the fishes of Colorado, p. 15.

105. Beckman, W. 1952. Ibid., pp. 41, 42, and 106.

106. Colorado Game and Fish Department total fish distribution, all species, all sizes 1953, p. 12. (These fish were recovered from Schweiger lakes [private] by state crews but it is unknown where or if they were stocked.)

107. Bulletin of the U. S. Fish Commission for 1881, p. 118 under name of Gordon Land - early (1877?) captures in Conejos River and Platte River; Forest and and Stream 1877 May 31 8(17):261 (See Appendix B, p. 80)

108. Field and Farm 1888 Nov. 10, p. 7.

109. Personal communication with Wayne Seaman.

110. Sinley, J., and T. Powell. 1980. Fish forage species introductions. Fed. Aid Proj. F-53 Final Rep., pp. 3 and 6.

111. Sinley, J., and T. Powell. 1980. Fish forage species introductions. Fed. Aid Proj. F-53, Final Rep., p. 9.

112. Finnell, L. 1973. Fryingpan-Arkansas fish research investigations. Proj. Rep. No. 2, p. 52.

113. Imler, R. 1977. Coolwater reservoirs. Colo. Div. Wildl., Final Rep. F-52-R, p. 34. (Type error--should have been 1970)

114. Sinley, J., and T. Powell. 1980. Ibid., pp. 11-12.

115. Sinley, J., and T. Powell. 1980. Ibid., p. 12.

116. Report of the State Fish Commissioner of Colorado for 1888, p. 8.

117. Ellis, M. 1914. Fishes of Colorado. The University of Colorado Studies, XI(1):18, footnote.

118. Beckman, W. 1952. Guide to the fishes of Colorado, pp. 64-65.

119. Biennial Report of the State Forest, Game and Fish Commissioner of the State of Colorado for the years 1897 and 1898, pp. 32 and 33.

120. Beckman, W. 1952. Guide to the fishes of Colorado, pp. 68-69

121. Beckman, W. 1952. Ibid., pp. 82-83 and Lynch, T. P. Buscemi, and D. Lemmons. 1953. Limnological and fishery conditions of Two Buttes Reservoir, Colorado, 1950 and 1951. Colo. Dep. Game and Fish, p. 6.

122. Beckman, W. 1952. Ibid., pp. 91-92. Also see Lynch, T., B. Buscemi, and D. Lemmons. 1953. Ibid., p. 6.

123. Verbal communication with Dick Smith of Colo. Div. Wildl. Jan. 19, 1981 (140 fish were obtained at Milwaukee, Wisc., in late Sept. 1970).

124. Verbal communication with Steve Flickinger, Fishery and Wildl. Dep., Colo. State Univ., Jan. 19, 1981.

125. Div. Wildl. letter, Oct. 20, 1975, to Steven E. Rogers, Aquatic Biologist, Solar Energy Res. Corp., Longmont, authorizing the importation and experimentation with T. mossambica and aurea. (Unknown if these fish were actually stocked.)

126. Colorado Outdoors, January-February 1965, p. 15.

127. Ellis, M. 1914. Fishes of Colorado. The Univ. of Colo. Studies XI(1):64, 119.

128. Wiltzius, W. 1978. Some factors historically affecting the distribution and abundance of fishes in the Gunnison River. Colo. Div. Wildl., p. 114.

129. Ellis, M. 1914. Ibid., pp. 41, 42, and 119.

130. Wiltzius, W. 1978. Ibid., p. 115.

131. Ellis, M. 1914. Ibid., pp. 53, 54, and 119. (Called Redfin)

132. Wiltzius, W. 1978. Ibid., p. 119.

133. Ellis, M. 1914. Ibid., pp. 50, 51, and 119. (Called Western shiner)

134. Wiltzius, W. 1978. Ibid., pp. 120-122.

135. Beckman, W. 1952. Guide to the fishes of Colorado, pp. 35 and 106.

136. Wiltzius, W. 1978. Ibid., 130-131.

137. Ellis, M. 1914. Ibid., pp. 22-25 and 119. (Called Suckley's sucker)

138. Wiltzius, W. 1978. Ibid., p. 132.

139. Ellis, M. 1914. Ibid., pp. 25, 26,and 119. (called gray sucker, Platte River sucker,and fine-scaled sucker.)

140. Wiltzius, W. 1978. Ibid., p. 135.

141. Ellis, M. 1914. Ibid., pp. 97, 98, and 120.

142. Wiltzius, W. 1978. Ibid., p. 152.

143. Ellis, M. 1914. Ibid., pp. 87-89 and 119. (Called zebra fish, zebra top minnow)

144. Wiltzius, W. 1978. Ibid., p. 154.

145. Ellis, M. 1914. Ibid., pp. 57-59 and 119.

146. Hubbs, C., L. C. Hubbs, and R. E. Johnson. 1943. Hybridization in nature between species of catostomid fishes. Contr. Lab. Vert. Biol., No. 22, Univ. Michigan, pp. 13 and 39.

147. Li, H., and R. J. Behnke. 1967. Fishes of Colorado progress report. Colo. Coop. Fish. Unit, Colo. State Univ., p. 4.

APPENDICES

APPENDIX A
EARLY PRIVATE SALMONID HATCHERIES OPERATED IN COLORADO

Owner(s)	Location	Year constructed	Capacity	References
James M. Broadwell	About 9-10 mi. below Denver on S. Platte R. near Henderson	1871? (known to be operating in early 1872)		Rocky Mountain News 7/19/1873, p. 4 and 3/20/1874; The Denver Times, 6/3/1900, p. 4; Forest and Stream, 5/1/1884, pp. 269-270; Tribune-Republican, 1/1/1885, p. 10; Field and Farm 11/21/1891, p. 7; 4/16/1887, p. 5; and 7/23/1904, p. 8.
N. A. Baker	"Baker's Springs" Denver	1872?		Sebben, Lily, 1935, Colo. Mag., 12(6):220-222.
	Denver	1874?		Bull. U. S. Fish Comm. for 1882, p. 397. Rocky Mountain News 978/1875, p. 4.
Gordon Land	May not have been in Colorado	1866?		Bull. U. S. Fish Comm. for 1882, p. 397.
	Experimented in South Park and San Luis Valley (Conejos Springs). Not known if hatchery was used.	1872?		Rocky Mountain News 2/17/1874, p. 4, col. 2; 7/2/1874 p. 4.
	Buffalo Springs near Fairplay	1875?		Rocky Mountain News 11/10/1875, p. 5; also Bull. U.S. Fish Comm. for 1886, Vol. 6, P. 315.
	Cataract Lake in Summit County	1883?	250,000	American Angler 5/26/1883, p. 328; Forest and Stream 5/1/1884, p. 269-270.
	Denver	1885?		Tribune-Republican 1/1/1885, p. 10; Denver Directory for 1885.
		1886?	?	Bull. U. S. Fish Comm. for 1886, Vol. 6, p. 315.
	Nathrop, Chaffee County	1886?	200,000	Field and Farm 1/23/1886, p. 3
	Trout Creek Pass east of Buena Vista			Lillian Brigham. 1938. Colorado Travelore, The Peerless Printing Co., Denver, Colo., p. 192.
William A. Bell	Manitou Park, 25 mi. NW of Manitou Springs on Trout Creek	1874?	at least 100,000	Daily Tribune 7/19/1875, p. 4; Rocky Mountain News, 8/20/1875, p. 4; Bull. U. S. Fish Comm. for 1882, p. 397 and for 1887, pp. 38-39; Tribune-Republican 1/1/1885, p. 10.
William A. Bell and General Palmer	Rainbow Falls Park Trout Ranch, Manitou Park	1871?		Robert Watson 1971 The Pike's Peak Pioneers 100 years, Lithographic Press, Colo. Spgs., p.42,69,87.
	Head of Trout Creek	1876?		Chicago Field 4/1/1876, p. 108.
William H. Cushman	Basement in home at Georgetown	1874?		Freeman, Cheryl. 1972. Wanted: The Honorable Wm. H. Cushman. Colo. Mag, XLIX/1, pp. 37-38.
	Green Lake (along shore)	1875 Hatching house 60 ft x 25 ft (hundreds of thousands of eggs) with rearing facility		Rocky Mountain News 7/14/1876, p. 4; Georgetown Miner, 6/23/1877, p. 3; Baskin's History of Clear Creek and Boulder Valleys, Colorado, 1880, pp. 847-848; see also Georgetown Miner 8/13/1881, p. 1, and Crofutt's Grip Sac Guide 1885, pp. 100-101.
W. R. Scott	Morrison	1874?		Bull. U. S. Fish Comm. for 1882, p. 397.
	8 mi. above Morrison on Bear Creek	1879?		Georgetown Miner 1/18/1879, p. 3; see also 3/26/1881.
George De La Vergne	Colorado Springs	1877?		Bull. U. S. Fish Comm. for 1882, p. 397 (used by state in 1880-Biennial for 1879-80 pp.6, 7, 10, and 11); Colorado Springs Gazette 3/17/1879, p. 4.
	(Old Riggs ranch 1 mi. S of Colorado Springs)	1877?		Baskin's History of the Arkansas Valley, Colo. 1881, p. 453; also Tribune-Republican 1/1/1885, p. 10.
Albert W. McIntire	Alamosa, Conejos County	1880?	?	Bull. U. S. Fish Comm. for 1882, p. 397.
	San Luis Valley	1885?	?	Tribune-Republican 1/1/1885, p. 10.
		1891?	?	Field and Farm 9/19/1891, p. 7.
A. L. Rich (Fugua and Clemons were also involved)	Proposed hatching house at Chicago Lakes near Georgetown	1880?	?	Georgetown Miner 10/16/1880, p. 2; also 7/9/1881, p. 2. See also Field and Farm 2/15/1890, p. 7 and 3/22/1890, p. 7.
J. M. Gummey	Lake San Cristobal (could have had hatchery since he stocked salmon & Michigan whitefish)	before 1881	?	Crofutt's Grip Sac Guide to Colorado for 1881, pp. 115-116.
	Gunnison River	1883?	50,000?	Forest and Stream 5/1/1884, pp. 269-270.
J. D. Babcock	Troutdale Resort in the Bear Creek drainage above Morrison	1884?	?	Tribune-Republican 1/12/1885, p. 4.

Owner(s)	Location	Year constructed	Capacity	References
Charles Sweigart	Washington Springs, East Denver (near Grant's smelter)	1884?	100,000?	Tribune-Republican 1/1/1885, p. 10; Field and Farm 1/23/1886, p. 3
(E.V.) Bogart and (W.E.) Sisty	Central Park, Denver	1884?	200,000?	Tribune-Republican 1/1/1885, p. 10; Field and Farm 1/23/1886, p. 3
The Cleveland Cattle Company	Buffalo Springs, in the South Park (not known if hatchery was used)	1884?		Tribune-Republican 1/1/1885, p. 10
General John Pierce	Denver (?). Owned 4 hatcheries 1--Lake Archer Fish Co. in Denver	1886?	200,000	U.S. Fish Comm. Report for 1885, p. XXVI; Field and Farm 1/23/1886, p. 3; 1/30/1886, p. 11; 1/4/1890, p. 7; 1/23/1892, p. 7.
Sheriff Becker	Fish Ranch at head of Tennessee Park (unknown if hatchery used)			Rocky Mountain News 3/18/1885, p. 6, col. 2; Forest and Stream 4/2/1885, p. 189.
Peter Becker	Lake County?	1886?		Field and Farm 2/13/1886, p. 9.
	Chalk Creek, Chaffee Co. 2 mi. from Nathrop (may have been obtained from Gordon Land)	1886&1887	200,000 also 51 ponds	Field and Farm 3/19/1887, p. 3.
Patrick Brothers (Wash and Levi)	Pine River drainage, LaPlata Co. (Wits End Hatchery)	1885		Field and Farm 12/15/1888, p. 7; Bull. U.S. Fish Comm. 1889 9:25-26; E.F. Patrick, pers. commun.
Orlando Metcalf	Manitou Park, El Paso Co. (hatchery likely)	1889?		Field and Farm 1/26/1889, p. 7
W. S. Kincaid or C. Lerchen	Trout hatchery in Denver for sale	1889? (could have been as early as 1881)		Field and Farm 7/20/1889, p. 12 was operating in 1888, see Report of State Fish Comm. of Colo. for 1888, p. 22; see Report Colo. Fish Comm. 1889-90, p.4
Mr. Cuenin	Cochetope, Gunnison Co.	1884?		Rocky Mountain News 3/10/1884, p. 8, col. 3.
R. H. Duckett	Cochetope, Gunnison Co.	1889?		Field and Farm 8/31/1889, p. 7.
Duckett was also managing state hatchery at Gunninson	Cuenin, on Cochetope	1891?	at least 1,000,000	Field and Farm, 2/28/1891, p. 7; see also 10/31/1891, p. 7. Sold to Judge McIntire
Dr. John Law and Ex. Gov. James B. Grant	Close to Evergreen Lakes near Leadville	Before 1889	?	Forest and Stream 5/9/1889, p. 322; Frank Hall's History of Lake County 1891, 111:437-438; Bull. U.S. Fish Comm. for 1889, 9:13; Report of the State Fish Comm. of Colo. for 1888, pp.5-6; and State Biennial for 1890, p. 9
General A. H. Jones	Lakeside Ranch at Black Lake, Summit Co. (Blue River system)	1890?	300,000	Field and Farm 1/4/1890, p. 7 and 7/4/1891, p. 7.
	Aspen Hatchery or Pitkin Co. Likely Hallam Lake Hatchery on Roaring Fork near Aspen.	1890?	at least 150,000	Field and Farm 1/25/1890, p. 7 and 5/2/1891, p. 4.
	Saguache County	1891?	?	Field and Farm 1/31/1891, p. 7; 3/14/1891, p. 7; and 5/9/1891, p. 7
Joseph Richardson	Saguache County	1891?	?	Field and Farm 1/31/1891, p. 7; 3/14/1891, p. 7; and 5/9/1891, p. 7.
Lou Hartman	Gunnison	1891?	at least 9,000	Field and Farm 2/28/1891, p. 7 and 10/18/1890, p. 7
Mr. Hetzer and others	Hetzer's Lake in Grand Co. at head of Muddy (branch used by state)	1891?	at least 200,000	Field and Farm 7/4/1891, p. 7; 9/5/1891, p. 7
Weiss and Richardson	Arranged for constructing hatchery near Creede camp in Rio Grande Co.	1891	?	Field and Farm 8/22/1891, p. 12
William White	Old "fish farm" in Bergen Park, El Paso Co. (probably Bell's facility)	1891	?	Field and Farm 8/22/1891, p. 12; see also Frank Hall's History of El Paso Co., 1891, Vol. III, p. 380.
Mrs. Catherine A McCann	LeVeta	1892?	?	Field and Farm 1/2/1892, p. 7
Harper P. Orahood	Procured Lake Archer Co. of Gen. Pierce	1892?	?	Field and Farm 1/23/1892, p. 7
	Wellington Lake Hatchery near Buffalo	1892?	?	Forest and Stream 2/11/1892, p. 129; also Sports Afield Jan. 1892, p. 56 and April 1893, p. 58

Owner(s)	Location	Year constructed	Capacity	References
W. R. Callicotte	Aspen	1893?		State Bienniel 1893-94, p. 13
H. M. Harbison	Hatchery near Union Stockyards in Denver	1893?		Field and Farm 3/11/1893, p. 5
	Carlton Lake, 4 mi. from Grand Lake	1894?	?	Field and Farm 2/3/1894, p. 10
James B. Knoblock	Private hatchery to be built at Carbondale, Garfield County	1893	?	Field and Farm 7/15/1893, p. 10 possibly also 4/21/1894, p. 7 (E. H. Grubb)
Denver Professional men (fishing club)	Hatchery planned near Kezar on the Gunnison River	1893?	?	Field and Farm 8/5/1893, p. 7; Gunnison Tribune 6/17/1893
J.H. and T. Henderson	Near Rockwood, about 25 mi. from Durango, La Plata County	1894	250,000?	Field and Farm 2/3/1894, p. 10
Senator Teller	Gilpin County	1894?	?	Field and Farm 11/3/1894, p. 7
O. H. Maryatt	Rio Grande County	1895?		Field and Farm 11/2/1895, p. 6
Lord Dunraven's agent (Theo. White)	Estes Park	1896?		Field and Farm 8/15/1896, p. 7; 5/2/1903, p. 5; 10/21/1905, p. 6
W. T. Kirkpatrick	Durango area	1899?		Field and Farm 8/5/1899, p. 7; Rocky Mountain News 8/24/1899, p. 6
	Emerald Lakes	1895?	about 400,000	State Biennial for 1897-98, pp. 45-46; also Biennial of 1899-1900, p. 21. Rocky Mtn. News 8/13/1899, p.20
	Emerald Lakes	1903?		Field and Farm 6/13/1903, p. 5; 6/16/1917, p. 5
William Alexander and Richard Forrest	Alexander Lake on Grand Mesa	between 1891 & 1895		Colo. Mag., Vol. V, No. 5, pp. 163-164; Field and Farm 7/15/1891, p. 12 (no hatchery there) and fi7471892, p. 7 (talk of branch hatchery)
Sold to: William Radcliffe	Alexander L. and Island L. on Grand •Mesa (commonly called Grand Mesa Lakes)	1895?	1,000,000 (2 hatcheries by 1901, with capacity of 2,840,000)	Colo. Mag. Vol. 23, No. 1, pp. 34-35; Field and Farm 5/8/1897, p. 8; 11/23/1901, p. 8; Denver Times 8/11/1899, p. 6; Biennial Report of State Game and Fish Commissioner for 1899-1900, p. 20. Senate Doc. 271, 1903-04, p. 6.
G. D. Bird	Gunnison	1899?	?	Gunnison Tribune 5/5/1899
Sold to: Sam Duckett and J. A. Tain	N of State Fish Hatchery in Gunnison (facility was being enlarged)	1904		Gunnison Tribune 1/8/1904
Albert Jeffers	Near mouth Beaver Creek W of Gunnison	1900	At least 150,000	Gunnison News 5/18/1900; 6/8/1900; 11/30/1900
Sold to: Mr. Proboscoe	Gunnison	1903	At least 150,000	Gunnison News-Champion 12/18/1903
Scott E. Land (brother of Gordon Land)	Weld County	1903	?	Gunnison News-Champion 4/10/1903 (S.E. Land became State Hatchery Superintendent at the State Gunnison Hatchery)
	Pitkin Springs	1906	18 x 32 12 ft high 1,000,000 yearly	Gunnison News-Champion 5/11/1906
Sold to (?): R. L. McKnight	Near Pitkin	1912	2,000,000	Biennial Report of State Game and Fish Commission for 1911-12, p. 18
H. A. Decker	Crested Butte	1903?	450,000	Gunnison News-Champion 10/30/1903; 12/11/1903 and Gunnison Republican 12/13/1903
F. W. Crossley & William Harris of Cripple Creek and T. C. Smith and D. W. Smith of Routt County		1906		Field and Farm 12/15/1906, p. 8
	Marvine Lodge on Marvine Creek in Rio Blanco County	1908?		Biennial Report of State Game and Fish Comm. for 1907-08 p. 32; also Biennial for 1911-12, p. 18
Estes Park Protective and Improvement Assoc.(?), Estes Park, Larimer County		1907		Photo Denver Public Library; State Biennial for 1907-08 p. 32; also Bienniel for 1911-12, p. 18
Bert Hosselkus	Lost Lakes in Mineral Co. near head of Clear Creek-Rio Grande drainage	1914?	8,000,000	Field and Farm 10/24/1914, p. 8; 8/31/1918, p. 8

APPENDIX B

SOME OF COLORADO'S EARLY FISH CULTURISTS AND THEIR HATCHERY FACILITIES

I have collected items and articles over the years, which I consider classic to the history of Colorado's fish culture, and they are reproduced verbatim in most cases. I chronologically oriented the material by hatchery facility, but I was unable to pinpoint dates for the establishment of the Bell, Baker, and Cushman facilities, which probably were among Colorado's earliest fish hatchery facilities. The Broadwell facility appears to have been the first one.

I included some historical material on facilities and lives of several of these men, primarily because of their relationships with other culturists, the availability of materials, and to add "life" to listings in Appendix A.

The reader is warned that the frequent use of the name Salmo virginalis for Colorado native trout in some of the Bell and Land items is taxonomically incorrect since only the greenback trout (Salmo clarki stomias) and yellowfin trout (Salmo clarki macdonaldi) of Colorado's native trouts were known to be present in most of the waters they discussed.

JAMES BROADWELL FACILITY ON THE SOUTH PLATTE RIVER

From Denver RMN (1873 Jan 19:4 c 3):

Trout Breeding

Yesterday Mr. James M. Broadwell [Fig. B-1] received twenty thousand trout spawn which he purposes hatching, at his beds, when the minnows will be transferred to his ponds down the Platte, where he already has a large number of fish. These eggs were procured of Mr. A. Palmer, of Boscobel, Wisconsin. They were received in twenty cans, containing one thousand each, and neatly packed in damp moss. The entire lot was then enclosed in a large box filled with damp sawdust. In this manner the eggs were brought through in excellent condition.[*]

Mr. Broadwell is devoting much time and attention to this business of fish breeding and has an excellent locality about nine miles from Denver. Three years ago he procured a hundred trout from the mountains and a quantity of other common fish, and they were all placed together in a pond and no special care taken of them. These fish multiplied greatly and grew to large size. A year ago last fall he ordered ten thousand trout eggs from Mr. Palmer, and they were placed in the hatching beds and successfully hatched. These were afterwards transferred to the ponds, and Mr. Broadwell has now a very large number of the finny tribe. He now proposes to enlarge his plans for fish propagation. The hatching apparatus is very simple, consisting of a plank trough sixteen feet long, eighteen inches wide and six inches deep, set at a gentle incline. The bottom is lined with about two inches of coarse, clean gravel, through and over which flows a streaM of water four inches deep. The house is constructed of common boards, and is only intended for a temporary shelter. The young fish are fed with thickened milk, boiled eggs grated fine, and boiled liver. The older ones have a diet of raw liver and raw beef. Trout farming will ultimately become a prominent interest in the territory.

From Denver RMN (1873 Mar 5:4 c 1):

Eighteen thousand of the twenty thousand fish eggs received a few weeks since by J. M. Broadwell, esq. have hatched during the past week, and the little fish are doing "as well as could be expected" under the circumstances.

From Denver RMN (1873 Mar 22:4 c 1):

Alderman Broadwell received some time ago twenty thousand trout eggs, of which about ninety per cent were hatched in his ponds a few miles north of town. The young fish seemed to diminish rapidly in numbers, and the reason could not be guessed until yesterday, when it was discovered that muskrats were eating them up. All have been destroyed except two or three hundred. Mr. Broadwell will at once order more spawn.

The hatching apparatus and house mentioned above is the earliest documentation of a fish hatchery in Colorado that I have found. Furthermore, the trout eggs hatched by Broadwell in 1872, and obtained from Boscobel, Wisc., must have been eastern brook trout (Savelinus fontinalis) making it the first successful introduction of the species into Colo.

From U.S. Fish Comm. Rep. for 1884:666:

Statement of J. M. Broadwell, Denver, Arapahoe Co., Aug. 29, 1883.

DISPOSITION OF CARP RECEIVED. - Three years ago this summer I received 5 mirror carp and 10 scale carp through W. E. Sistey. I at first kept them in a pond which was fed by an abundance of cold spring water from the bottom, and had an average temperature of about 50 . This spring I made a pond about 300 by 500 feet large, and about 3 feet in its deepest part, with warmer water and a muddy bottom, to which I removed the fish.

PLANTS. - The first pond contained but little vegetation, but in the new one there are many kinds of plants, moss, and tule (or bulrush, Scripus lacustris L.), and other grasses.

ENEMIES. - There are no other fish in the pond, but some frogs.

FOOD. - I only feed them the offal from trout ponds, which is liver, lights, etc.

GROWTH. - When I moved them this spring the largest ones weighed 4 pounds and the smallest ones 2 pounds. There were 14 of the original fish left. The mirror carp were much the largest. There were but 5 young ones then, and they all seemed to be of the scale kind. They were about 6 inches long in April. I think they are doing very well since changed to the new pond, and the largest fish will weigh 6 pounds now.

[*] Of 5 fish culturists in Wisconsin with hatchery experience prior to 1873, Mr. Alfred Palmer was the earliest, dating from 1864. He was the only culturist from Boscobel who had hatchery experience (U.S. Fish Comm. Bull. for 1882: 435-436).

Fig. B-1. JAMES BROADWELL was born in Illinois in 1827 and migrated west, arriving in Denver early in 1859 with a small stock of dry goods and groceries. He also had $11,000 in gold coin in a buckskin bag. He stayed at a log house at 14th and Larimer streets, but later that year, moved to land that was to become known as the "Broadwell ranch" or "rancho." This land was desirable because of its fine supply of spring water. It was on the South Platte River about a mile below where the State of Colorado established its first fish hatchery in 1881, near Henderson.[2]

Shortly after arriving in Denver, Broadwell purchased 30-40 yoke of oxen from discouraged settlers. He put the ox-teams on the road hauling lumber and timbers to build Denver's first two-story frame hotel, the "Broadwell House," at the corner of 16th and Larimer. Its doors were opened on Christmas Day, 1859, and it was the premier hotel of the town, being furnished with goods and furniture obtained in St. Louis. Many early settlers obtained their first meal in Denver at this hotel, and it was also here that Horace Greeley and party stayed before they established the Greeley colony. Many important meetings were held at the Broadwell House, including those that resulted in the "Fish Breeders Association." Adjoining the Broadwell House, Mr. Broadwell also built the Broadwell Block, which contained a clothing company, which he operated for many years.

In 1865, Mr. Broadwell acted as coroner for Denver. During 1872-73 he was an alderman and also was Denver's mayor, along with being the vice president of the "Old-timers Club" of Denver. Besides his significant trout-culture credits, which included the earliest known successful introduction of brook trout into Colorado in 1872 and being the instigator in the formation of the Fish Breeders Association during 1874, he bred and raised some of the finest thoroughbred horses that were produced in Colorado before the turn of the century. Broadwell probably was better known for his breeding of horses than his fish endeavors, but he continued to expound the economic value of fish culture to Colorado through Denver's Field and Farm newspaper in the late 1880's. During the 1890's, Broadwell leased part of his fish-breeding facilities to the State of Colorado for their use. He died April 17, 1900 at the age of 73. (Photo courtesy Colorado Historical Society)

REPRODUCTION. - They did not thrive in the cold water: the young seemed to hatch, but did not live. Now at the present time there are or seem to be a great many young from 1 to 4 inches long.

DIFFICULTIES. - The only difficulty was that cold water.

From FF (1887 A[illegible] 16:5):

Farmer James M. Broadwell. - The most profitable products of my farm are the speckled trout. After the first outlay in reservoirs and appliances, the fish yield ninety per cent, in profit, and they always sell quickly at long prices. Fish culture is profitable and quite interesting.

From FF (1891 Nov 21 :7) :

An addition to the state fish hatchery below Denver has recently been in course of construction and is now nearly completed. It is located on the Broadwell farm just below and adjoining the present site. It will be a duplicate, so far as capacity is concerned, of the original plant and increase the possibilities in incubating trout over a half million fry. In erecting the annexes on the Broadwell property the state secures the best water supply from live springs obtainable near Denver. The conditions of the lease are such that the state shall supply Broadwell with 25,000 fry a year for the use of the waters, and at the expiration of the lease, leave the buildings erected as the property of Mr. Broadwell. The lease covers a period of several years and the arrangement is of great advantage to the state, as it augments the value of the hatchery one hundred per cent, and gives state Fish Commissioner Land an opportunity to extend his work for the benefit of the people with very little cost to the state.

DR. W. A. BELL FACILITY AT MANITOU PARK

F[illegible] T[illegible] D[illegible] T[illegible] (1875 J[illegible] 19:4 [illegible] 4):

Manitou Park . . .

. . . Trout fishing and Fish Culture

The trout streams which traverse the estate have for some time been carefully preserved and are now full of fish which are in season for the angler from July 1st to April 1st, the spawning season for the native trout in the park being from the middle of April until the end of May. The hatching house and fish ponds are worthy of a visit. Here 100,000 eggs of the Eastern trout were hatched last winter, and the young may be seen in their nurseries, whilst many thousand eggs in their native varieties are visible in all stages of incubation.

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[2] The Henderson area, because of its many fine copious springs, was greatly used for raising trout. Besides the state's "Denver Hatchery," private trout growers in this area during the early 1940's included: "Burns & Hutchings Trout Farm," then managed by Harry G. Burns; Gordon C. Hutching's"Trout Haven, R.F.D. No. 1"; Roy E. Clark's "Trout Creek Farm"; and Charles L. Kinney's "Kinney Trout Farm" (Private Fish Sources Colorado Conservation Comments 1944 Mar 7[1]:22). Later, problems arose that terminated most of these facilities. The nemeses of trout growers, industrial expansion and residential encroachment, transpired. Contaminants from manufacturing plants, particularly the oil refineries, affected the quality of the water needed for hatching and rearing trout. Furthermore, water pumping to supply the almost ever-expanding numbers of inhabitants with domestic water lowered the water table in the area, and greatly reduced the volumes of these springs necessary for trout rearing. Production at the state's "Denver Hatchery" declined from nearly 10 tons in 1957 to less than one ton in 1965, and fish rearing consequently was terminated in 1967. Though not absolutely certain, I think that "Hutchings Trout Farm," operated by Gordon and Bob Hutchings until the late 1970's, was located on the old "Broadwell Ranch."

From Denver RMN (1875 Aug 20:4 c 2) and Rod and Gun (1875 Aug 28:348):

Prof. Hayden speaks with great enthusiasm of his recent trip to Manitou Park, He started from Manitou under the guidance of Dr. W, A. Bell, the owner of the park, and after a ride of twenty miles over the Ute Pass, came to one of the most beautiful summering places in Colorado. The park is located nearly opposite the Divide, near the head of Monument creek, on the west side of the front range of mountains. Trout creek runs for twelve miles through the middle of the park, while a low range of hills, covered with pines, rises on either side, and far beyond are other mountains, with an elevation of 11,000 or 12,000 feet. The scenery is extremely picturesque and attractive to the visitor. Dr. Bell has secured about 10,000 acres of land in this lovely region, and he intends to make it a pleasant resort for tourists and pleasure seekers generally. Stages run from Manitou to the park three or four times a week. Numerous convenient buildings have already been erected for the accommodation of visitors, and a fine livery stable is attached for their benefit. In this park Dr. Bell has started one of the most important enterprises in the Territory. The little stream which runs through the middle of the park is peculiarly adapted for the raising of trout. Near the stream a remarkably fine large spring gushes out from beneath a ledge of limestone, with a temperature of 58 degrees. This spring keeps the creek free from ice for a distance of two miles during the winter. Here Dr. Bell has established his hatching apparatus and nurseries for the young fish. In January last Dr. Bell obtained of Seth Green, of New York, 100,000 eggs of the common brook trout of the East, and in February all but about 12,000 of the eggs produced young fish.

Hatching young fish is a very delicate operation. The success depends chiefly on the spring being protected from freshets. The water must be absolutely free from dirt. First, there are tin trays, about eighteen inches square, with a perforated false bottom. On this bottom black beads are placed, on which the white eggs rest. They must not touch each other, The water comes direct from the spring through a succession of filter boxes, and passes up through the false bottom, leaving all sediment behind, and flows from one tray of eggs to another. Each tray holds 5,000 eggs. The condition of the eggs is determined by the color. All bad eggs are removed every day with a bulb syringe. After they are hatched, the little fish are kept for a fortnight in trays, feeding on the contents of their umbilical sacs. They are then transferred to nursery No. 1, in long troughs lined with gravel, and fed with drops of cream. In six weeks they are transferred to outside nurseries. When ten months old they are supposed to be able to take care of themselves, and not be eaten by the larger fish. They are then let out into the main stream. The stream is prepared by the construction of a series of dams and riffles, thus forming ponds. Beavers are encouraged to remain in the park, and several of the dams were made by them and are now kept in repair by them. There are about a dozen of these dams within the space of four miles. The shade of willows is very important, and the succession of dams produces ponds of standing water, in which much vegetation grows, thus increasing the amount of animal life on which the fish feed. The native trout spawn from March until the end of July, depending mainly on the temperature of the water. The colder the water and the higher the altitude, the later the spawning season. At Manitou Park, which is 7,300 feet elevation, the fish spawn in May, very few spawning after the middle of June. It will be readily seen that this is one of the most important enterprises for the benefit of our people in Colorado. Suppose 70,000 of the young fish reach the age of two years, and weigh half a pound each, there will then be in Dr. Bell's fish preserve 35,000 pounds of fine trout ready for the market. Dr. Bell has purchased the little lake on the Divide, and intends to turn Monument Creek into it, and transfer the fish from the park to it in quantities.

The breeding of fish for food is becoming one of the most important industries of the day. Prof. Baird, of Washington, has been appointed United States Commissioner of Fisheries, and his valuable labors for several years past are well known. Local commissioners have been appointed in nearly every State in the Union, who co-operate with the United States Commissioner. Should there not be one appointed for Colorado?

From Tribune-Republican (1885 Jan 1:10):

....Among those who have been successful in the business of raising fish in Colorado may be mentioned the following:

...,Dr. Bell, Manitou Park, established in 1874, with 100,000 trout....

INTRODUCTION OF BROOK TROUT INTO COLORADO

An explanation for introduction of brook trout into Colorado was given in an undated letter, likely written by Bell in 1882 or 1883 (Bull. U.S. Fish Comm. 1887, pp 38-39):

ROCKY MOUNTAIN TROUT AND BROOK TROUT IN COLORADO. I have lived in Colorado ten years and have noticed the common trout of that country (Salmo virginalis, I believe) almost disappear from all streams in or near the settlements. I believe that the eastern brook trout (Salvelinus fontinalis) would do better,[^] and I have expended over $5,000 in its introduction. The weak points in the Rocky Mountain trout are these:

(1) It spawns between May and August, and is therefore out of season in the summer time, when visitors come to the mountains expecting sport and pleasure.

(2) The eggs are deposited during the most dangerous time of year for their safety, and freshets from the sudden melting of snow rip up the spawning beds and destroy the eggs in vast numbers.

(3) The fish is so easily caught, it is so unwary and confiding, that the fish in a moderate-sized stream can be taken out in one season with a hook and line and a grasshopper. Without the modern hereditary instincts of self-preservation, apparently, it cannot hold its own against the fisherman.

(4) It is a poor table-fish at best.

In contrast to these, the brook trout has the following strong points:

(1) It spawns between November and February, and is in season in summer, when most desired.

(2) The eggs are deposited at the time of year when freshets are unknown, when the spawning beds are protected by surface ice, and the eggs are placed out of danger.

(3) The fontinalis is very wary, and has learned for generations to look out for pins and fish-hooks, so that it generally requires some skill to catch this species.

(4) It is a much better table-fish than the Rocky Mountain trout.

My fish ponds are at Manitou Park, 25 miles northwest of Manitou, up the Ute Pass, where I have a large hatching house by a very fine spring, several ponds, an artificial lake of 30 acres, and 12 miles

[^] The species had earlier been introduced by J. M. Broadwell.

of trout stream, formerly famous for the western trout, but quite denuded of them when I commenced to perserve.

Two years in succession, 1874 and 1875. I got 100,000 eggs of the fontinalis from Seth Green, and hatched them without difficulty. After that we had our own fish to spawn, and have spawned them each winter. The streams running through the park are now well stocked with fontinalis, and also the lake, which is situated at the lower end of the stream I preserve. They live at peace with the western fish, and don't fight with them even when confined in small ponds. They are quite healthy. In watching both kinds together you always find the fontinalis below and the virginalis above, each kind keeping together and not mixing it up. (William A. Bell, Colorado Springs, Colo.)[4]

BELL'S ASSOCIATION WITH GORDON LAND

From Denver RMN (1875 Nov 10:2 c 2) and/or Greeley Tribune (1875 Nov 17, 6[262]):

SOUTH ARKANSAS, LAKE COUNTY, COLO., November 1, 1875.--Fifteen miles this side of Fairplay we encountered the first object of note, Buffalo Springs. From fissures in the deep, black soil, half a dozen or more streams are thrown into a circular pool with great force and beauty. The amount of water discharged by the cluster combined is 312 inches, and the crystal stream that goes meandering down through a broad meadow and joins the Platte, would furnish ample power for an ordinary mill. Here we found Gordon Land, the noted pisciculturist, just nicely started in the business of trout breeding. He has commenced with 2,500 native trout taken from the Platte, and is daily adding to the number. Although he has made but little show as yet in the stay of improvements, the plan embraces the construction of a fish breeding establishment second to none in the Territory. The temperature of the water, 44°, Mr. Land says, comes nearer the exact range wished than any east of the mountains, and as the great flow prevents all possibility of freezing, he has found his ideal of a place for this interesting occupation. This gentleman, it will *be* remembered, stocked the Manitou waters with 100,000 Eastern trout, last year, and has for some time been identified with similar enterprises at Denver and elsewhere in Colorado. The springs and magnificant ranch surrounding are the property of Mr. George H. Green, a prominent stockman of this section.

In SA (1897 Jul 19[1]:38), William R. Scott, an early fish culturist from the Bear Creek-Morrison area, discussed the various varieties of fish found in Colorado:

...those indigenous to the country are Mykiss, Spilurus, Virginalis, herring and sucker; the herring (Coregonus Williamsoni) being found in the Yampa (Bear River) and its tributaries, while the others were found in all waters except in the streams of the North Park region, where there were no fish found 20 years ago except the sucker. Salvelinus Fontinalis was first introduced from New York in 1874, I think by Land, late Fish Commissioner. It is probably the best known and most admired of all the fishes in Colorado to-day, and if any man says anything derogatory to its character he is sure to have a contention on his hands...

Scott's earlier derogatory opinion of the eastern brook trout (SA 1890 Jan 2, 4[1]:809) appears to contrast almost point for point Dr. Bell's "weak points" of the Rocky Mountain trout given previously.

The description that follows may have been part of the Bell facility or a different facility altogether (Chicago Field 1876 Apr 1, 5[7]: 108):

FISH CULTURE.--At Pionion Springs Fish Ranch, situated at the head of the famous Trout Creek, Colorado, the business of fish culture has been commenced with a view to raise mountain trout for the table. The object of the managers is to confine themselves exclusively to the rearing of trout, and every variety to be found in these mountains will be sought after, and, if possible, made to contribute to the attractions of the place, as will also the brook trout of the East, there being now on hand some 5,000 fry of that superb fish, the survivors of a lot of 25,000 spawn shipped here last month from Boscobel, Wisconsin. The loose manner in which they were packed, and the extremely rough usage on the way, were the causes of this great mortality.

The natural advantages afforded by this beautiful stream are in every way adapted to the culture of mountain trout. With what nature has done and art can do, the best results may be looked for. From the superabundance of insect life with which the stream abounds, little or no feeding of the fish will be required until the numbers shall crowd the hundreds of thousands, or their weight be rated by the ton.

From Robert Watson (The Pikes Peak Pioneers 100 Years or Who's Got the Corner Stone? 1971 Lithographic Press, Colo. Springs, pp 68-70):

Ward (Ward Moorhouse of New York Times) visited me at our fish hatchery and resort, Rainbow Falls Park, (Bergun's Park) located ten miles north of Woodland Park, Colorado. My wife, Neva and I had moved up from Colorado Springs in 1953 and purchased the old, famous resort and were hatching "rainbows" when he wished to do an article on the two of us. He was a very talkative and active plump gentleman who moved about like a large uneven rolling stone that couldn't decide where to settle_ As we moved from

"Seth Green and A. S. Collins, early noted pisciculturists from Rochester, N.Y., mentioned in an article (Brook Trout Culture Department of Agriculture Rep. for 1872 [p 2531): "Some eight years ago, we believe, Seth Green's was the only establishment in the United States making a business of raising and selling fish stock. Now there are about a dozen widely-known farms, and some hundreds of smaller ones which have attained only a local reputation. Of these establishments, Pennsylvania has the most in number, although not the largest, Massachusetts is probably next, while New York boasts the largest and most complete... There is scarcely a State in the Union into which of late years we have not sent trout fry or eggs." The Denver Tribune-Republican (1885 Jan 12:4 c 2) unsuccessfully endorsed for Colorado Fish Commissioner, Mr. J. D. Babcock, formerly of Golden and a nephew of Seth Green, who was operating a private hatchery at his home in Troutdale and who was said to have been a student of fish propagation for years. Troutdale, a resort opened in 1882, was located in the mountains above Bear Creek and could be approached from Morrison by rail and stage (RMN 1882 Jul 16:5 c 1). It was just 10 miles from Beaver Brook Station on Bear Creek with 30 log cottages (American Angler 1885 Jan 17, 7[3]:41). The Tribune-Republican item said of Mr. Babcock's hatchery that it was hardly second in importance to the State Hatchery (Denver) and referred to Seth Green as "the father of the science of fish propagation." Actually, it was Theodatus Garlick who first artificially bred the brook trout in Ohio early in 1854 that correctly deserved the title "The father of American fish culture" (FS 1881 Dec 8, 17[19]:364).

lake to lake and from hatchery trough to rearing ponds, he scratched on a pad now and then. In a few days emerged the story he called "How a Trout Ranch Operates" (Colorado Springs Free Press Sunday Review May 1, 1955). We took to each other in quite a fashion. I have not heard from him in years and I miss him, as I am certain the whole Pike's Peak region does.

About a week after his nice display and story about Neva and myself and our resort, much ado about the publicity was felt by us in many ways. You will *see* why I am inserting the story. (See page 87). Some of the response was from an elderly gentleman in Arizona who said that in the spring of 1871 he supervised the hatchery for the first time. He said he "raised speckled beauties for General Palmer at the hatchery that we had newly purchased."

....As the tours and years passed by, the spring of 1871, the year the hatchery started, was imbedded in my speeches...

From Colorado Springs Directory, 1984 (p 368):

Rainbow Falls Park (Hatchery)
Established 1871 3rd oldest hatchery in U.S.[5]
687-9074 Tours
North of Woodland Park

Other than the above questionable recollection from an Arizona gentleman estimated at over 100 years old (1955 - 1871 = 84 plus his age in 1871), I found no evidence that a fish hatchery was operating in Manitou Park before 1874. None of the other documents that I have presented even suggest that Bell was operating a hatchery before 1874. A photo (Fig. B-2) of the interior of a Manitou Park fish hatchery has been dated between 1874 and late 1878, based on information available on the photographer. Dr. Bell himself reported to the U.S. Fish Comm. that his interest in fish began in 1874, so it would be highly improbable that he built and operated a fish hatchery before he had an interest in fish. If there was a hatchery operating in Manitou before 1874, apparently it was built and operated by someone other than William A. Bell. However, Dr. Bell owned most of the land adjacent to Trout Creek in Manitou Park by 1874, including existing facilities, and I cannot understand why he found it necessary to spend $5,000 importing 200,000 brook trout eggs during 1874 and 1875 unless he had considerable capital outlay in hatchery building construction and equipment. The eggs, including transportation from Seth Green's in New York, should not have cost even $1,000 at this time.

Fig. B-2. Interior of MANITOU PARK TROUT HATCHERY between 1874 and 1878. (Thurlow photo courtesy Special Collections, The Colorado College Library)

[5] The Bull. U.S. Fish Comm. 1882 suggests more than 50 privately-owned fish hatcheries were operating in the U.S. before 1872.

THE MAN, HIS ASSOCIATES, AND FATE OF MANITOU PARK

Dr. William Abraham Bell (Fig. B-3) was one of the founders of the Denver and Rio Grande Railroad, pioneer of Colorado, and closely associated with much of the state's early history. He was born in Clonmel County, Tipperary, Ireland, April 26, 1841, the son of William Bell, a London physician. Following his father in the medical profession, he attended school at the University of Cambridge, where he graduated in arts with first-class honors in natural science tripos, and received his M.A. degree in 1863. After completing the usual course of medical studies at the London Hospital, he received his medical degree from the University of Cambridge in 1864 and in the winter of 1866-67, visited the U.S. for the first time on a recreation tour. In the spring of 1867, through the influence of Philadelphia friends, he became the physician for the Kansas Pacific Railway Surveys, which were organized under the protection of the U.S. government and led by General W. J. Palmer to determine the best route for a southern transcontinental railway. It was during this time of western travel and exploration that General Palmer and Dr. Bell became friends. They remained lifetime friends and close business associates.

Fig. B-3. DR. WILLIAM A. BELL (1841-1921) operated an early hatchery in Manitou Park. (Photo courtesy Denver Public Library, Western History Department)

After returning to England at the close of the expedition in 1868, Dr. Bell practiced medicine in London and authored New Tracks in North America, a large volume describing the Kansas Pacific Survey, published in 1869. He again joined General Palmer in Colo. for a 6-week trip in the summer of 1869. During the summer of 1870, Dr. Bell made his third trip to Colo. and that fall took the first step towards inaugurating the great system of narrow gauge railways throughout the Rocky Mountains by incorporating the Denver and Rio Grande Railway Companies. Under General Palmer and in association with Col. D. C. Dodge and others, Dr. Bell helped found and construct this railroad and served as vice-president for many years.

Dr. Bell became a large landowner almost immediately upon his settlement in Colorado. About 1872, he became interested in Bergen Park, the area just north of present-day Woodland Park, and began to accumulate holdings there.[b] He bought out several of the early homesteaders including Messrs. Ryan, Drury, Christ, Garstin, Montague, and Bergen. Bergen was the first homesteader who settled in 1861 on a site a short distance northwest of the mouth of Missouri Gulch and apparently after whom the area was named. There was no connection between this Bergen Park and the Bergen Park near Evergreen, which was named for Thomas C. Bergen who was an early fish culturist in the Morrison area.

By 1873, Bell had completed a large hotel (Fig. B-4) in the park, which he called the Manitou Park Hotel (can be seen on Hayden's 1873 map of Colo.) and apparently changed the name of Bergen Park to Manitou Park to make the area more attractive and appealing to the People of Manitou Springs and Colorado Springs. Although Dr. Bell visited Manitou Park frequently and had a cottage of his own near the hotel, his primary Colo. residency was an elegant home at 404 Manitou Ave. in Manitou Springs, which he called "Briarhurst" (Fig. B-5). During the winter of 1872-73, Dr. and Mrs. Bell lived at the "Manitou House" while their own home was being built. Briarhurst was destroyed by fire early in 1886 (RMN 1886 Jan 9:1 c 4).

Dr. Bell was instrumental in the founding of the resort at the springs of Manitou as representative of the Colorado Springs Company. He also owned two of the finest hotels in Manitou Springs and was involved with the construction of the Antlers Hotel in Colorado Springs. Before the end of 1875, he had acquired the entire 10,000-acre Manitou Park estate and by 1881 a farm of 2,000 acres in the Wet Mountain Valley opposite Westcliffe--a farm that probably had no equal in the state. He was part owner and trustee of two patented land grants in New Mexico containing 95,000 and 413,000 acres and at one time (1891) was president of the Trinchera Estate Co. (Colo. Farmer 1891 Aug 20:5). He was also involved with the founding and development of Alamosa, Manitou Springs, and Durango.

Fig. B-4. BELL'S MANITOU PARK HOTEL was originally built in 1873, but Bell accidentally burned it down in 1887 (Frank Hall 1891 History of the State of Colorado 3:380). A larger hotel was built in 1889 at a cost of $50,000, but fire destroyed it too in 1899 (RMN 1899 May 14:1 c 5). (Photo dated Aug. 3, 1887, Courtesy Denver Public Library, Western History Department)

Courtesy Special Collections, The Colo. College Library

Courtesy Denver Public Library, Western History Dep.

Fig. B-5. BRIARHURST (above) was destroyed by fire. The new one (below) was a 23-room Tudor country manor designed by Frederick Julius Sterner and built with native orange "peachblow" sandstone from the Fryingpan River valley on West Slope (Colo. Spring SUN 1972 Jul 9:8A).

[6] Letters of Rose Kingsley (mentioned in Robert Watson's book) suggested that Bell already owned land in Manitou Park in 1871.

From 1870 to 1877, financial matters connected with the railway company and with the establishment of the Colo. Central Improvement Co. obliged Bell to spend much of his time in Europe. His English clients furnished about half the capital to establish this company, which evolved into the Colo. Coal and Iron Co. by late 1880 and later into today's huge Colo. Fuel and Iron Corp. Obviously, Dr. Bell himself did not build a fish hatchery, pick dead fish eggs from the trays in his Manitou Park Hatchery, nor manage the hotel and resort business as well as a lumbering venture that he began about 1880. He must have had experts construct these facilities and managers see that his ventures ran smoothly.

I believe that Dr. Bell employed Gordon Land, an early noted pisciculturist in Colo., to build his fish facility initially because a reporter gave Land credit for stocking the Manitou waters with brook trout in 1874 (RMN 1875 Nov 10:2 c 2). It is likely that Francis Cholmondeley Thornton, "Chumley", a Cambridge graduate who came to Colorado Springs in 1873 to work for Dr. Bell as foreman for the Bell ranch in Manitou Park, managed the fish facility during the early years. This is especially so if "Chumley," the name frequently used by Marshall Sprague (Newport in the Rockies--The life and Good Times of Colorado Springs 1961 Sage Books, Denver), is the man who ran advertisements such as this one from FF (1887 Jun 4:11):

> Manitou Park--Colorado's Famous Summer Resort.
>
> Seven miles from Midland, up Ute Pass. One-half hour drive from Manitou Springs. "Four-in-hand" coaches meet trains. Good trout fishing (Salmo Fontinalis imported). Furnished cottages, hotel livery, billiards, lawn tennis, etc. Rates $3.00 per day; $17.50 per week. Fresh trout on table every day. Address: H, G. Thornton, Manitou Park, Colo.

Another item that appeared in Denver's FF (1887 Jun 11:8) was as follows: "H. G. Thornton, Manitou Park, Colorado, purchased this week the grand Galloway bull 'Curley 2nd,' from E. J. Binford of this city. The price was not given. This bull is one of the finest in the country."

Mr. James Annin, Jr., who operated a trout hatchery a short distance above Seth Green's establishment at Caladonia near Rochester, N.Y., mentioned in Chicago Field (1878 May 4:182) that in 1876, Mr. Thornton of Colo. Springs sent him 5,000 eggs of the native trout of Colo., which spawned in May. This probably was the earliest exportation of a Colo. native trout, but unfortunately, the warm weather during transport spoiled them all according to Annin. Successful exportation of Colorado's native trout was later accomplished by the Federal Hatchery at Leadville when they sent native eggs and native trout (likely of Twin Lakes origin) to federal hatcheries in Northville, Michigan, and Wytheville, Virginia, early in the 1890's (FS 1890 Jun 19, 34:436 c 2).

The location of Bell's original hatchery in Manitou Park is difficult to pinpoint except to say that it was about 12 miles north of Woodland Park near present-day Rainbow Falls Park trout ranch, owned by Robert Watson of Woodland Park. Two springs arise within ½ mile of each other--a large, constant, 49°F flow at Watson's facility, and a fluctuating flow that varies between 46-52°F, arising south (upstream) of the Watson spring on the Atwell ranch (Fig. B-6). Mention was made in FF (1891 Aug 22:12) that:

> The old "fish farm" in Bergen Park El Paso County, one of the oldest hatching establishments in the state, has been moved to a lake four miles above its original site. William White's fish pond in the same locality is also non est, having been washed out by a Rocky Mountain freshet.

The lake referred to was not Manitou Park Lake, which Bell made by damming Trout Creek about 1896.

Sprague, in his Newport in the Rockies (p 84), mentioned that General Palmer held a half interest in Bell's 10,000-acre ranch, but he failed to say when the General acquired that interest. When Dr. Bell was closing out many of his interests in Colo. real estate shortly after the turn of the century, General Palmer purchased the Manitou Park property outright from him for $60,000 and made arrangements whereby both men became joint donors of this property to Colorado College for the purpose of establishing "The Colorado School of Forestry," under the control of the college. The deed of gift was dated April 30, 1906, and covered 10,635.64 acres and certain water rights with the lands (extracted from the chapter "Foundation of the Colorado School of Forestry," Gordon Parker papers 1930 Dec 31). Sprague (p 323-324) says, "The school was never a success. In 1912, Colorado College sold off 3,237 acres of Palmer's gift. The School of Forestry was discontinued in 1931. Soon thereafter, Manitou Park began to be managed by the U.S. Forest Service for Colorado College. In 1949 or 1950, title to the entire 10,000 original acres passed to the U.S. Forest Service." I find it difficult to comprehend how 3,237 acres could be sold from an original gift of 10,635.64 acres leaving the "10,000 original acres" for the U.S. Forest Service unless, however, the Forest Service had bought the 3,237 acres sold by the college.

General Palmer died in March 1909 and Dr. Bell died in England in June 1921. Mrs. Bell died in 1938. The Bell's had four children born in the 1870's--one son and three daughters.

Fig. B-6. ROBERT WATSON'S RAINBOW FALLS PARK TROUT RANCH, Manitou Park, March 1984 (believed to be at or near original site of Dr. Bell's fish facility in Manitou Park). (A) Looking west from office building on east side of Trout Creek--hatchery and springs are on left, residence, flag, and stables on right, ponds and raceways in foreground; (B) concrete hatchery building; (C) springs (49 °F) that flow about 450 gallons a minute and are said to be the largest natural spring in the Pikes Peak region; (D) old wooden raceways (nurseponds), south of hatchery; (E) steel hatching troughs inside hatchery; (F) Watson's fish truck. Hatching eggs has not been done here in recent years, but fish are obtained elsewhere and stocked in ponds. Daily fishing permits are required. (Photos by W. Wiltzius)

N.A. BAKER FACILITY IN DENVER

From Denver RMN (1875 Sep 8:4 c 2-3):

A BEAUTIFUL TROUT GARDEN

A Nursery of the Speckled Beauties in Denver--Fish Culture in Green Lake--The Need of a fish Commissioner

A News reporter had occasion, a short time since, to call attention to the success of Dr. W. A. Bell, of Manitou, in fish culture, in Manitou Park, and he then remarked that this persuit would yet become one of the most important industries to our people. In the meantime we have been making further inquiries into this matter, and we find that a number of people, in various portions of the territory, have given more or less attention to this subject.

It is hardly known as yet that on the immediate borders of the city there is a most interesting trout garden, worthy of all praise. Mr. Baker has a fine, pure spring of water, just on the west side of the city. He has prepared a ditch, or canal, about one hundred yards long, nine feet wide, with water five or six feet in depth. This is separated into ponds of various lengths, from twenty-five to fifty feet. He has now eight of these ponds, and the number may be increased as the occasion requires. Near these ponds is located what is known among fish culturists as the spawning race. It consists of a box thirty feet long, three feet wide, and about four feet deep, with a plank bottom. There are also two false bottoms, each seven-eights of an inch apart, which are kept perfectly clean. Here the fish spawn naturally, and then the eggs can be taken into the hatching house, where they remain forty to sixty days, requiring daily attention. Here they remain in the alevin stage about thirty days, when the most critical period arrives for procuring some suitable food to preserve the young fish. At first they are fed with fine bits of liver, with cream or curds. The cream is intended to make the particles of liver float, inasmuch as the little trout prefer to take their food from the surface of the water. Afterward they are removed to a long trough, which is called a nursery, in comparatively restricted quarters, for greater convenience in feeding, and they remain there two months. They are then placed in the open ponds, and after this stage they are of comparatively little trouble. After leaving the nurseries the fish are carefully graded in the ponds before mentioned; those of a size kept together to prevent them from devouring each other; those of four months old eating those of a month old with a keen relish.

Mr. Baker has hatched out 50,000 young trout. The eggs yield from 90 to 95 percent of young fish, while with care 75 percent may be brought to maturity. With proper feeding the young fish will reach the weight of half a pound in two years. Mr. Baker has one pond which contains about 400 of our mountain trout, which will average almost one pound apiece, and a most interesting sight they are swimming about in their narrow quarters.

Mr. Cushman, the enterprising banker of Georgetown, has stocked the beautiful Green Lake, near that town, with about 60,000 mountain and salmon trout. He is meeting with most complete success. It is quite probable that there are many other persons in the territory giving their attention to this charming and most important pursuit, if we knew where to find them.

Prof. Baird says that in the natural state not more than one young fish out of ten arrives at maturity, while, by artificial means, nine out of ten of the eggs may be made to produce a grown fish. Perhaps there is no more desirable or useful food than this, and if, after as naturalists suppose, fish are serviceable in restoring an exhaused brain, or even in supplying the lack of brains, then by all means let our people wake up at once to the importance of this subject before it is too late.

A fish commissioner should at once be appointed, to cooperate with Prof. Baird, the U. S. fish Commissioner, whose duty it shall be to make an annual report on this subject and communicate important information to the people through the public press. Dr. W. A. Bell, Mr. Cushman, or Mr. Baker would, undoubtedly, serve in this capacity without salary, and most valuable results would flow therefrom.

The following was extracted from a letter by Gordon Land on fresh and salt water eels, East Bay, Michigan, May 17, 1877 (FS 1877 May 31, 8[17]:261).

> ...while constructing the trout ponds of Mr. Baker in west Denver, Colorado, I saw one specimen in what is known as Smith's mill ditch, the water supply of which is taken from the Platte a few miles above Denver. This eel certainly was a long way from home if said home was in salt water. Very respectfully, Gordon Land.

In the preceding two articles, the reference to the location of the Baker facility in "West Denver" is misleading. What was "West Denver" in the 1870's is quite a distance from "West Denver" of today. Fortunately, Mrs. Lily M. Sebben, the daughter of Nathan Addison Baker, pinpointed the location in a brief sketch of her father that appeared in Colorado Magazine (1935, 12[6]:220-222) a short time after his death at the age of 91. She noted that when the Baker family (originally from N.Y.) arrived in Denver on March 20, 1860, Nathan's father (Addison Baker) took 160 acres of the lowlands for farming, where some of the finest stock in the country was raised. On this land were fine medicinal springs, later known as Baker's Springs, which were marked by "Peace Pipe Chapter," Daughters of the American Revolution with a bronze marker on the east end of the Colfax viaduct. It was at these springs, according to Mrs. Sebben, that Nathan, after disposing of his Wyoming newspaper holdings in 1872, returned to Denver and established a fish hatchery for raising mountain trout. She never said when it was constructed or when it was put into operation.

Before the Baker family acquired the land containing these springs, the site, in a setting of great cottonwoods, had been used as a camping ground by early scouts and pioneers. Many councils with the Indians had been held there. In 1843, General Fremont's exploration party camped at "The Springs" and with them was William Gilpin, the geographer, who 18 years later became the first territorial governor of Colorado. Many people stopped there to rest and it soon became covered with white tents belonging to the adventurers who came here looking for gold. Pony Express riders watered their horses here before proceeding to the settlements north of Larimer Street. This site soon became the nucleus of the city we now call Denver (Lillian Brigham Colorado Travelore 1938 Peerless Printing Co., Denver, p 290).

According to McGrath (Pioneers of Colorado 1934, 1:56), on April 30, 1932, a bronze tablet was placed on the 14th St. viaduct at the mouth of Cherry Creek, to replace the original marker (set Oct 1921) that had been lost or destroyed. It had the following inscription:

BAKER'S SPRINGS

250 feet south

(Where councils were held by John C. Fremont, Kit Carson and other pioneer scouts, camping ground of early pioneers. Denver's first water supply, marked by Peace Pipe Chapter, Daughters of the American Revolution--1843-1921.)

Some early issues of the Denver City Directory held at the State Historical Society indicated that Nathan A. Baker was listed as a "trout culturist" between 1877 and 1881. His father, Addison Baker, was usually listed as "farmer," but it is known that shortly before his death on Jan. 20, 1884, Addison had corresponded with the U.S. Fish Comm. regarding German carp they had sent him. Culturists for the Comm. had imported German carp into the U.S. in 1876 and began distributing their progeny to various culturists in the U.S. late in 1879.

In the Bull. U.S. Fish Comm. 1883 (p 305), is written "...About the first of July 1883, a circular was prepared containing fifteen questions, covering the whole field of carp-culture. One of these questions was as follows: 'Have you eaten carp? How were they cooked, and what was the opinion of their edible qualities?' This circular was sent out July 20, 1883, by direction of Professor Baird, to all persons who appeared from the records of the U.S. Fish Comm. to have received young carp in 1879 and 1880. There have been received thus far over 600 replies, and from these have been copied verbatim everything which correspondents have said with reference to this subject. Over 350 had not yet tasted carp..." On page 315, the 158th reply was the only reply from a Colorado recipient:

158. BETTER THAN SUNFISH OR TROUT.--Fried, and better than the sunfish. I prefer them to the mountain trout from my pond nearby or to my eastern trout bred here.--Addison Baker, Denver City, Col.

Statements from ten Colorado respondents to other questions on the 1883 circular were published in the U.S. Fish Comm. Rep. 1884 (p 665-667), but only that from Mr. Baker follows:

31. Statement of Addison Baker, Denver, Arapahoe Co., Colo., Aug. 6, 1883.

DISPOSITION OF CARP RECEIVED.--About three years ago I received 25 carp, which I placed in a natural pond on Platte River bottom. It is 800 feet long, from 50 to 100 feet wide, and from 2 to 6 feet deep, with a gravely bottom overlaid with black muck and moss.

The water in the pond is spring water, but rises and lowers with the Platte River, which is near by, and nearly 10 miles from the foot of the mountains. When the river is low I turn in water taken from farther up the stream. The temperature of the water is about 60 degrees.

PLANTS.--The pond contains numerous plants belonging to this mountain region, and also a kind of moss that grows nearly to the surface of the water.

ENEMIES.--I had sun-fish in the pond at first, but, since, the other mountain fish have run through the filling pond from the river--suckers, dace, catfish, and bull-heads. Muskrats have made considerable trouble.

FOOD AND GROWTH.--I have given the carp no food. They are now, I should think, from 6 to 8 inches long, 3 or 4 wide, and from 4 to 6 ounces in weight.

Although both Nathan A. Baker and Addison Baker were known to be fish culturists, they were probably best known in Colorado for their ownership and breeding of fine horses. A monument with a lifesize figure of a horse can still be seen at the gravesite of Nathan A. Baker in Riverside Cemetery in Denver. Nathan, before he founded three of Wyoming's earliest newspapers (Cheyenne Leader, South Pass News, and Laramie Sentinel) in the late 1860's, was an office manager for the RMN owned by W. N. Byers and also a vice-president of the State Historical Soc. of Colo. This society was founded in 1879 under the name "State Historical and Natural History Society" and it was suggested (undocumented) that the idea for the society originated at an 1879 meeting of the Sportsman Club of Denver, an organization founded on October [11] 1869. This club took an active interest, not only in hunting and fishing, but in all matters relating to the natural history of the region. During its early years a large proportion of the Society's members were more interested in natural history than in history (Colo. Mag., 1953 Jul 30[3]:161).

W. H. CUSHMAN FACILITY AT GREEN LAKE NEAR GEORGETOWN

CALIFORNIA SALMON

From Denver RMN (1876 Jul 14:4 c 4):

An interesting feature of one day in Georgetown was a visit to Green Lake and the trout propagating establishment there. The lake is two and a half miles south of town and a thousand feet, probably, above it, It is fed by springs and melting snows, but has no visible outlet. Of course, it was not naturally stocked with fish. W. H. Cushman [Fig. B-7] bought one hundred and sixty acres of land including the lake and entirely surrounding it. Two years ago he began stocking it with trout and has put in ten thousand of these fish which were brought from other streams--mainly Bear creek. They now appear numerous in the lake and can be seen in all parts of it. Some are of two pounds weight, but they do not breed in the lake. Many of them are very tame and come to be fed, darting and leaping for food that is thrown to them, with the greatest eagerness. The lake is provided with elegant boats for hire, and in moving over its crystal depths trout are at all times visible.

Near by the hatching house, and in its admirably arranged troughs and boxes are two hundred and forty thousand young California salmon, now from five to six months old. The spawn was brought from that state by one of the government's fish Commissioners and hatched with great success. In some larger boxes

Courtesy Colorado Historical Society

Fig. B-7. WILLIAM H. CUSHMAN, a Georgetown banker from Illinois, was involved during the 1870's with the building of the Berthoud Pass Toll Road and the establishment and development of the Green Lake resort and fishery a short distance above Georgetown. His mishandling of bank funds led to an indictment charging him with embezzlement in July 1878, afterwhich, he lost control of the Green Lake facilities, became a fugitive by fleeing the state of Colorado, and eventually settled in New York where he remained as a broker. Trial proceedings against Cushman progressed through 1881, but were never resumed thereafter. The prosecution dropped its complaint, and the case was thrown out of Federal District Court on Dec. 24, 1883 (Colo. Mag. 1972 49[1]:35-54).

outside the building are some thousands of salmon about a year and a half old, and from four to five inches long. Also a good many trout of near the same age, and from one-half to two-thirds the size. They are too much crowded and will soon be removed to ponds that are being prepared for them at the edge of the lake. The hatching troughs are supplied with spring water which is very cold. It takes the eggs about two months to hatch, and the young fish do not require food until six weeks old. They are then fed on beef's liver, cooked and grated. They are somewhat subject to disease, but the only medicine given them is common salt. Very few of them die.

From Georgetown Miner (1877 Jun 23:3 c 2):

Green Lake and its environment is the property of Wm. H. Cushman, Esq., of Georgetown, who vies with nature in preserving and enhancing its beauty and rendering it enticing to the public. Four years ago he commenced stocking it with mountain trout brought over from Bear Creek [Fig. B-8]. These of which there are now 10,000 have thriven remarkably well, and some have attained a very large size. Two years ago he built a fish hatching house, sixty feet in length by twenty-five feet in width, near the margin of the lake, and engaged quite extensively in pisciculture - hatching out the eggs of trout and California salmon by hundreds of thousands. Here the curious visitor may see the gradual development of infant salmon life, from the first moment of their existence until they are sufficiently large to be transferred to the tanks and ponds that await their reception and which at this time contain 25,000 fishes two years old, 150,000 yearlings and 35,000 young fry which were hatched out last winter. These are under the immediate care and supervision of Mr. Francis Johnson, who cheerfully and politely gives the interesting details relating to this department, to all who seek such information. A small mountain stream has been brought into the lake at considerable expense, and this maintains the volume of water at all seasons of the year. Fishing in the lake is not allowed at the present time, but in the near future some arrangement will probably be made by which the lovers of the seductive art may gratify their piscatorial propensities.

The early federal fish distribution records are explicit in regards to chinook salmon eggs being sent from the Baird Station in Calif. to W. H. Cushman in Georgetown, Colo.--25,000 shipped on Oct. 18, 1874; 240,000 on Oct. 7, 1875; and 300,000 on Oct. 2, 1876. The Georgetown Miner (1876 Oct 21:3) reported that Cushman had received an addition to his stock of fish at Green Lake--three crates of salmon eggs from Calif. This was the last shipment of salmon eggs sent to Cushman by the federal government. In some early years the federal records carried follow-up information on their egg shipments--how many of the eggs hatched, how many fish were stocked, and where, It was reported that of 25,000 salmon eggs sent Cushman in 1874, Clear and Green lakes in Colorado received 11,450 each.

The RMN (1876 Jul 14:4 c 4) article, presented earlier, verified the 240,000 eggs shipped in Oct. 1875 by reporting 240,000 young salmon, 5-6 months old, were in the troughs and boxes. This same article, however, mentioned "some thousands of salmon about a year and a half old and from four to five inches long" were in some larger boxes outside the hatchery building. These fish had to have been from the Oct. 1874 eggs if they were years old and almost all of them were reported as having been stocked in Clear and Green lakes. An unlikely alternative is that the 4- to 5-inch salmon were from the Oct. 7, 1875 eggs and took "2 months to hatch in the very cold spring water," which would leave them at about 7-8 months of age and 4-5 inches long, an unrealistic growth in such cold water. These salmon had to have been from the Oct. 1874 eggs because by July 1876, Cushman had only received the first two egg shipments and he had two size or age groups present at his facility with the 4- to 5-inch salmon being the largest and, consequently, the oldest. Apparently what Cushman did was report to the federal government that the salmon from the 1874 eggs were stocked in Clear and Green lakes when he actually was holding them in boxes at his lakeside facility at Green Lake (Fig. B-9).

The holding and rearing of these salmon before stocking them was a smart procedure at that time considering he had previously stocked Green Lake with trout seined mainly from Bear Creek. These trout probably were larger and would have preyed heavily upon smaller-sized salmon. Most culturists at that time were stocking swim-up fry or very small fingerlings.

WAS IT THE FIRST HATCHERY IN THE STATE

I wondered where Cushman hatched the salmon eggs sent to him in Oct. 1874. The Georgetown Miner (1877 Jun 23) stated that his hatching house at Green Lake had been built 2 years previous--apparently in the spring or summer of 1875. Cheryl Freeman in her excellent paper "Wanted: The Honorable William H. Cushman" (Colo. Mag. 1972 49[1]:35-54) said:

In 1873 Cushman made Green Lake into a mountain resort and opened it to the people of Georgetown and the territory. He brought a small mountain stream into the lake at great expense to keep the water

Fig, B-8. GREEN LAKE ABOVE GEORGETOWN, before 1876, was originally barren, but was stocked by Cushman with trout mostly from Bear Creek near Morrison in 1873-74. The lake had no inlet or outlet, but Cushman (at considerable expense) diverted a small mountain stream into it to maintain the volume of water during all seasons. (Photos by Perry and Bohm, Denver--courtesy Denver Public Library, Western History Department)

fresh and stocked the lake with mountain trout. In 1875 he added a private hatchery, earlier begun in the cellar of his home. This was probably the first fish hatchery in the state.

She also reported that he received the Oct. 1876 salmon eggs, but unfortunately the only reference cited for any of her above statements was the egg shipment verification in the Georgetown Miner (1876 Oct 21).

If Cushman had been hatching trout eggs in his basement before 1872, Freeman could be correct about that hatchery being the earliest, but the Broadwell facility was operating then and the Baker facility may have been operating that early. Furthermore, Gordon Land may have been hatching trout eggs in South Park and the San Luis Valley (Conejos Springs), where he was known to have been "experimenting" in 1872, or earlier. He was in Colorado at least as early as 1869 and had hatchery experience in the "states" before coming here. His interest in fish dated from 1866 according to the federal circular containing the information presented in Table 5. Both N. A. Baker and W. A. Bell said their interest in fish dated from 1874 so it is highly unlikely that they were operating fish hatcheries before they had an interest in fish. What Addison Baker was up to in the early 1870's regarding fish is unknown since he didn't answer the 1881 federal circular even though the federal government probably sent him one because he was raising carp that they had sent him.

There was an earlier "Alphabetical list of American fish culturists and of persons known as being interested in fish culture" published in the very rare U.S. Fish Comm. Rep. 1872-73. For Colo. (p 558), only one man, G. S. Cushman of Georgetown, is listed, but unfortunately I never found any fish-related information on him. This first listing missed such people as Jacob Hetzel, C. S. Pancost, W. E. Sisty, Gordan Land, Peter Fisher, and G. A. Storz. They all answered the 1881 circular, were interested in fish before 1873, and were in Colorado at that time. Both federal lists missed James Broadwell who was instrumental in founding the Fish Breeders Assoc. in 1874 and who had a hatchery in operation during 1872, the earliest that I have documented. No listing is complete, and that certainly includes any in this account.

Did W. H. Cushman ever get around to actually stocking Green and Clear lakes with Calif. salmon and did they survive? An ad that appeared in the Georgetown Miner (1879 Aug 2:2 c 4) suggested he did:

TOURISTS
--should visit--
GREEN LAKE
--the--
GEM OF THE MOUNTAINS!
Highest Place in the World to Get a Boat Ride.
Thousands of New Hampshire Trout!
California Salmon!
Rocky Mountain Trout!
Which will feed from your fingers.

Since his last salmon egg shipment was in Oct. 1876 and assuming there was no natural reproduction or spawning of the older mature salmon, the youngest salmon would have been 3-year-olds by 1879. His oldest salmon could have been 5-year-olds (1874 eggs). They survived, but were they in the lake or still in his ponds, troughs, or boxes near the hatching house? The accounts of Green and Clear lakes in Crofutt's Grip-Sack Guide to Colo. (1881 Jan 1:102) didn't adequately answer this question for Green Lake, but affirm salmon stocking in Clear Lake:

GREEN LAKE--is one of the most charming little resorts in Colorado. It is near three miles from Georgetown south, reached by an easy wagon road that winds up the side of the mountains, from which there is a fine view of Georgetown and the valley below. This beautiful body of water, half a mile long by a quarter wide, is without a peer in any land. Altitude, 10,400 feet above sea level. In a row of one of the boats, the tourist can see the petrified forest standing upright many feet below the surface, with trout swimming among the branches. Here are hatching houses containing thousands of California Salmon, of various ages, while in the lake have been placed over ten thousand trout, mostly of Eastern and Rocky Mountain varieties. Tourists are allowed to fish at a charge of fifty cents for each fish caught. Many of them weigh from four to five pounds. The fish are very tame, eating from the hand. The boat charges are twenty-five cents per hour for each person. Fine accommodations are provided at the lake for a limited number of tourists at reasonable charges [Fig. B-10].

> CLEAR LAKE--is one-fourth of a mile above Green Lake, and is a trifle larger. It is surrounded by tall pine and spruce trees, and stocked with California Salmon, many of which will weigh from seven to eight pounds. Clear Lake is 2,000 feet higher than the city of Georgetown, and is the source from whence the water supply for that city is obtained.

I have surmised that Cushman must have stocked some salmon from his Green Lake boxes into Clear Lake. These salmon that were most likely from Cushman's original three egg shipments (between 1874 and 1876) would have ranged in age from 5 to 7 years old--an age that approaches the maximum longevity of salmon.

On the back of L. McLean's photos (Fig. B-11) was printed:

> This lake is an emerald gem set in the mountains at an elevation of 10,000 feet. Distance from Georgetown about 2 1/2 miles. The water is clear as crystal, and the eye can penetrate to the depth of sixty feet and distinctly see the great rocks and petrified forest many feet below the surface, with trout and salmon swimming among its branches. Here, in the hatching houses, are thousands of California Salmon of various ages, while in the lake have been placed over 150,000 trout and salmon. At the lake you can be supplied with elegant boats and find many ways for pleasant recreation, with nothing to interrupt or mar the pleasure of the occasion. The greenish color of the water, from which the lake takes its name, is caused by the submarine vegetation.

All that was reported regarding Cushman's facility occurred before either the state or federal government had operated a single hatchery in Colo. An item in SA (1891 Jun 15, 616]: 160) mentioned that the presence of suckers in Green Lake was the result of transplanting nine such fish from Bear Creek (Morrison area) by W. R. Scott in 1879.

Fig. B-9. WILLIAM H. CUSHMAN FACILITY AT GREEN LAKE in the late 1870's. The large barn-like house along the far shore is believed to be the hatching house that Cushman built in 1875, which was used to hatch chinook salmon eggs from California during 1875 and 1876. (Photo by W. G. Chamberlain, Denver--courtesy Colorado Historical Society)

Fig. 8-10. BOATERS ON GREEN LAKE were charged 25 cents for each person per hour as well as 50 cents for each fish caught. Many of the fish weighed 4-5 pounds. Mr. W. R. Scott, a fish culturist from Morrison, stocked Green Lake with suckers in 1879. (Photo courtesy Colorado Historical Society)

Fig. B-11. VIEW OF GREEN LAKE in the late 1870's looking south (L) and resort buildings and boats to the west (R). (Photos by L. McLean's Colorado Scenery, Georgetown; courtesy Denver Public Library, Western History Department)

COLONEL DE LA VERGNE FACILITY NEAR COLORADO SPRINGS

From Weekly Colo. Springs Gazette (1877 Dec 22:2 c 5):

Geo. DeLaVergne, of Clinton, Mo., called upon us yesterday. He has purchased the ranch of Mr. J. B. Riggs, about one mile south of town, and intends to engage in the trout business on an extensive scale. The large springs on the place furnishing excellent facilities for that enterprise.

From Colo. Springs Gazette (1879 Mar 27:4 c 2):

A Visit to the Fish Ponds.

A few days ago we visited the extensive fish ponds of Colonel De La Vergne. Though the work was hardly under way, we found a great deal to interest us. As we had no note book with us, we will not go into the details of this business, but give the general outlines of it.

We first saw a pond in which were about seventy mountain trout, caught by the colonel himself in the mountains, and brought to his place. Other ponds contained about 200 more of these trout. Most of these are two years old, and a good size for eating, but they will be kept for reproducing purposes. They reproduce very rapidly, one female trout laying at least 500 eggs. Near the mountain trout is a hospital where the sick trout are successfully treated on allopathic principles.

A little distance off are three other ponds containing about 1,300 brook trout which were bought a few months ago in Denver from a party who had brought them from the east. The brook trout are decidedly the "gamest" of the trout species. We were much interested in seeing them partake of a little lunch of beef liver. Some of them would jump clear out of the water, while over the long pieces there would be a terrific struggle for full possession between two or three trout who might have hold of it.

Next we went into the nursery, a covered stone building, which was filled with youngsters. There were about 55,000 baby brook trout and 3,500 lake trout. It will be about two years before these fish will be large enough to send to market.

These are fed on ground liver made into a soup with about one tablespoonful of meat to half a pint of water. This department is the most interesting of all. Unusual care is given to their culture. The methods of hatching and raising them is exceedingly interesting. Ponds outside have been prepared for these fish to which they will soon be removed.

Though Colonel De La Vergne had no experience before buying the Riggs ranch, he has been unusually successful. Everything is done according to the most advanced scientific theories and best experience in fish culture. His plans for the future are large and comprehensive. The business requires much patience and it will be two years before he will supply fish in any quantity. But then he will be able to supply them in large quantities.

He has a larger pond covering about an acre into which he proposes to introduce the European carp, a fish of delicious flavor and weighing as high as fifty pounds. This enterprise is of great interest to this city as the great lack of our markets has been fresh fish.

Colonel De La Vergne is always glad to see visitors, and explains his operations to them on all days except Sunday. Lately his place has become a Sunday resort, very much to his discomfort and inconvenience. Some visitors do not always act with discretion when about the fish ponds, and he prefers always to accompany the visitors. As his grounds are private, of course his wishes will be respected. We again repeat that he will be glad to receive visitors on other days. As he is very enthusiastic and intelligent, we know of no more profitable way of spending an hour than with Colonel De La Vergne and his fishes [Fig. B-12].

From Biennial Rep. Fish Comm. Colo. 1879-80 (p 6):

I [Sisty] remained in Denver from the 7th of December until the 11th [1879], having thirty-one fish [carp] left, which I then shipped to Colonel George De La Vergne, of Colorado Springs, my reasons for so doing are that he is making the artificial propagation of fish a business, and has ponds prepared specially for the reception of carp, where all other fish will be excluded, a condition of things very necessary for the successful breeding and raising of carp, as they are a very inoffensive fish themselves, and will not thrive where they are placed with others, and particularly the predaceous varieties. From him, as also from others who received them, I look for good results, while from others I shall be happily disappointed if I do not hear the reverse, as they have placed them in ponds and lakes where suckers and sun fish abound; others where there are gold fish and a questionable variety of carp that is very bony and the flesh valueless, and which doubtless are hybrids; consequently the product, I fear, will be valueless.

I am pleased to announce that Hon. E. D. Potter, Superintendent of the Ohio State hatcheries, has promised to Colorado a donation of 50,000 vivified white fish eggs and 1,000 vivified brook trout eggs, which he will ship by express early in January next. I have made arrangements with the Denver Water Company to hatch the 50,000 white fish eggs and place the young fry in Lake Archer, thereby testing the matter fairly whether the white fish will adapt themselves to the waters of Colorado or not. Of their excellence as a food fish there can be no doubt, and they can be artificially propagated very readily and cheaply by millions.

I have arranged with Colonel De La Vergne to hatch the brook trout eggs for the State, and will see that the young fry is cared for, hoping that ere long the State will be the owner of a State hatchery and State ponds. They will then have the trout for breeders, Next year I will be able to make a distribution of black bass....

[Page 10] ....The 50,000 white fish eggs and 1,000 Brook trout eggs that E. D. Potter, Superintendent of Hatcheries of the State of Ohio, kindly donated to the State of Colorado last February [1880], were lost through the negligence of the Express Company having them in charge. The trout eggs did not reach Colorado Springs until the seventh day after shipment from Toledo, Ohio, all being hatched and nearly all dead. The white fish eggs were in an equally bad, if not worse, condition when they reached Denver, on the eighth day after shipment from the same point, consequently they were a total loss.

[Page 11] ....Colonel George De La Vergne, of Colorado Springs, under date of November 18, 1880, says: "I transferred my carp to their feeding ground about the 20th of May last. They then measured 1 1/2 to 2 1/2 inches. July 26 some of them measured 7 inches. All of them had made an astonishing growth; were not fed, but subsisted on the natural food of the pond. September 2 we transferred them to their winter quarters. Some measured 9 1/2 inches, and strikingly plump; others had made a proportionate growth."

From U.S. Fish Comm. Rep. 1884 (p 667):

Statement of George De La Vergne, Colorado Springs, El Paso Co., Aug. 29, 1883.

DISPOSITION OF CARP RECEIVED. I received a shipment of carp in the fall of 1879, 18 of which survived, and were placed in the ponds. One pond measures 75 by 100 feet, is from 3 1/2 to 4 feet deep, and has a sandy loam bottom. Connected with this is a pond one-third of an acre in extent and from 6 inches to 2 1/2 feet deep, with a bottom of loam and turf. A strong spring 200 yards distant supplies the first pond, from which the water backs into the second. The temperature of the water in the ponds is 60° in summer and in winter 35°. The water freezes, but not where the supply comes in.

PLANTS. The ponds contain Colorado wild grass, two varieties of indigenous moss, dock, rushes, etc.

ENEMIES. There are some frogs; I sometimes kill mud-turtle, and I am not altogether rid of suckers. A fish-hawk took one of the original fish, and one died from wounds the cause of which is unkown.

GROWTH. They get their own food. The old ones, of which there are 16 now left, are from 18 to 24 inches long, and are bulky. They are remarkably healthy. The young vary from the size of a steel pen to 12 inches long.

REPRODUCTION. There probably were from 1,500 to 2,000 young last spring. I think there are very many fry now.

SALES. I sold 25 young fish last spring.

DIFFICULTIES. The only great difficulty was the drawing down of the water and stranding of the young in the moss, weeds, etc., on the margin of the ponds.

From Colo. Springs Gazette (1879 May 24:4 c 1):

Colonel De La Vergne sold 900 trout to Mr. A. Merriam a few days ago which will be used in stocking a fish pond on Steele's Forks. Mr. Holt proposes also to stock a pond at his ranch. The expense is very slight and it will add materially to the ranch bill of fare. We are glad to note this step on the part of our ranchmen. There is no need of living on bacon and bread alone. The past few years have made a vast difference in the mode of living of our ranchmen. Many now have a good vegetable garden, a cow, and some hens, and live as comfortably as the average inhabitant of Colo. Springs.

From Colo, Springs Gazette (1882 Mar 2:3 c 3);

BROOK TROUT:

Col. De La Vergne is now selling trout from his ponds south of the city.

Orders may be left at the ranch or sent through the Post-Office.

(Ibid. p 4, c 1)

Col. De La Vergne is now prepared to supply the market with trout taken from his hatchery in the southern part of the city. Many have been waiting anxiously for this announcement, and they can now procure for their tables some of the finest and largest trout ever offered for sale in Colorado.

From Colo. Springs Gazette (1883 Sep 19:1 c 5-6):

...Colonel De La Vergne's enterprise is a business one, and yet it is a happy combination of pleasure with profit. He is a man of considerable means, and has a beautiful farm on the Fontaine Qui Bouille, about a mile below Colorado Springs. His place was recently visited and written up by Professor Dorimelle, of the California School of Agriculture,

Special Collections, The Colorado College Library

Fig. B-12. COLONEL GEORGE H. DE LA VERGNE (1837- 7) operated a fish hatchery and ponds in Ivywild section south of Colorado Springs. He came to Colorado Springs late in 1877 from Clinton, Mo., where he had a wholesale botanical nursery and purchased the Riggs ranch. There, he engaged in ranching, stock growing, and fish culture while managing his retired father's, George W., estate. The Colonel had mining interests in Gunnison county; established the De La Vergne Furniture Co. on S. Tejon St. in the late 1880's; was a ruling elder of the First Presbyterian church; was prominently connected with the Y.M.C.A.; was a member of the Board of Trustees and one of the Executive Committee of Colorado College; and also was a vice president of the Exchange National Bank. At Nashville, Tenn. in 1867, George married Emily Rice, daughter of Hon. Wm. H. Rice, an English missionary of Honolulu, Sandwich Islands. They had two sons, Paul and Harry. George was last listed in the Colorado Springs Directory of 1894 along with sons Harry and Paul and father George Sr., all residing at Wailua, Lihue. Lihue was a subdivision of Colorado Springs platted by the Colonel, and named after the town where his wife was born. His younger brother Edward and sister Katherine also resided at Lihue in the mid- to late 1890's, but the whereabouts of immediate members of the Colonel's family after 1894 are unknown to me. Apparently the Colonel, at age 80, was still alive when his brother Edward died in 1917 (Colorado Springs Gazette 1917 Sep 19:1 c 5, 3).

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whose report in the Cultivator's Guide, a San Francisco periodical devoted to elegant rural news, is hereto appended. He says:

"We have long felt that many farmers and others possessing an unfailing supply of water were neglecting a source of much comfort and profit in not raising a home supply of fish.

"On the 16th of July we visited the pleasant house of Colonel George De La Vergne, near the town of Colorado Springs, Colo., and were greatly interested in his arrangements for utilizing the water of a magnificant spring, undoubtedly fed from sources in the Rocky Mountains, which rise abruptly within two or three miles to the west. The spring itself is at an elevation of about 6,000 feet above the sea, and has a temperature of about 40° Fahrenheit in April, May and June, which rises to about 48° in October, November and December. After passing through a milk house the water is conducted through a series of trout ponds, or, more properly, tanks, four or five feet wide, then on a hundred yards or so to wider reservoirs for carp, and finally keeps green a meadow which furnishes abundant crops of grass for a choice herd of Jersey cattle. Hatching boxes are fed directly from the spring. Several species of trout have been tried. Colonel De La Vergne finds the brook trout from the Atlantic coast, Salmo fontinalis, to be the best suited to his purpose. It is more easily domesticated, and in every way a better fish than the trout of the neighboring streams of the Rocky mountains. The latter spawns in May, June and July, an undesirable time, while Salmo fontinalis spawns in late autumn and early winter, and is in fine order for the table during the summer months. Some of the three-year old fish were about three-fourths of a pound in weight. They presented

a lively sight when a handful of curds were thrown upon the water, as they rushed for it, but are said to prefer meat, which is chopped fine for their use. With the eastern fish were some Mackinaw trout, easily distinguishable by their blue backs and the absence of the red and white fins of their associates. In spite of their large ancestors, they do not grow as fast as the brook trout; probably on account of restricted quarters and the low temperature of the water. Cold water seems to be essential to Salmo fontinalis, as we believe that it has not generally done well in the coast range streams of California. Three kinds of carp are in the ponds, and all doing well. They are the German scale carp, mirror carp and leather carp, the latter having a smooth skin similar to that of a catfish. Scale carp which were two and a half inches long when put into the ponds in three years grew to a length of twenty inches. They received no food but that which was natural to the pond, mainly a variety of vegetable growths, including "spatter dock", which drops its seed in the water, thus forming favorite morsels for the carp. Though his fish did not grow as rapidly as those of the same species in warmer waters, Colonel De La Vergne thinks that there will be compensation in a superior quality of flesh. A recent valuable acquisition is the Golden Orfe or Ide, a specimen which is said to have the honor of being eaten by the emperor of Germany on his birthday. The stock consisted of four fish, about as long as one's finger, the survivors of a shipment from Blackburn of Fulton Market, in New York. They were very beautiful, of a golden hue, in some, varied by black spots on the head. We trust that they may thrive and multiply in their new home, and that some of their progeny may find their way to California, and there ornament the waters and grace the tables of the 'Lords of Sodi.

"Colonel De La Vergne has young fish and spawn for sale, and any one interested in starting a fish pond, however large or small, will do well to visit his place if possible and see for themselves what he has done, and learn what he would avoid doing in setting up a fish farm. He is a gentleman of those kind and thoughtful habits so often to be noticed among men who love the cultivation of fruit and flowers and bees and fish, and no one can fail to be interested in his enterprise upon its pleasures. Although embarking in the enterprise on a large scale without any previous knowledge of the business, he has found it, on the whole, profitable."

Considering the recent rapid development of the Colorado Springs area, it is difficult to pinpoint where George De La Vergne's Ivywild fish facility was located. My wife, Nancy, lived on Alsace Way in Ivywild in the early 1950's and suggested that I contact Eugene Lilly, who was then rearing fish at the "High Valley Farm," west of Alsace Way, south of Cheyenne Road On April 4, 1984, I had a phone conversation with Mr. Lilly.

He could not recollect ever hearing the name of Col. George De La Vergne in the Ivywild area. Mr. Lilly acquired his Alsace property in 1927 from Horace G. Frantz, a noted fish culturist, who may have come to Colo. Springs for health reasons about 1917. He said that the hatchery that was on his property in 1927 was a frame building, and that he raised fish in about 10 pools using springs that then flowed about 200 gallons per minute. Later, due to the drilling of deep wells and pumping of water in the Broadmoor area, the water table dropped, thereby reducing the output of his springs, and prompted him to discontinue raising fish commerically in the late 1950's.

Robert Watson, a historian of the early days of Colo. Springs and also a "fish man," recently told me he also was unfamiliar with the De La Vergne name, but that the Colonel may have originally located his facility at a large constant 52°F springs where Horace Frantz once operated his "Frantzhurst Rainbow Trout Company" along Fountain Creek, in the 1000 block of South Sahwatch near present-day "Bowl-Mor Lanes" west of Dorchester Park. Watson recalled working there for Frantz in the early 1950's and thought his spring would have been the "best-suited" one in that area to raise fish. Mr. Frantz actually operated a facility under that same trade name near Salida, which in the late 1930's was considered the largest private commercial rainbow trout farm in the world. In 1956 the state acquired this facility and renamed it Mount Shavano Hatchery and Rearing Unit.

GORDON LAND FACILITY AT CATARACT LAKE

The following is from American Angler (1883 May 26, 3[21]:328). It is believed to have been written by "Bourgeois".

FISH CULTURE IN COLORADO

Cataract Lake Trout Hatchery--Three miles from the Blue is a small lake noted for its trout in past years, but at present nearly depopulated of its finny inhabitants. It is surrounded on three sides by enormous masses of irregular rocks in the crevices of which grow bodies of spruce and pine, almost hiding the rocks and forming a picturesque back ground; nearly in the centre of the encircling cliffs a stream measuring 2,800 miner's inches in August pours over the precipice a distance of about six hundred feet. The view from the east, at the outlet, is grand and picturesque. The lake is half a mile long and a quarter wide at the widest point, with many nooks, bays and inlets. The elevation is 7,400 feet.

Mr Gordon Land has filed a homestead here and intends to make his residence near the lake and engage in propagating trout. He has a hatchery fifty feet long by thirty feet wide, fitted with all the appurtenances science and experience could dictate or suggest. In the hatchery are now 250,000 eggs and fish fry which will be placed in the lake in April. The water used is brought from a spring six hundred feet away, and an inch stream is used. The eggs are from W. L. Gilbert's Old Colony hatchery, Plymouth, Mass., and Mr. Land estimates that the loss will be about one and a half per cent. He expects to hatch artifically half a million of eggs from Rocky Mountain trout, and with another quarter of a million of Eastern eggs will put into the lake within the year, since he came here, fully a million trout. The food is a great variety of aquatic plants, and millions of black back suckers, which have increased as the trout decreased.

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7. "Bourgeois" was the pen name used by Judge Lewis B. France of Denver who supplied the readers of American Angler, a weekly New York angling paper, with much information and activities in Colorado. Of approximately six books written by France, his Mountain Trails and Parks in Colorado (published by Chain Hardy and Co., 1886) and Rod and Line in Colorado Waters (published by Chain Hardy and Co., 2nd ed., 1887) were his most widely read and best (in my opinion). Both volumes are in the "Special Collection" section at Colo. State Univ. Library.

> Game is abundant in the neighborhood, and with a splendid Martini magazine rifle and Tooly double barreled breech loader it is no wonder that the mountain cabin is decorated with numerous specimens of the sportsman's skill. The writer, from an acquaintance of fourteen years with Mr. Land, can bear witness to his gentlemanly and companionable qualities and his eminent ability as fish culturist. Summit county and the fish interest is fortunate in having him.

Later, a Mr. Howard W. Hill was raising trout at Cataract Lake, with trout of 10 pounds size reported as common (RMN 1902 Mar 9[mag sec]:2, c 3-5).

PATRICK BROTHERS' FACILITY (WITS END HATCHERY) IN THE PINE RIVER DRAINAGE

From FF (1888 Dec 15:7):

> The Patrick brothers, of Pine River, La Plata county, have a fine place for fish and are making the propagation of fish a decided success. They now have a lake of ten acres in which are between 50,000 and 60,000 trout ready for the market at the present time. Besides this lake they have two small ponds used for spawning [Fig. B-13]. They are arranging to cover twenty five more acres of ground, one-half of which will be ready for the reception of trout next summer. The water is obtained from flowing springs and is pure and healthy for trout. They construct runs between their lakes and this is the only true method of successful trout culture.

Fig. B-13. WITS END HATCHERY AND TROUT-REARING FACILITY was established by Wash and Levi Patrick in the Pine River drainage in 1885 according to Wash's son, Emerald Flint Patrick, presently of Ignacio. Rainbow trout were bred at this facility and were routinely stocked in waters nearby. In 1898, Wash Patrick became superintendent of the state's La Plata Hatchery near Hermosa about 12 miles north of Durango. In 1901, he was appointed superintendent of the Emerald Lake Hatchery, then operated by the state, and later (1903) became superintendent of the new state Durango Hatchery, which he headed for a few years. Between 1909 and 1913, Wash Patrick was General Superintendent for all state fish hatcheries. (Photo from Emerald Flint Patrick)

JUDGE OR GOVERNOR A. W. McINTYRE (McINTIRE) FACILITY IN SAN LUIS VALLEY

The Denver Tribune-Republican (1885 Jan 1:10 c 5)[8] and American Angler (1885 Jan 24, 7[4]: 56) said:

> A. W. McIntyre, of San Luis Valley, has one of the finest fish farms in the state. It is stocked with 25,000 trout, numberless carp and a quantity of native fish of all kinds, including eels. This is the only place in the state where eels are cultivated.

From FF (1891 Sep 19:7):

> Judge McIntire, over in Conejos county, has an ideal water supply for fish culture on his farm fourteen miles from Alamosa. One of the springs on his place flows 12,000 gallons a minute. The Judge has begun the construction of a lake to cover thirty acres, to be supplied from this magnificent spring and when filled he will stock the waters with eastern brook trout. R. H. Duckett of Cuenin, Saguache county, has been secured by the judge to lay out the lake and supervise the work of construction.

PETER BECKER FACILITY ON CHALK CREEK

From FF (1887 Mar 19:3):

> A great fishery is being built up on Chalk creek in Chaffee county by Mr. Peter Becker, ex-sheriff of Lake county. The gentleman is turning his attention to trout, and none other. He has a series of fifty-one ponds, with a capacity of one thousand fish to each. His stock consists of native mountain trout, eastern brook trout and English brook trout. This latter variety Mr. Becker imported across the waters last season. In addition to the fifty-one ponds the gentleman has a hatchery and feeding house with capacity of two hundred thousand. This fine trout establishment is situated about two miles from Nathrop on the line of the Denver and Rio Grande road a few miles below Buena Vista.

GENERAL A. H. JONES FACILITY IN SUMMIT COUNTY

From FF (1890 Jan 4:7):

> At his Lakeside ranch on the banks of the Black Lake in Summit county, General A. L. Jones has a private trout hatchery supplied from a spring of pure water. Eastern brook trout are now spawning and the youngsters will be turned into the big lake next season when the ice goes out. His hatchery has a capacity of 300,000 trout in a season, which makes it nearly as large as the state establishment near Denver.

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[8] This article, "Fish Culture in Colorado," lists and briefly describes seven other private fish facilities including the Bell facility at Manitou Park, George De Lavergne's at Colorado Springs, the Cleveland Cattle Company at Buffalo Springs, Land's facility at Cataract Lake, Charles Sweigart's near Grant's Smelter, James M. Broadwell's near Denver, and Bogart and Sisty's at Central Park. It erroneously mentioned that W. E. Sisty was the superintendent of the State Hatchery. Sisty was Colorado Fish Commissioner and Mr. Bogart was superintendent of the State Hatchery 8½ miles north of Denver. The American Angler's account was an extract of the Tribune-Republican article.

W. T. KIRKPATRICK FACILITY AT EMERALD LAKE NEAR DURANGO

F[illegible] D[illegible] RMN (1899 A[illegible] 13:20 [illegible] 1):

KIRKPATRICK, HIS MISSION

Citizen of Durango Giving Time and Money to the State,

Many Colorado Streams Are Stocked With Trout by His Generosity.

More Than 1,000,000 Fish From His Hatcheries Placed Free of Charge in Public Waters – Work Begun at Emerald Lakes [Figs. B-14,-15,-16].

Special to The News.

DURANGO, Colo., Aug. 12. - W. T. Kirkpatrick of this city has many ways of making himself useful to his fellow-man, but one in particular has attracted attention for its contrast with the practices of the owners of licensed game preserves.[]

Mr. Kirkpatrick is an enthusiastic fisherman. It is his wish that as many others as possible shall enjoy his favorite sport. To this end he is spending freely both time and money in stocking with trout for the benefit of the public the streams of Colorado.

Emerald lakes, embracing an area of about 800 acres, are located at the head of Lake Fork branch of Pine river, at an altitude of 9,800 feet. Surveys show the lakes to be in Hinsdale county, at the eastern limit of the Needle mountains. They are the most picturesque in the state, being surrounded on three sides by heavy timber and on the west by precipitous walls of trachyte. So far the depth is conjecture, as it has been impossible to this date to measure it for more than 500 feet, but it is believed that the extreme depth will go well into the thousands of feet.[10]

The lakes are reached from Durango by an excellent wagon road to Graham Park, thirty miles, through ferns, flowers and pines, thence fifteen miles by trail. The lakes were first stocked with fish taken from Pine river and carried over the trail in kegs on pack animals, in 1888, by members of Durango Rod and Gun club. Later W. T. Kirkpatrick located the lakes as a reservoir site, and afterwards leased the approaches from the state. During the period Mr. Kirkpatrick has directed his attention to them he has constructed and maintained at private expense two hatcheries, with an aggregate annual production of 750,000, which will be increased to 1,000,000

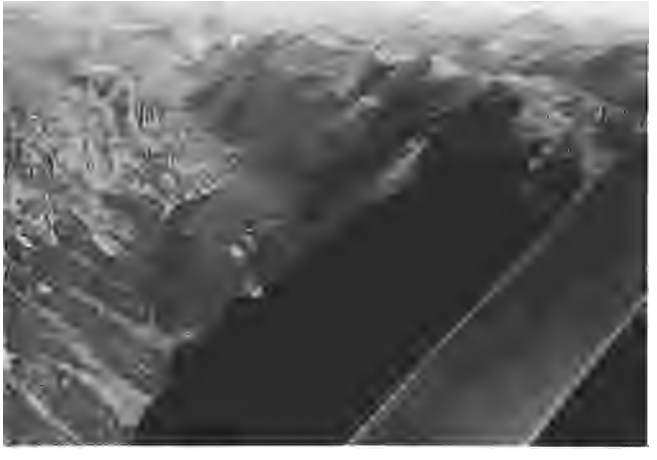

Fig. B-14. EMERALD LAKES are in the Pine River drainage above Vallicito Reservoir, Hinsdale County. Originally barren, Big Emerald Lake was stocked in 1888 with trout from the Pine River by members of the Durango Rod and Gun Club. W. T. Kirkpatrick began propagating trout at the lakes about 1895, and by 1899 had two hatcheries operating. Later, he allowed state spawning crews the use of the facilities, which resulted in the stocking of millions of cutthroat trout in public waters throughout Colorado. Rainbow trout probably were introduced into Emerald Lake before 1900 and their eggs were also later taken by state crews until the mid- to late 1920's. (Division of Wildlife photo by Geoff Tischbein)

Fig. B-15. STATE SPAWN-TAKING CREW seining cutthroat trout spawners (above) and stripping the spawners (below) at Emerald Lake. The basic procedures shown are still used today, except that the trout are anesthetized, then thoroughly rinsed, and the stripping is done in an area protected from direct sunlight. Anesthetizing relaxes the fish and results in fewer broken eggs. Direct sunlight, broken eggs, most anesthetizing agents, and excessive fish slime or water in the stripping pan, are all known to affect adversely the fertilization process. (Photos from State Fish Commissioner Biennial for 1905-06)

[9] On April 27, 1899, the Colorado Legislature approved a considerable number of new game and fish regulations that had been proposed by sportsmen led by Colonel (Judge) D. C. Beaman of Denver early in February. One of these new regulations required for the first time in Colorado's history, a "fee" for procuring a license to operate any privately-owned game and fish preserve in the state. By early Sept. 1899, 36 such licenses had been issued (RMN 1899 Sep 2:3 c 5). Because of a suit and a general misunderstanding of this new law, considerable notoriety appeared during August regarding License No. 2, that had been issued to William Radcliffe who was operating a private fishery in the Grand Mesa chain of lakes.

[10] This is a gross exaggeration. The deepest body of water in Colorado is Morrow Point Reservoir at 418 feet. Emerald Lake is 243 feet.

during the present season. All the cost of improvements, salaries of men and expenses of every character have been borne by Mr. Kirkpatrick, and never has he sold or attempted to sell fish, spawn or privilege. Aside from stocking barren lakes in LaPlata and Hinsdale counties, individual lakes, Pine river and tributaries, he has given away to the state of Colorado and its streams more than 1,000,000 trout.

Mr. Kirkpatrick is a handsome, well preserved bachelor of middle age, a native of Ohio, and one who takes delight in giving to those less fortunate than himself. He is extremely charitable and never so ill at ease as when his generous works are known, as he shuns notoriety. To surprise him in an act of charity is to put him to flight. With him the hand that did not give never knew in a single instance what the hand which did give was doing. He leads a grand unselfish life, has a comfortable fortune and takes life easy. He devotes much in the way of money and kindness to the needy and deserving, to church and to charity.

Fig. B-16. EMERALD LAKES. (A) Early dam at outlet of Big Emerald Lake. (B) Hatchery building to right of cabin and inlet to Little Emerald Lake; water supplied by gravity flow from Big Emerald. (C) Cabin where state spawning crews lived. (Photos from Emerald Flint Patrick of Ignacio)

WILLIAM RADCLIFFE FACILITY AND THE GRAND MESA LAKES FEUD

BACKGROUND

On May 14, 1896, a wealthy Englishman, William Radcliffe (Fig. B-17), acquired certain leases to property adjacent to Alexander Lake for $7,000, as well as irrigation rights and exclusive right of fishing and propagating fish in all 20 of the Grand Mesa lakes operated by the Surface Creek Ditch and Reservoir Co. At that time, the property included a hotel, stables, cabins, one fish hatchery, an ice house, and outhouses.

Radcliffe's acquisition, which was for 99 years, was obtained from Richard Forest, who earlier had propagated fish on Grand Mesa with a partner, William Alexander. Mr. Alexander, namesake for one lake in the chain of more than 100 lakes on the Mesa, had mysteriously disappeared about 1893. Apparently after his disappearance, the Grand Mesa lakes were heavily poached by local residents. Radcliffe learned that for 2 or 3 years before he bought the property, fish had been taken by illegal methods such as seining, snagging, dynamiting, and by hand while running up small streams to spawn. Even before the disappearance of Mr. Alexander, the Grand Mesa Lakes had a rather tainted history of illegal propagation of fish and fishing.

In July 1891, Colorado's Fish Commissioner Gordon Land found it necessary to personally inquire into alleged violations of the fish laws in western Colorado. Mr. Alexander of Delta County had been shipping trout to Leadville and Ouray at profitable figures, claiming the trout were propagated in his lakes at the head of Surface Creek. However, Mr. Land's inspection into the matter demonstrated that the lakes designated by Alexander and his partner had been stocked by trapping the fish from adjacent streams and impounding them in Alexander Lake (Fig. B-18). No hatchery was on the place then, nor ever had been. The trout stolen from public waters had been confined in this alleged summer resort lake, later to be removed and sold under the pretense that they were from "private ponds." Mr. Alexander was fined $50 and costs, and each party who bought fish from him in Leadville and Ouray were also fined according to the law (FF 1891 Jul 25:12).

Fig. B-17. WILLIAM RADCLIFFE (1856-1938) was a wealthy Englishman who owned several lakes on the Grand Mesa and operated two hatcheries for fish propagation before the turn of the century. He was a graduate of Oxford and fancied clean sport, athletics, hunting, and globe-trotting. He usually spent his summers in Colorado and the rest of the year in Paris or London. (Sketch from RMN 1901 Jul 19:3--courtesy Colorado Historical Society)

While these "propagators" were conducting their fish business, they were getting stiff poaching competition from Delta County locals who made it their custom every spawning season to procure about a year's supply of fish. This was accomplished at the chain of irrigation lakes on Grand Mesa. When large numbers of trout had left a lake and ascended a connecting stream to spawn, the poacher would lower the headgate to that stream, leaving the trout high and dry. Although one poacher could accomplish this task, efficiency was improved if at least two were involved--one to drive, scare, or concentrate the trout in an area of stream where a wagon could be easily loaded, and another to lower the headgate and return to assist in loading the wagon. According to FF (1897 May 8:12), the early fish culturists at the Grand Mesa lakes disposed their fishing rights and propagational privileges to the Englishman Radcliffe, because they could not control the local poachers.

GRAND MESA LAKES FEUD

After acquiring the facilities at Alexander Lake, Mr. Radcliffe began to improve his property as well as to propagate trout. He built two houses for his employees and a private house for himself, along with a fish house and a second hatchery. Radcliffe usually stayed at his Grand Mesa estate only during the summers and spent the rest of the time in Paris or London.

Similar to the charitable endeavors of Mr. Kirkpatrick, who operated a large fishery preserve in the Durango area, Radcliffe donated many cutthroat trout to the state for stocking in public waters (eggs and young fish). Unlike Kirkpatrick, though, and probably because of the notorious and scandalous poaching that had transpired earlier at the Grand Mesa lakes, Radcliffe employed as many as seven deputized state game wardens to patrol his property. He also required that fishermen have a permit to fish his lakes. This no doubt irritated many law-abiding fishermen, and incensed those persons who had been accustomed to poaching the Grand Mesa lakes. Soon Mr. Radcliffe was accused of giving fishing permits to only a favored few. He denied this, saying:

> No one has ever been refused a permit to fish in a way laid down by the law of the state of Colorado and to take away with them all their catch without payment of a single cent. On the other hand, I have strictly insisted upon the observance of the game laws.

In 1899 Colorado Legislators passed a law that required, for the first time in the state's history, a "fee" for procuring a license to operate any privately-owned game and fish preserve within Colorado. Radcliffe was quick to comply. Of 36 licenses issued before Sept., Radcliffe's was the second. Colorado's Fish Commissioner Johnson issued a Class A Park or Lake license to Mr. Radcliffe on May 4, 1899, that entitled him to propagate, catch, and sell fish from 13 of the Radcliffe lakes as well as the streams connecting these lakes. Since 1896 Radcliffe had used only 12 of the 20 lakes originally acquired (Alexander, Barren, Eggleston, Upper Eggleston, Hotel, Upper Hotel, Island, Deep Slough, Sheep Slough, Carp, Beaver, and Beaver Dam Lake).

Radcliffe's fish business finally became lucrative by 1899. The expenses associated with hiring spawn-takers and culturists were lessened considerably through a contractual agreement with the U.S. Fish Comm. who took on those tasks in exchange for a share of the eggs collected at the lakes. Either because of jealousy of Mr. Radcliffe's success with his fish business or irritability associated with his requiring permits and employing guards, Delta County residents, in August of 1899, filed a suit questioning the legality of Radcliffe's newly-acquired Class A license. Charges of fraud and misrepresentation were made. A general misunderstanding of this new license law prevaled in Colorado then, and many of the press releases were either inaccurate or very confusing. Judge D. C. Beaman, who had been the instigator of the lake license law in the Legislature earlier in the year, assisted Radcliffe in the suit defense. The ruling favored the legality of Radcliffe's license, which further irritated many residents.

Fig. B-18. The old fish hatchery on ALEXANDER LAKE was just part of Radcliffe's entire Grand Mesa Lakes property that was destroyed by irate mobs retaliating for the killing of Womack. Radcliffe countered with a claim against the U. S. and eventually was awarded $25,000 for damages. (Photo courtesy Colorado Historical Society)

Adverse feelings toward Radcliffe still festered nearly 2 years later. William A. Womack, a well-known cattleman and resident of Delta Co. since the late 1880's, had been warned several times about poaching the Grand Mesa lakes. He had his summer cattle range near the lakes, and on July 14, 1901, Womack, accompanied by four of his range riders, Frank Hinchman, Frank Trickle, and Dan and John Gipe, proceeded to the Grand Mesa lakes to fish (?). According to an item in the RMN (1901 Jul 19:3 c 1), it was Womack's intention not to show his fishing permit and, if ordered away from the lakes, to take the matter into the courts and make Radcliffe show upon what authority he prevented people from fishing the lakes.

On July 14, 1901, Womack's fishing party was confronted and warned away on two occasions by Frank A. Mahany,[1] one of Radcliffe's deputized state game wardens. Radcliffe was away from the lakes on business that day. Details of what actually happened varied considerably, and later were the subject of a sensational trial, because warden Mahany shot and killed Womack and wounded Hinchman during a confrontation at Island Lake (Fig. B-19).

The killing of Womack so provoked the local residents that on the evening of July 16, 1901, an irate mob set fire to all of Radcliffe's buildings except his two hatcheries, a fish house, an ice house, two small cabins, and two large cisterns. These were spared because it was believed that the U.S. Fish Commission had a share in them.

After 1899, Radcliffe operated his fish business under an agreement with the U.S. Fish Comm., whereby they were to send E. A. Tulian, Leadville Hatchery Superintendent, and three other men to the lakes to collect eggs. From the close of the spawning season, about July 4, two men were to be left as long as necessary to attend to hatching the eggs (cutthroat trout), in Radcliffe's hatchery, and plant the fry. The first one-half million eggs were to be put in Radcliffe's hatchery, the next one-half million brought to the Leadville Hatchery, and so on, to the close of the season. From the eggs brought to the Leadville station, Mr. Radcliffe was to receive 33.3 percent of fry when they were feeding well.

After it became known that the buildings spared by the first mob belonged to Radcliffe and were not those of the U.S. Fish Comm., a second mob, on August 25, 1901, set fire and destroyed all of Radcliffe's remaining property. Because of repeated mob threats between July 16 and Aug. 29, 1901, and lack of state or federal government protection, neither Radcliffe, his employees, nor the U.S. Fish Comm. men under contract to Radcliffe, were able to give expert care to approximately 2 million eggs and young fish. Many died or became diseased, despite reports to the contrary. Shortly after the first mob had struck, Radcliffe notified the U.S. Fish Comm. in Washington that they were in breach of their contract with him.

Fig. B-19. ISLAND LAKE ON GRAND MESA is where a Delta County fisherman was murdered in July 1901 by a state deputized game warden. The warden had been employed by W. Radcliffe, a fish culturist, to prevent poaching at his lakes. (Photo from State Fish Commissioner Biennial for 1915-16)

He was informed by his lawyer that the laws in Colorado made it impossible to take civil action against the State of Colorado or the County of Delta nor against the sheriff. Radcliffe's only recourse left was a civil action for damages against the individuals composing the mob. However, most of the mob were masked, making legal identification almost impossible. Furthermore, even in the event of obtaining a judgment against some of the mob, the laws of Colorado gave an exemption of $2,000 in cases of judgments against ranchmen, etc., and Radcliffe was informed that not one of the mob was even worth $1,000.

Meanwhile, lawyers for Mahany procured a change of venue on his trial from Delta to Gunnison. This change most likely resulted because of an attempted lynching of him and a small chance of obtaining an unbiased jury in Delta. On Sept. 20, 1901, the trial began and on the 22nd Mahany was found guilty of manslaughter, but he was not sentenced at that time. Apparently, on Sept. 27, 1901, his lawyers waived the filing of a motion for a new trial and stated to the District Court in Gunnison that he consented that judgment for involuntary manslaughter be entered on the verdict. The Court, however, declined to pass sentence, and over the objection of the lawyers, ordered that the verdict be set aside and there be a new trial. Before this second trial began, Mahany also had lost an appeal for a Writ of Habeas Corpus in the State Supreme Court (Colo. Reports, January term 1902, v 29 p 442-446).

Radcliffe, apparently dejected by the adverse feeling towards him in Delta County and the governor's refusal and U. S. Government's inability to protect his property or life, on Nov. 15, 1901, leased his Grand Mesa lakes property, including his exclusive rights of fishing and propagation, to the U.S. Fish Comm. for the sum of

[1] At least 6 different spellings of this name have appeared in print (Mahany, Mahaney, Mahoney, Mehaney, Mehany, and McHaney). My use of Mahany is based on such spelling in State Supreme Court documents.

$1 for 3 years. Late in Dec. 1901, Radcliffe appealed to the British Embassy in Washington D.C., noted the facts supported by affidavits in his case, and requested that demands be made on the U.S. government for redress and compensation of $65,000. His case consequently became an international affair. Over the next 40 months, much correspondence, with additional supporting facts and affidavits, was generated. Both state and federal governments investigated the case (see Claim of William Radcliffe, Senate Document 271 p 1-40, 58th Congress, 2nd Session, 1903-04).

Mahany, meanwhile, underwent a retrial at Gunnison and on Apr. 23, 1902, a jury found him guilty of voluntary manslaughter, even though five of the jurymen were for acquittal when balloting began. His attorney immediately filed a motion for a new trial before he was sentenced. On Apr. 26, 1902, Judge Stevens sentenced him to not less than 6 nor more than 8 years in the state penitentiary at Canyon City. A writ of supersedas was applied for in the State Supreme Court and was granted on Apr. 29, 1902. The Denver Republican (1902 Apr 30:3 c 6) reported that this Supreme Court action kept Mahany from the penitentiary, since orders had been sent to the sheriff of Gunnison County to hold him until the Supreme Court could pass on his case. Eventually, Mahany brought an action to the State Supreme Court, alleging that the District Court in Gunnison erred in refusing to sentence him upon the first verdict to a term in the county jail; erred in overruling his plea of former jeopardy; and erred in rendering judgment upon the second verdict. In April, 1903, the State Supreme Court, however, ruled to the contrary, thereby affirming the verdict and the sentence passed during Mahany's retrial at Gunnison in 1902 (Colo. Reports 1903[Apr term] 31:365-369).

The Mahany case was not yet finished. Over the ensuing 18 months, a group of Mahany's West Slope friends, led by Mrs. Mahany in Fruita, worked diligently towards obtaining a pardon for him. Eventually, a petition, which pointed out that Womack had threatened Mahany on numerous occasions, and that he had been repeatedly warned about poaching, was submitted to the state pardon board on Nov. 18, 1904. This petition contained the signatures of 7 of the jurors who had convicted Mahany, 50 local business men, and many of the residents of Fruita. The board granted an unconditional pardon to Frank Mahany, thus, concluding one of the sensational murder cases in the early history of Colorado (Denver Republican 1904 Nov 19:12 c 1).

Mahany was free at last, after being confined for over 40 months. Most of that time he had spent in the county jail at Gunnison before being sent to the penitentiary. On Nov. 21, 1904, Mahany went to Fruita for a joyous reunion with his family, which included young children. They had been residing there with Mrs. Mahany's father. The next day Mrs. Mahany went to Grand Junction to express her thanks to those who had given her assistance (Grand Junction News 1904 Nov 26:1 c 4).

By Feb. 1904, Radcliffe's claim had progressed to the point where the U.S. Secretary of State informed the British Ambassador that the Justice Department had determined to ask the President that he recommend to Congress a sum of $25,000 be appropriated for the relief of Mr. Radcliffe, if he would accept it in full payment for damages suffered. Radcliffe agreed, and on Apr. 14, 1904, President Theodore Roosevelt recommended this to Congress. Unbelievably, it was not until Jan. 9, 1909, that Congress passed an Act to appropriate the $25,000 to Radcliffe (U.S. Statutes at Large 60th Congress 35[pt 2, ch 17]: 1400). By this time, however, I have estimated that the U.S. Fish Comm. had procured additional cutthroat trout eggs and fish from the Grand Mesa lakes valued at approximately $26,600. The U.S. government may have delayed payment until the $25,000 acceptable to Radcliffe was recovered fully. Colorado benefited because the Fish Comm., with those additional eggs and fish, produced approximately 5 million more cutthroat trout than they would have otherwise and most of those were stocked in Colorado waters. Furthermore, other eggs of species such as brook and rainbow trout were also taken by the Commission from the Grand Mesa lakes before 1910. Clearly, the U.S. Fish Comm. was not the loser in this case, except that it soon lost its rights to take eggs from these lakes. In the U.S. Fish Comm. Rep. for FY 1910 (pp 9-10) is written:

> At present only two stations- one in New England and one in Colorado- obtain their supplies of eggs from wild fish, and the fields heretofore open to them are narrowing each year because of the encroachments of commercial fish culturists. In 1910 Wellington Lake and the Grand Mesa Lakes, heretofore the most productive sources of the Colorado station for eggs of the blackspotted, brook, and rainbow trout, had to be given up to private enterprise.

After the first mob had struck in July 1901, Radcliffe feared for his life and never returned to his once beautiful estate at Grand Mesa Lakes. He spent some time in Denver and New York City before he returned to England while negotiating with the U.S. government through the British Ambassador. In 1921 he published "Fishing from the Earliest Times," a tome describing fishing techniques and methods used by ancient civilizations. William Radcliffe died on May 10, 1938, in Kent, England at the age of 81 (Denver Post 1938 May 11:3).

YELLOWFIN TROUT AT GRAND MESA

LeRoy Wood's interpretation of "the Grand Mesa Lakes Feud" appeared in the magazine section of the Denver Post (1928 Sep 9) where he said:

> So rich in resources is this mountain (Grand Mesa) that battles for its possession might have been expected, and, in fact, this was one of the game-infested hunting grounds over which the Indians made their last stand in Colorado against soldiers of the United States. In the spring of 1881, the Utes fought Johnson's army on Battlement mesa and were defeated and driven out of the state to the Uintah

> reservation in what now is Utah. But when white men came into undisputed possession of Grand Mesa the greatest battle among them was not for the verdant range, the great acreages of timber, tremendous veins of coal nor almost unlimited stores of water for irrigation - WHITE MEN FOUGHT FOR A NEW FISH!

Mr. Wood failed to explain what he meant by "NEW FISH." Originally, the only trout found in waters of the Colorado River drainage, which includes the Grand Mesa, was Salmo clarki pleuriticus, the Colorado River cutthroat trout. However, by the turn of the century, many exotic trout had already been introduced into the Colorado River drainage. There is a possibility that Wood was refering to the yellowfin trout, a rare cutthroat trout variety, supposedly endemic only to Twin Lakes near Leadville. A German fish culturist, Siegfried Jaffe, in a French fish culture journal (Bulletin De La Societe D'Acclimation 1902, 49: 422-424), reported that Mr. Tulian of the U.S. Fish Comm. at Mesa Lakes sent him 10,000 yellowfin trout eggs in May 1899 and an additional 20,000 eggs in July 1902. The U.S. Fish Comm. was taking cutthroat trout eggs from the Grand Mesa Lakes in those years, but neither the Leadville Station nor the U.S. Fish Comm. records confirmed that yellowfin trout had ever been stocked into any West Slope waters. Before 1899, federal stocking records used the name yellowfin trout in their reports, but not thereafter. Only the fiscal reports for 1896, 1897, and 1898 showed stocking of yellowfin trout to be all in Front Range waters--Twin Lakes or tributaries of Twin Lakes near Leadville, Evergreen Lakes at the Leadville Station, and Mammouth Creek near Nederland close to Teller Lake. The latter place was close to the fish hatchery operated by Senator Teller.

Official federal records do confirm that the German culturist, S. Jaffe, was sent "black spotted trout" eggs during 1899 and 1902. "Black spotted trout" was a catch-all term used to denote any or all cutthroat trout being reared by federal hatcheries. Official records for many years after 1898 did not distinguish between specific cutthroat trout varieties, despite several being reared. I find it hard to believe that the U.S. Fish Comm. would have kept "yellowfin trout" on the "fishes being reared" list until 1905 if they had not been rearing them, even though the last time "yellowfin trout" was officially used in a distribution report was during fiscal 1898.

There is other supportive, circumstantial evidence that yellowfin trout may have been successfully established in the Grand Mesa Lakes. D. S. Jordan, the taxonomic expert who first described the yellowfin trout for the scientific community in 1890, mentioned in his autobiography (Days of a Man 1922 v 1, World Book Co. Pp 334-335) that the yellowfin trout was then extinct in Twin Lakes, but that eggs from the Mount Massive hatchery near Leadville had been shipped to France where it became successfully established. Federal records before 1922 indicate that the U.S. Fish Comm. had sent 10,000 "black-spotted trout" eggs to France during FY 1908, and again in FY 1910. In those years, the Fish Commission's station at Leadville was collecting "black-spotted trout" eggs only from Grand Mesa Lakes and Grand Lake.

Admittedly, there are at least three inconsistencies to the arguments presented:

1. After FY 1905, the U.S. Fish Comm. had removed "yellowfin trout" from their "fishes being reared list."
2. The records do not identify Leadville as the station from which the "black-spotted trout" were shipped to France. At that time, distribution records were not cross-correlated with the station of origin.
3. If expert Jordan was so familiar with the history of yellowfin trout (its extinction in Twin Lakes and its establishment in France), how could he have been unaware that the variety had been established at Grand Mesa, as I have suggested?

We probably will never know for sure if the yellowfin trout was successfully established at the Grand Mesa Lakes, unless additional information is found. However, at the present time, my feeling is that adult yellowfin trout were probably present in low numbers between 1899 and 1905 from which to take small allotments of eggs such as Jaffe's; but they became rare thereafter, due to competition with rainbow and brook trout introduced by the U.S. Fish Comm. after they acquired the lease from Radcliffe in 1901. The variety was then removed from their "fishes being reared list." Why Jordan was unaware of this or just didn't mention that eggs of this fish had been taken from Grand Mesa Lakes, will remain a mystery.

BERT HOSSELKUS FACILITY NEAR CREEDE

From FF (1914 Oct 24:8):

> One of the best fish hatcheries in Colorado is owned by Bert Hosselkus at the Lost Lakes in Mineral county. This establishment spawns 8,000,000 trout fry every year from its hatchery in the Box canon near the head of Clear creek, one of the headwaters of the Rio Grande and pretty well up in altitude. The turnoff sells from $3.50 to $4.00 the thousand and the state of Colorado takes all the surplus, something like two million fingerlings so that nothing is left at the end of the season. James Stell of Delta county recently stocked up a new trout run from this hatchery. His place is at a chain of lakes high up on the Grand mesa between Cedaredge and Collbran.

HORACE FRANTZ FACILITY WEST OF SALIDA[12]

From A. H. Carhart (Moving Day for Rainbows Outdoor Life 1939 Dec p 43):

> At Salida, Frantz operates the biggest commercial rainbow-trout farm in the world. He ships fish to restaurants as far away as New York City and Philadelphia, Pa. He also sells live stock to owners of private lakes, and thus has developed a system of transporting the fish over mountain and plains roads, and delivering them "on the hoof," ready to take to new waters and rustle their living.
>
> Frantz's tanks look like old-fashioned bathtubs. They're made of galVanized iron, rounded to prevent

[12]Variously called Frantzhurst Rainbow Trout Co., Frantzhurst Trout Hatchery, or Mt. Shavano Trout Farm.

possible injury to fish as the water swishes them about. Each slatlike cover is cushioned with sponge rubber on its underside, and ice is placed on top to keep water temperature down. But the real reason for Frantz's success in carrying large quantities of fish lies in a patented hollow carbon cylinder that rests in the bottom of each tank. To one end of it a hose from an oxygen tank is attached. When oxygen is fed into the cylinder it comes out of myriad needle-point holes, maintaining proper oxygen content in the water. The expert consults a table which indicates how much gas under pressure must be released each hour to sustain the trout.

ADDITIONAL INFORMATION ON GORDON LAND HATCHERIES AND ACTIVITIES

This was extracted from Gordon Land's letter on Fresh and Salt Water Eels, East Bay, Mich., May 17, 1877 (FS 1877 May 31, 8[17]:261):

...I have also taken five real eels from the mud in winter on the Conejos River, one of the sources of the Rio Grande, this being upwards of a thousand miles from the Gulf. I know of others being taken near there in summer at the mouth of Rio La Jara. While constructing the trout ponds of Mr. Baker in West Denver, Colorado, I saw one specimen in what is known as Smith's mill ditch, the water supply of which is taken from the Platte a few miles above Denver. This eel certainly was a long way from home if said home was in salt water. Very respectfully, Gordon Land.

From Denver RMN (1876 Jan 16:4 c 1):

Fish Culture - Something for the Legislature to Consider.

To the Editor of the News

Buffalo Springs, January 15, 1876. - Believing that whatever will tend to further or develope a desirable and promising industry, will be deserving of the attention and consideration of our territorial council, I submit the following, trusting that it may serve, in a measure, to draw out more especial interest in the business of fish culture. That the growing needs of our territory demand a more abundant fish food supply, there is no longer any doubt among those who have given the subject even the slightest consideration. What I ask in behalf of fish culture is, that it be exempted from taxation for a period of not less than five years, believing that such exemption will serve to give greater stimulus to this new and desirable enterprise. While the business entails considerable outlay in capital to the beginner, it does not, at present, yield to the territory any benefit in a taxable way, mainly owing to the fact of there being so few engaged in it. That the business is of the first importance, reference need only be made to acts of the older states and to that of the general government. Another serious drawback, and one directly in the way, is the fact that many of our best and well-to-do citizens are those who came here in the "pioneer days," long before fish culture had made any progress even in their eastern homes. Consequently, they are not at all familiar with the recent gigantic strides that have been taken there, in regard to this most important enterprise, save only such meagre items as they have gleanned from the press. I offer this with the hope that it at least merits legislative attention. G. L.

From Chicago Field (1879 Oct 25, 12[11]:164):

"Mountain Trout."--(Salmo Virginalis.) LEADVILLE, COL.

EDITOR CHICAGO FIELD:--Here in Colorado we have several varieties of what are generally known as mountain trout, but the Salmo virginalis are far the most common and widespread in their habit. They differ both in general appearance and habits from S. fontinalis or the common brook trout of the east and Northeast. The spawning season extends over a period of five months from April 1 to September 1, being earliest in the foothills and latest in the higher mountain regions. Even at this writing, October 9, I found in the head-waters of the Arkansas river young trout not over one inch in length, while in most of these mountain streams trout of that size appear in the latter part of June and first of July. These trout during Summer remain in the shallow, cool waters and return to deep or warm waters in the Fall and Winter. Nature gives them little or no food in Winter in our highest snow water streams except where spring branches join them, and it is in such spring streams that our little trout find food and shelter, away from their larger brethren of the lakes and deep rivers. As soon as the water from the melting snows and ice begins to swell the streams, it is the signal for the trout to advance, and up they go in countless numbers, branching off into every side brook or rivulet until they find a suitable spawning ground. Their mission ended, they linger along in the upper waters, feeding and sporting in the ripples and pools till the receding of the floods warn the larger ones of their danger and the narrower confined waters affording less food impels them to depart. Down they come, but not in such schools as when upward bound. For months, each deep hole with its sheltering bush or bank and the strong swift current setting into it contains one, two or three "heavy fellows" (one pound and upward); these are the beauties that the "Tenderfeet" hook and always love to tell about when they get back to camp. But as Winter draws nigh, these "monarchs of the brook" seek deeper and more sheltered waters, leaving to the little ones the sole possession of the Summer stream; with the advent of another Spring the big ones are the first to move in the upward race. Gordon Land.

From Chicago Field (1879 Nov 29, 12[16]:245):

Mountain Trout.--Salmo virginalis. LEADVILLE, COL.

EDITOR CHICAGO FIELD:--The natural food of the Colorado mountain trout during the most of the Summer is the insect life carried to them on the surface of our lakes and streams. Myriads of grasshoppers and other winged insects fall into the water, and are borne along by wind or current until some watchful trout, ever on the alert for passing favors, "takes then in." During the Winter months they depend entirely upon the young of the creek sucker, minnows and crustacea, particularly the gammarus, or fresh water shrimp, which are found in all our best trout streams in great numbers.

There are some streams supplied by springs of a uniform temperature of 60 deg. Fah. whose waters are literally alive with crustacea and a superabundance of aquatic vegetation. Where these conditions are the most favorable, almost every species of water insects abound. The water of such streams is invariably hard, and the trout in them are noted for their fine game qualities and excellent flavor, although I must admit that trout of the greatest size are oftener found in our snow-water streams (whose waters are pure and soft), such as the Rio Grande del Norte, the Gunnison, the Taylor, the Eagle, the Grand, the Bear, the Green and their many tributaries that take their rise in the snowy range.

However, I do not wish to convey the idea that because the largest trout are more frequently found in the snow-water streams that they are not also to be found in the hard water or exclusively spring streams, for in the deep holes of the latter trout of great size are frequently taken, and are so pre-eminently finer in flavor that it may be accepted as

proof that nothing in the water is the cause for their being less abundant than in the former, while the great numbers in small areas of the younger and smaller trout would go far to show that the lime water streams of comparatively high temperature, with their excess of vegetation, are far better adapted for the finest development of the trout than are the snow-water streams.

I believe the true reason that trout of great size are oftener found in such streams as I have mentioned is not that their waters are soft, but rather that they are deeper and more extensive; for it is well known that our main rivers are supplied from the melting snows, and it is in these great streams that the most of our trout must find their home and food, not because they prefer them, but because the smaller streams are overcrowded. Gordon Land.

From Chicago Field (1880 Jan 3, 12[21]:324):

Mountain Trout.--(Salmo virginalis.) Leadville, Col.

Editor Chicago Field:--These fish are excellent feeders when kept in confinement. They will take food from the bottom as well as in transit, and soon become familiar with a given place where they have been frequently fed, returning to it regularly and waiting with extreme patience for their allowance of food. I have purposely kept them in suspense until nightfall, to see if they would remain; and sure enough, my finny family, with mouths, were at their station upon my arrival, and evinced their delight by coming far up over the submerged platform as soon as I entered the house that enclosed the head of the pond.

I had placed a butcher's block on three legs at the upper end of the platform and inside the house, so that all food, as soon as chopped, could be tossed at once from the block to any part of the submerged floor and all pieces that fell from the block while chopping would fall direct into the water, so that the fish could get them; besides, I had a good current passing over the whole width of this floor, which was very acceptable to the fish. They would come upon the platform in great numbers as soon as I would begin my chopping; the pounding would jar the building, and of course the pond below. To rest their perceptive faculties, I would steal into the house quietly, long before the hour for regular feeding, and begin pounding on the block, and when but a few minutes had elapsed I would be sure to have a "full house," but I never had the heart to disappoint such an anxious audience. Many a pleasant hour I spent in their company.

Among them I had my favorites; their fondness for me was measured by the stock of food I was willing to disburse, yet a few of them seemed always hungry, real "Mexicans or Utes," whose desire for food was not to be satisfied, at least I never could do it. When their bellies had become so distended by food that "aldermanic" would fail to express their rotundity, the latest morsel would still be devoured. However, I did not feed them all in so lavish a manner; I fed only every other day, for my trout were all adults, and had been recently taken from a neighboring stream, and were when captured perfectly wild.

I have handled hundreds of thousands of Eastern trout, but never had any please me quite so well as these. The food given was the ordinary creek-sucker cut up into small pieces; bones, fins, heads and all, nothing came amiss, eggs and entrails included; this, too, being their natural food, only improved by hashing. Fish and insects are the proper food for trout. By making ponds more like deep, narrow ditches, than lakes, trout can be better fed with less trouble than in any other *way;* and here I will add that no feeding pond for adult trout should be a greater length than twenty feet if the best results are to be attained, and in no case longer than forty feet unless two feeding stations are employed, and then the twenty-foot division will be found the best. I am indepted to Mr. Thompson, of New Hope, Pa., for the use of a clean board bottom to feed over, he having kindly written to me his method and manner of feeding. Gordon Land.

From Chicago Field (1880 Feb 21, 13[2]:19):

Singular Incidents in Trout Raising. BUFFALO SPRINGS, COL.

EDITOR CHICAGO FIELD:--In one of my ponds, the lower of the chain. I had placed several thousand creek suckers to serve as food for my trout in time of need. My reason for placing them in this pond was that it contained a superabundance of insect life, and aquatic vegetation, and in it I had only two or three thousand mountain trout of medium size; this seemed to be sufficiently well stocked with food for both the suckers and the trout. Up to the time of the introduction of the suckers, my trout were fat and sleek, but after about two months I began to notice their lank appearance, and by the end of another month I saw plainly that unless I gave them food other than that they were able to find in the pond, they would surely die of starvation. While this famine was playing sad havoc with my "spotted beauties," the greedy, fat, ugly suckers were flourishing; they displayed their powers as persistent feeders to the best possible advantage. Every stone, stick, bunch of moss, and aquatic weed was robbed of its insect life; indeed, the bottom of the pond was fairly cleaned by these rapacious feeders, and every bed of mud was worked full of holes by them. I never beheld such a growth in any fresh-water fish as in these ugly suckers; many of them were less than two ounces in weight when put into the pond, and when taken out and killed three months after, tipped the scales at eight to ten ounces. So much for an abundance of food of the right sort, and to carry out the principle these burly fellows were chopped up and fed to the very fish they had robbed. I had the pleasure of seeing my lank and hungry trout devour them, heads, body, and bones; for I cut up the entire fish. In a few months the insect life again became abundant, and I resolved henceforth to let my trout wiggle in ponds that contained no suckers.

Many I know will wonder how I removed my suckers from the water in which I kept both, without handling my weak and starving trout. I did it by using a strong current of water passing through a trap box of singular, though simple construction. First having drawn down the water until it passed along a narrow channel in the center of the pond, I placed one of these boxes at each end (inlet and outlet). I had them so made that most of the water passed through a lower false bottom, while the fish (both kinds) passed into the trap through which a constant, though gentle, stream flowed; once into this compartment return was impossible, nor could they injure themselves in any way. Out of this section I could easily remove the objectionable fish with a small square dip-net, a few at a time, and when all but the trout were removed, a slide was inserted to divide the space so that new incomers could enter without mixing with those already there. Out of the upper box-division the trout could escape into a vacant or temporary place above, and a similar provision was made in the box below. By such simple, durable, and inexpensive devices I am able to control my fish at all seasons in the most complete and satisfactory manner, for almost any fish will move up or down when, as above cited, a strong current is employed, and a complete and radical change made in the pond by lowering the water. While engaged at these ponds I was often annoyed by the depredations of mink. Not being much of a trapper I wrote to Seth Green for advice, knowing that he must certainly have had some experience with them. From him

I was pleased to receive a highly satisfactory and prompt reply. He related how, upon one occasion, he had been robbed by a number of small fish that he intended to use as bait, by a mink that happened his way. After carefully reading over his letter I resolved upon the following: I bought at once one-half dozen Newhouse No. 1 mink traps. I made several small shallow boxes, which I placed near the inlets and outlets of my ponds, sinking them close to the bank so that about two inches deep of water covered the bottom; into each box I put a number of small live fish; also one mink trap, lying in the water and chained to the box. I then felt ready for business, and I can safely state that from that time on I had the mink under control. I captured them at intervals until eleven fell a prey to the traps.

The mink business overcome, I still had an enemy for trout, that gave me several uneasy nights. Looking for mink signs in the snow, I discovered foot-prints of a bird, and upon several occasions freshly killed trout. This unwelcome visitor always came at night, and disappeared before dawn. Being mid-Winter I felt sure it was not the night-heron, nor any wading bird, for my noctornal thief usually alighted upon little mounds close to the bank, as I found by his footprints in the snow. Conscious of his success as a fish-destroyer, not only from the number of partly eaten fish that I found but also from the frequency of his visits, I determined to do a little night watching. My poacher put in an appearance about nine o'clock; the moon being full I could easily discern his outline. Bird it was sure enough, but what kind. This, by the aid of my ten-gauge Charles Daly, I tried to determine, but what should have been a well-directed shot proved a bad one, for my bird took to his wings, while I, no wiser, but a very sold man, took to the house, resolved to try my skill by daylight. The next morning I made a careful examination of the banks of my ponds and found that his birdship invariably alighted upon any little hillock or eminence near to the bank. I then went immediately back to the house and sawed off three or four blocks from a small log about twelve or fifteen inches in height; these I placed at intervals along the bank and chained my mink traps, one to each block, setting the trap on the top end, covering it loosely with dry snow. The next morning to my complete surprise I found a large horned owl with one foot securely in the trap; this was my experience at intervals of a few days until I had captured five, when Spring opened up and my fishing owls perhaps found that mice, young rabbits, and ground squirrels were more easily obtained than trout in shallow water.

Another curious incident, or rather a number of them; that came under my observations at this place was the frequent attempts on the part of the common mouse hawk to take trout from the shallow water or riffles between my ponds, though I never knew them to be successful. I often shot them in making the attempt. Gordon Land.

From American Angler (1883 Mar 24, 3[12]:186):

THE GAME FISHES OF AMERICA.

With the issue of January 6, 1883, the first of the Third Volume of THE AMERICAN ANGLER, we inaugurated the series of essays on "The Game Fishes of America." They will be continued through the year 1883, and probably extend over some months of 1884.

The following named eminent writers on angling have either forwarded their MSS. or are now preparing it for publication as a part of the series:

Mr. Charles Hallock, an essay on "The Sea Salmon."
Mr. W. David Tomlin, "Norman," an essay on "The Brook Trout" and "The Grayling."
Col. F. S. Pinckney, "Ben Bent," an essay on "The California Trout."
Mr. A. N. Cheney, "A. N. C.," an essay on "The Salmon or Lake Trout."
Mr. H. H. Thompson, "H. H. T." an essay on "The Land-Locked Salmon."
Mr. A. R. MacDonough, an essay on "The Sea Trout."
Mr. J. G. Rich, an essay on "The Rangeley Trouts."
Gen. R. U. Sherman, an essay on "The Bisby Trout."
Mr. Gordon Land, an essay on "The Trout of Colorado."
Mr. W. Thomson, "W. T.," essays on "The Mascalonge" and "The Pike."
Mr. A. N. Cheney, "A. N. C.," an essay on "The Black Bass."
Mr. S. C. Clarke, "S. C. C.," an essay on "The Fishes of the Southern Coast, including the Gulf Coast of Florida."
Judge F. James Fitch, "Fitz." an essay on "Amateur Rod Making."
Mr. D. W. Cross, an essay on "Minnows as Bait."
Dr. E. Sterling, an essay on "Catfishes."
Dr. D. C. Estes, an essay on "The Wall-Eyed Pike."

From American Angler (1883 May 12, 3[19]:291):

THE COLORADO MOUNTAIN TROUT.

SALMO VIRGINALIS.--GIRARD

Eight Paper

This fish presents, when in fine condition, a singular beauty. The sleek, plump and graceful form displays an array of nicely-rounded black spots on back and sides that increase in numbers from and including the dorsal to the extremity of the caudal fin. These black spots are distributed over a beautiful greenish brown color that gradually lightens below the lateral line until it approaches an almost pure white on the belly. In the spawning season a tinge of crimson pervades the gill covers and extends backwards past the pectoral fins. The head and jaws are strong and shapely. In the males the lower jaw protrudes somewhat beyond that of the females.

The habits of the Colorado trout are varied and well adapted to the conditions the mountain lakes and streams afford, seeking the cool or shallow water in summer and returning to the deep or warm waters in the winter. Those in the stream have a fixed habit of ascending with the rise in water consequent upon the melting snows and the approach of summer, and gradually drifting back into the deep pools with the receding waters, and finally when the frosts of winter cut off both the abundance of water and their supplies of food, they retire into the deeper and lower portions of the snow-water streams, where they remain until the advent of another spring. If, on their downward journey, they encounter a spring stream or pool fed by springs of high enough temperature to afford open water and food for winter, there great numbers will remain; but, as if gifted with human foresight, only as many will stay as the water will sustain. The others will continue downwards until a suitable place to pass the winter in is found.

Their brethren,whose home is in the lakes, pursue a different course, going both up and down stream with the rise of water, if the lake has inlet and outlet, and returning back into the lake on the approach of winter, finally descending into its depths to pass the icy months. Many have wondered at this seeming difference of habit of the same variety of trout, but investigation shows the habit true to nature. In this connection I refer particularly to their habit of going down stream out of the lake when the same variety of trout in the streams are going up, as are also those that ascend the stream that flows into the lake. The reason is, they are seeking the streams for the purpose of spawning, and

if the winter quarters happen to be in a spring stream of high temperature instead of a deep lake they will back down and out into some cooler stream where the temperature is congenial. The reason why they find their way back into a lake to winter when it is necessary to ascend its outlet in order to reach it, is not because they are able to return to it by instinct, but owing solely to the fact that the surface water of the lake which flows from its outlet is so exposed to the heat of the sun as to be in itself a sure guide by reason of its high temperature, so that a trout descending the main snow water stream in search of a place to winter is attracted by the warm, spring-like flow from the lake, and naturally ascends. So it will be seen that the same variety of trout, governed by one habit, go both up and down stream in spring and fall.

The spawning season of this trout extends over a period of not more than two and a half months, the greater number depositing their eggs between May 15 and June 15. However, I have met with females filled with ripe ova in September, but such instances are rare, and only encountered high up in the snow-water streams. At the Twin Lakes, where this fish is found in great numbers, and where the elevation exceeds 9,000 feet, the young trout make their appearance the first week in July.

In all the lakes of these mountains the trout go in great schools, and when the lucky fisherman finds a school around him he should lose no time, but keep close to his work. Upon such occasions several hundred may be taken by an expert angler in a few hours with hook and line. They will bite equally well at grasshoppers or artificial flies at such times. In the streams they do not bite well until after "high water," which is from the 1st to the 15th of June. During July and August they occupy every riffle and eddying pool, and eagerly rise to flies or other insects that may chance to fall on the water.

Denver, Colo. G.L.

From FS (1883 Dec 6, 21[19]:367 c 3):

THE TROUT OF COLORADO.--Cataract Lake, Nov. 22.--In FOREST AND STREAM of Nov. 8, Senator G. G. Vest makes a very great mistake in asserting that the 4 1/2-pound trout taken by him while fishing in the Rio Grande Del Norte, in Southern Colorado, was of the species known as Salmo fontinalis. For as a matter of fact no such fish are native in that stream, but the common black spotted mountain trout, S. virginalis, of Gerard, is found there, and the fish taken by the Senator was undoubtedly of that species. Neither are there any brook trout in the waters of the Snake River or the Gros Ventre, if by brook trout he means the S. fontinalis of Mitchell. But the black spotted trout with reddish fins, and the black flecked trout with yellowish fins are both found there. The first named is widely known as mountain trout and the last as the salmon trout, but they are wholly unlike the salmon trout of the Great Lakes, the S. confinis of De Kay, or more properly the S. namaycush of Pennant. No person need come to the streams of the Rocky Mountains expecting to catch the common brook trout of the East, nor of Virginia, for S. fontinalis is not found here, except in such streams as have recently been stocked by the Fish Commission or through private enterprise. I can fully agree with the Senator in the matter of flies for mountain trout, although I would add the black gnat and the grizzly king to my outfit.--Gordon Land.

The above article is confusing to me because I have been unable to substantiate that Land spent any of his early years in Wyoming where he could have acquired knowledge of the two trout "forms" in the Snake River and Gros Ventre waters. To this day, one of these forms (the fine spotted Snake River cutthroat trout) has not been officially described as a new species or subspecies (Robert J. Behnke 1979 Monograph of the native trouts of the genus Salmo of western North America pp 75-80). Land, however, had considerable fish culture experience in the South Platte and Arkansas drainages of Colorado and probably assumed that the "forms" he encounterd there were also found in Wyoming waters. In any event, this article probably was the earliest to have noted a "black flecked trout with yellowish fins."

From U.S. Fish Comm. Rep. 1885 (p 114):

Gordon Land, Denver, Colorado, was sent 10,000 rainbow trout eggs on February 25 from McCloud River station in California.

Gordon Land wrote back to the California station prior to March 15 that the 10,000 eggs arrived in good condition (U.S. Fish Comm. Rep. 1885 p 311).

From FF (1886 Jan 23:3):

The Colorado Fish Commissioner [General John Pierce] says there are one million trout in the various hatcheries of the State, distributed as follows: In the state hatchery, 300,000; in Bogart's hatchery, at Central Park, 200,000; in the hatchery at Grant's smelter, 100,000; in Land's hatchery, at Nathrop, Chaffee county, 200,000, and 200,000 in my four private hatcheries.

From Bull. U.S. Fish Comm. 1886 (pp 314-315):

HATCHING AND FEEDING OF ROCKY MOUNTAIN TROUT,--The following is extracted from a letter of Gordon Land, dated Nathrop, Colo., September 7, 1886:

I believe that the Rocky Mountain trout (Salmo virginalis) of this State are very desirable fish tor tne trout breeder, inasmuch as they are summer spawners and grow rapidly, are easily taught to feed, and will readily take food from the bottom as well as in transit. They do not bite each other as much as do the common brook trout (Salvelinus fontinalis), and live quite harmoniously together. My experience this year in hatching their eggs was somewhat unusual. I took the spawn on June 21, and in seventeen days the eye-specks were plainly visible; in twenty-five days, or on July 16, they hatched. The temperature of the water varied from 52° Fahr. at night to 62° during the middle of the day. Part of the time the eggs were buried in mud from a freshet that had flooded my hatchery, but I did not lose any on that account. They feed like little pigs. I never used water of so high a temperature before. At my other hatcheries the temperature was 45° and 52°; in either case the eggs did well, but were of course longer in hatching. The best results I ever had in feeding were at Buffalo Springs, in South Park (Park County, Colorado), where I fed them on finely chopped suckers--bones, fins, heads, entrails, and everything. The water was cold, 44° Fahr., but when fed on suckers the trout grew at an astonishing rate; many of them, which I sold in the market at nine months old, averaged 4 and 5 ounces each, dressed. Had I possessed warmer water and such an abundance of fish-food, I believe I could have done still better.

From FF (1890 Mar 8:6); SA (1890 Feb 14, 4[4]:68-69) or FS (1890 Jan 23, 34[1]:8 c 2):

Mr. Land says: "I notice one error that has been published by some of the papers, and that is in regard to the yellow fin trout of the Twin lakes,

> wherein it is stated that they are found only in that particular body of water. I have myself taken and spawned them in the waters of Chalk creek, Chaffee county, and, in fact, all the tributaries of the upper Arkansas, although I have not taken them in any other watershed. I mention this merely to show that they do not inhabit solely a lake or a single tributary of a stream, but are in all of the headwaters of the same stream, as it is only natural that they should be."

Taxonomic expert Dr. David S. Jordan stated in FS (1889 Sep 19, 33[9]:167) that:

> While we were at work on the exploration of Colorado, Mr. George R. Fisher of Leadville, an enthusiastic and very well-posted angler, called my attention to the existence of two native species of trout in the Twin Lakes, a body of water tributary to the Arkansas River near Leadville. Through Mr. Fisher's help we were enabled to secure numerous specimens of these species. One of them, the "yellow-fin," seems to be a new species, and it is certainly very different from the common mountain trout. The black spots on the body and fins are very small, mere specks. The lower fins are all bright yellow, and there is a distinct yellow lateral band. The fish is abundant on sandy bottoms in the Twin Lakes, and readily takes the fly. Its flesh is paler and more watery than that of the ordinary trout, and on the whole inferior. We have not yet decided upon what its Latin name shall be.

What transpired was confusing and difficult to reconstruct chronologically. D. S. Jordan and B. W. Evermann described the yellowfin trout in a short letter dated January 10, 1890 (FS 1890 Jan 30, 3412]:29 c 1-2) and noted that the same description was also to be published in the Proceedings of the National Museum (v 12). In the later reference (p 453) they mentioned that advance sheets of this paper were distributed January 20, 1890. I extracted the following from their original description (pp 453-454):

> About ten specimens of this species [yellowfin] were taken with the fly in the lower Twin Lakes, about 15 miles southwest of Leadville, a beautiful mountain lake tributary to the Arkansas River.
>
> Most of the specimens were taken by Mr. George R. Fisher, of Leadville, a very enthusiastic and very well informed angler who first made known to us the existence of the species and accompanied our trip in search of it.
>
> There are two kinds of trout native to this lake, the yellow-fin or "Salmon Trout," above described, and the smaller "Greenback Trout," also found in the Arkansas and Platte, Salmo mykiss stomias.
>
> The yellow-fin trout lives largely on the gravels and about the north or sunny side of the lake. It reaches a weight of 7 to 10 pounds, the very large fish being usually taken with the spear; specimens of 13 pounds weight are reported. The species never leaves the lake except to spawn, and most of them spawn in the lake. It has never been seen in the river, and rarely in very deep water.
>
> The fish feeds freely on young suckers and even on young trout. It spawns in spring and the suckers infest its spawning beds, devouring the eggs.
>
> The flesh of the yellow-fin trout is very pale, and more watery than that of the other trout of Colorado. In flavor, its flesh is not inferior to the other species [contrary to Jordan's first note]. The color of the flesh may be due to the fact that it feeds on fishes rather than on crustacea. The "Greenback Trout" (S. m. stomias) feeds on crustacea and has very red flesh.
>
> We have taken pleasure in naming this species foL Hon. Marshall McDonald, U. S. Commissioner of Fisheries, in recognition of his services in spreading the range of Salmonidae in America.

Apparently Gordon Land, who was then Colorado's Fish Commissioner, had received an advance copy of Jordan's and Evermann's original description of the yellowfin trout because even before their description first appeared in FS (1890 Jan 30), Land wrote in FS (1890 Jan 23:8 c 2) his comments, noting some errors. Despite this, David Starr Jordan, when he published in 1891 his "Report of explorations in Colorado and Utah during the summer of 1889, with an account of the fishes found in each of the river basins examined" (Bull. U.S. Fish Comm. 1889 v 9 pp 1-40) referred to Salmo mykiss macdonaldi (Jordan and Evermann) as "the yellow-finned trout of Twin Lakes." He did, however, mention that the yellowfin trout had long been known to anglers to exist in Twin Lakes, and that Messrs. G. Land and G. R. Fisher had in one way or another, at different times, called attention to it. The inclusion of Land's name here differs from the original description that only mentioned Fisher. Furthermore, Jordan's 1891 description did not state that most yellowfin spawned in the lake and that they had never been seen in the river (Arkansas) as was written in the original description.

A document entitled "Notes from Joseph Hutchinson's Mining Expense Book--1871" printed in Under the Angel of Shavano (G. G. Everett and W. F. Hutchinson 1963 Golden Bell Press, Denver. Pp 66-67) lists $186 for G. Land in September 1871. Apparently Gordon as well as his brothers, Frank and Scott, were mining in the Arkansas Valley in the early years. F. A. Land (p 284) was one of several claimants for the Pioneer **Ditch from Brown's Creek on May 17, 1866, while S.E. Land was associated with the Hancock Placer in July 1880 (p 483) on which that townsite was founded. An obituary of F. A. Land (1843-1921) in The Salida Mail (1921 Jan 28:1 c 1) may be in error because it stated that he came to Colorado in 1871 and located at Leadville. Brown's Creek** enters the Arkansas just south of Nathrop where Chalk Creek joins the Arkansas. Hancock was in the upper Chalk Creek drainage near the Alpine Tunnel. Joseph Hutchinson came to what is now Chaffee County in 1866. He had extensive mining interest near Granite and had ranged cattle from around Tennessee Pass to as far south as Saguache by 1871. He had a ranch on the Little Arkansas close to Salida. Several accounts of the wildlife in this area by Hutchinson and other early settlers were given in the Everett and Hutchinson book from which the following accounts are extracted:

> [Hutchinson, pp 64-65]: At the time the country was settled, deer were very plentiful. There were some elk, but no buffalo, although there were a great many buffalo skulls around the country. From the best information obtainable at that time from the Indians, it was reputed that there was a very severe winter back around 1844 and practically all of the buffalo perished. The few remaining ones were exterminated before the coming of the white

men. Beaver were everywhere, and during the winter of 1879 a trapper by the name of Wilson succeeded in getting sixty pelts from the Little Arkansas south of the Hutchinson ranch. Antelope were particularly plentiful in the foothills and valley country and large herds were frequently seen around Missouri Park. Fishing was exceptionally good in both the North and South Arkansas and it was not uncommon to catch trout weighing four and five pounds. This country was well known by the good catches of trout and people came for miles around to camp and fish. At one time in the 1870's a fish canning factory was contemplated here.

[John Mundlein, pp 215-216]; When Mr. Mundlein came to this country, deer, elk, antelope, and mountain sheep were very plentiful in the vicinity or the present town of Salida, but there were no buffalo. Fish were plentiful in the Arkansas River at that time and in the '70's he recalled a particularly large school of fish going up the Little Arkansas River during the latter part of June after high water. A cockney of London named Watkins had rented a piece of land on what is now the Velotta Ranch and was raising vegetables, selling them to the miners. Watkins and another party by the name of Wilson were along the stream at that time. He met them later with about a half bushel of fish in a sack. They showed him the fish and told him that if he would get a fork, he could throw as many out of the creek as he wanted.

Beaver were very abundant in the streams when he first reached this part of the country. The ditch on Mr. Mundlein's place at the time he purchased it from Schriver in 1868 was not taken from the river but had its intake in a large beaver dam. This was interesting since it has been claimed that beaver did not exist or at least existed in no great numbers on the eastern side of the Continental Divide in the early days. However, they were very abundant here and at times some difficulty was encountered by the ranchmen in keeping their ditches open.

Hunting for the market commenced about the time that the Leadville mining camp started. The freighters would make a trip from the nearest railroad point into Leadville with supplies and quite often would load up with game for the return trip which was sold largely on the Colorado Springs market.

[Noah Baer, pp 225]: When Noah Baer first came (1860), the country was all a "wilderness, wild, virgin, beautiful and largely unexplored." He stated that wild game was plentiful everywhere and that the streams abounded with fish. This condition existed until about the time of the coming of the railroad (after 1879). Much of the game was killed to feed the construction crews.

The scientific community, which has based nearly all its statements and knowledge on the fishery surveys of Jordan in 1889, contends that originally only the greenback trout was present in the Arkansas and South Platte rivers and that it was a small fish, usually less than 2 pounds. The yellowfin trout, however, was reputedly found only in Twin Lakes and was a large trout. In an article entitled "The Rocky Mountain Trout (Salmo stomias)" in the Chicago Field (1880 Feb 14, 13 [1]:5), about 400 trout were caught from the South Platte River near Bailey the first two days of July 1880 by two fly fishermen and none weighed over a pound, but further down the river in the foothills 15-20 miles above Denver, fishermen took trout that weighed from 5 to 10 pounds with live bait or spoons. It was also noted that the larger trout seldom or never would rise to a fly. The coloration and spotting patterns for the trout caught were briefly described and clearly recognizable as cutthroat trout, but they were not suggestive of yellowfin trout.

If the Chicago Field article and the Hutchinson account of the large trout were true, then either greenback trout originally grew to much larger sizes than our scientists reported or yellowfin trout were present in both the Arkansas and South Platte rivers. Land, however, said the yellowfin was only in the Arkansas River drainage, and if this was true, then the undescribed large trout mentioned for the South Platte by Chicago Field had to be either greenback trout or a third variety. Most likely they were large greenback trout.

There were other reports of large fish in the early years from Front Range waters in Colorado. The RMN (1882 May 5:2 c 2) mentioned that "a twenty-five pound salmon was caught in a millrace near Trinidad the other day." I have doubts that this fish could have been a true salmon because the term "salmon" or "salmon trout" was frequently used in the early years for any large, unusually red-meated trout. Jordan and Evermann actually used "salmon trout" in their original description of the yellowfin trout.

In SA (1891 Mar 15, 6[3]:62 c 3), W. R. Scott reported hearing of some natives caught in the South Platte, from Buffalo station down, weighing as much as 10 pounds. He stated, however, that the largest he had seen was one he caught himself on Oct. 17, 1889, just above the junction of the south and north branches of the South Platte. It was a male and weighed 3½ pounds when taken from the water. Another notable fish from the South Platte River was taken by P. M. Lessley on June 19, 1892, just below Dean's station on the Denver and South Park Railway, only 28 miles from Denver. It was, according to SA (1892 Jul 9, 2:39), a monstrous "cutthroat" trout (Salmo mykiss) that was said to be the largest of its kind ever taken in those waters, measuring 23½ inches in length by 6 inches in depth, and weighing 5¼ pounds. Later, P. Miller captured a native at Buffalo weighing 10 pounds 7 ounces (SA 1897 Oct 19[4]: 281).

SA (1891 Jun 15, 6[6]:161) showed a photograph of three trout (Fig. B-20), clearly identifiable as cutthroat, taken from John Thompson's lake near Buena Vista (Arkansas River drainage) that were reported as weighing 6, 4, and 3½ pounds. Nearly all state and federally-reared natives stocked in Colorado waters prior to 1898 were taken from Twin Lakes' spawners and were primarily greenback trout. No state Fish Comm. Rep. ever documented rearing or stocking the yellowfin trout, but FF (1894 Jul 21:7) noted: "the state of Colorado has secured 10,000 eggs of yellow-fin trout, a rare fish... Mr. Callicotte [then Fish Commissioner] will endeavor to stock a number of the streams with yellow-fin species."

From FF (1891 Mar 14:4):

On the Habits of our Native Trout.

--FISH COMMISSIONER GORDON LAND--

In reply to the statement that trout enter the great irrigation canals of the San Luis valley as early as May or June I will say, that, knowing such to be a fact was one of the prime causes of my objections to the placing of screens at the head-gates. Other people and not the "commissioner" stated that screens would only be needed in the fall months. What the "commissioner" did say in regard to the habits of our native trout was that they went up stream in search of cool, shallow waters in which to deposit their spawn in the early summer, and that they went down stream as soon as the waters began to recede, or as soon as they had performed their mission of depositing their spawn, or when impelled down by the approach of winter in order to find deep or warm water in which they could have both food and shelter.

There are many instances where our mountain trout go both up and down stream in the early summer when in search of gravel beds in shallow waters for the purpose of depositing their spawn. Notably at the outlets of all our large mountain lakes, in fact all our breeding trout at the Twin Lakes hatchery, are taken when decending the outlet stream in May and June, and the bill now before the legislature for the purpose of erecting a suitable screen at the outlet of the lower Twin Lake is especially designed to prevent the escape of the fish, down the stream. At the upper end of the Twin Lakes the fish go up stream for the same reason that they go down stream at the other outlet, viz.: they are in search of spawning beds in the cool running waters.

Man has produced the change on the Rio Grande that now apparently makes them change their habit of running up stream. Before the ditches were constructed in the San Luis valley no one ever knew our native trout to go down stream in May or June. They could not find the cool, shallow riffles except by going up. Now these large canals offer new conditions both in spring and fall, and the fish drift into them at all seasons when the ditches are carrying water, and especially so when they are coming down stream on the approach of winter. It is then that their habit is a fixed one, and no means known to me except a spring-branch or a deep pool will divert them, or cause them to refrain from their downward course. They certainly will not go up the ice cold waters of the main stream at this season of the year.

In May, 1883, I published in the American Angler a full description of these peculiar habits of our native Colorado trout. In that paper the movements of our mountain fish are quite minutely described, and they are in full accord with what I have stated above. Except on occasions when I have been misquoted--and they have been very frequent--no different statements have been made by me.

From Denver RMN (1901 Jul 28:12 c 4):

DAMS FOR FISH

Gordon Land an Expert Piscatorial Artist, says They Should Be Used at Once.

Millions of Trout Being Lost to State and Anglers During Winter Months.

Railroads, He says, Should Pull Together for the Purpose of Maintaining Hatchery on Their Own Responsibility-Outlook in Hills.

Judging by the conversation of tourists now in the state, trout fishing is one of the main attractions of the Rocky mountains. Anything that will assist in supplying the streams with a larger number of trout will be of material assistance in increasing the popularity of Colorado as a summer resort. In speaking of this subject last evening, Gordon Land, an experienced fish man and for several years in charge of the game and fish interests of the state, had the following to say:

Not all the streams of Colorado are fishing streams. Many of them are ruined by sawdust and mining plants, and these may be left out of the calculation. At the same time there are plenty of mountain streams in this state that ought to be carefully guarded as trout preserves. The use of the water after it leaves the mountains prevents the mountain trout from coming to the deep water in the winter, as was their habit in the earlier days. They are confined to the streams higher up in the mountains, and as a result many of them are killed in the winter when the streams freeze up. The remedy for this is to provide rough dams at different places in the mountain streams, making the water three or four feet deep and providing a place where the fish may live in the coldest season of the year. These dams would cost little money, and in many instances they could be made by the railroad laborers at odd times. I consider the dams highly important, as without them the state is losing large quantities of fish every winter.

The railroads of the state, continued Mr. Land, ought to combine for the fish interest and they ought to maintain a hatchery on their own responsibility at a point convenient for the principal lines. The Denver and Rio Grande, Colorado and Southern, Colorado Midland and Burlington are lines that should in every way possible encourage the propagation of mountain trout. If these lines would unite on the fish question and establish a central hatchery subsidiary to the state hatcheries, it would be a great step in the right direction. The cost would not be heavy to any of the roads, and the effect in encouraging fishermen to come to the mountains would be immense. There is nothing more strongly appeals to the average man than an opportunity to catch mountain trout, one of the gamest of fish. The Platte river above its exit from the mountains ought **to be one of the greatest fishing grounds in the world [Fig. B-21], and the north and south forks of the Platte are unsurpassed in natural advantages for fishing, but it will require constant attention and supervision to make the streams what they ought to be as fishing resorts. What is it gives fame to the Gunnison region? It is the fishing [Fig. B-22], and men living in Denver ride 250 miles to reach the fishing streams in the Gunnison region. The St. Vrain and** other streams in Northern Colorado are excellent for fishing, but the amount of fish to be found is very small under present conditions. Boulder ought to be a great fishing town. The people of Boulder, however, take no interest in the fishing opportunities of some of the streams above the town, and nobody is attracted to Boulder on a fishing excursion. I will venture to say if the Boulder people will turn their attention to improving the streams for fishing, the town in three years could not accommodate the strangers that would be attracted from distant points.

This question of developing the fishing interests of Colorado, in the opinion not only of Mr. Land but of many other Denver men, has not received the attention it deserves. Strangers arriving in the state are surprised that the subject is not more thoroughly appreciated, as there are large regions in Colorado, with excellent streams, where no fishing is to be found.

From Lillian Brigham (Colorado Travelore 1938 The Peerless Printing Co., Denver. p 192):

Tour 75--Tour Creek Pass to Buena Vista Jct--13.7 Mi.

In Cochetopa Forest here, Trout Creek's CCC has planted willows for flood control along artificial dams, in an effort to restore the once beautiful stream. Beaver colonies originally had a succession of dams and trout-filled pools--now eroded. After erosion depleted the fish supply, Gordon Land, a Detroit scientist, built a Fish Hatchery where Hwy crosses Trout Creek.

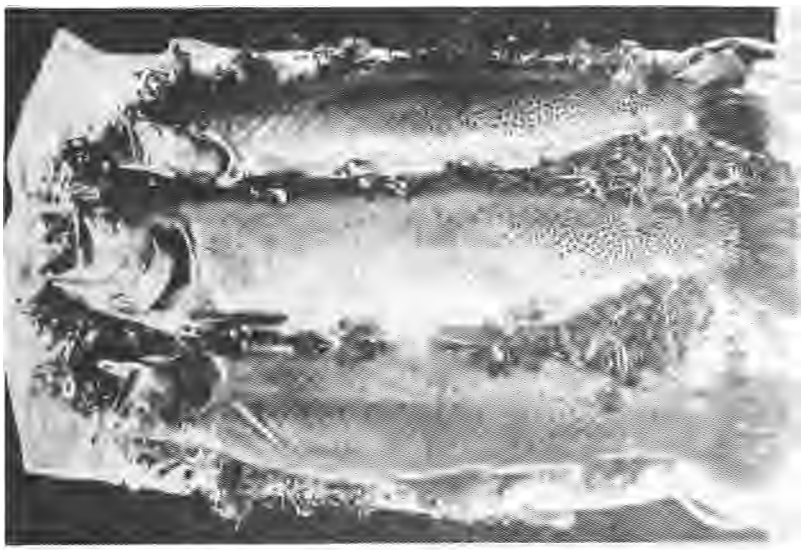

Fig. B-20. These CUTTHROAT TROUT were caught from the Arkansas River drainage in 1891. (Photo from SA 1891 Jun:161)

Fig. B-21. These TROUT were caught in the South Fork of the South Platte River. (Photo from State Biennial for 1909-1910)

Fig. B-22. These RAINBOW TROUT were just a portion of the fish caught in deep water with minnows on a No. 4 hook, below the confluence of the Tomichi and Gunnison rivers on Aug. 4, 1895, in about 3 hours time by W. A. Welch of Lyons, Colo., J. B. Clements of St. Louis, Judge McDougal of Gunnison, and E. T. Bailey of Hartford, Conn. These fish weighed, when caught, a little over 80 pounds, and after cleaning, 66 pounds. The largest was 9 pounds before dressing, and the smallest 5½ pounds. No doubt, it was catches like these that prompted the National Geographic Society to rate the Gunnison River the best trout stream in the United States, and Gordon Land to state "...men living in Denver ride 250 miles to reach the fishing streams in the Gunnison region..." (Photo by E. N. Clements, Denver, for SA 1895 Sep)

APPENDIX C
GORDON LAND GENEALOGY

I recently read John Hart's typewritten "Colorado's Department of Game and Fish - Yesterday - Today," (1954:11) and Assistant Director Hart stated that Commissioner Gordon Land's widow was one of Charles Lindbergh's aunts and she became one of Colorado's best known citizens for her work in the education field. Lindbergh (1902-1974), the famous aviator, was a prolific writer. The Lindbergh-Land family genealogy is briefly given by Charles A. Lindbergh (Autobiography of Values 1976 Harcourt Brace Jovanovich, New York and London, pp 404-05). From this, it appears that Gordon Land's niece, Evangeline Lodge Land (1876-1954) was Lindbergh's mother. Her father, Charles Henry Land (Lindbergh's maternal grandfather, 1847-1922) was a Detroit dentist-inventor and one of at least three brothers of Gordon. The other known brothers were Frank (1843-1921) and Scott (1850-1923), also Coloradoans. Very little, however, is given on their genealogy.

Hart mentions (p 42) that S. E. Laird (known to be typographical error for Land) was State Superintendent of Colorado hatcheries when he died in 1923. Scott Ephraim Land (1850-1923), according to his obituary in the RMN (1923 Aug 29:14 c 2-3), married Jennie Emory, of Hamilton, Ontario in 1876 before coming to Colorado from Detroit in 1879.[13] Actually, Scott may have been in Colorado before 1879 because he talked of killing 140 hawks for bounty in South Park, Colo. in the season of 1877 near the lakes at Buffalo Springs (FF 1890 Mar 1). Gordon had begun a fish facility there in 1875. Furthermore, Scott's son, Emory, was born at Canon City, Colo., on Jan 9, 1879, which indicates that the Scott Land family had come to Colorado earlier. I already mentioned that S. E. Land was associ- with the Hancock Placer in July 1880 in the upper Chalk Creek drainage near the Alpine Tunnel. His obituary said that "Scott was engaged in the real estate business for a number of years and played an important part in the building of Montrose and Alpine, Colorado, where he resided before coming to Denver."

According to early Gunnison and FF newspapers, Scott spent a few years in the Montrose area before 1891. He was manager of the Montrose Livestock Co. in July 1887 and was elected secretary of the Uncompahgre Stock Growers Assoc. in 1889. After Gordon Land had been appointed Colo. Fish Commissioner, FF (1889 Mar 2:2) said that "the Lands are wide awake representative men in this new west." In the 1892 Denver Directory, Scott Land was listed as a real estate agent at the same address with his brother, Gordon. Apparently Scott had spent some time as a fish culturist in northern Colorado (Weld County) and Wyoming before being appointed Superintendent of the Gunnison Hatchery in April 1903 (RMN 1903 Apr 19:2 c 5 and Apr 22:11 c 2). His obituary noted that "he was a former deputy fish commissioner for Wyoming and built a number of fish hatcheries in that state." FS (1895 Jun 1:447) mentioned Supt. S. E. Land planted 50,000 trout in Dome Lake in the Big Horn Mountains, Wyoming.

Colorado Commissioner John M. Woodard in his 1903-04 biennial (p 21) remarked:

> imported, from Wyoming, Mr. Scott E. Land, who has no superior as a fish culturist. I placed Mr. Land in charge of the Gunnison hatchery, as superintendent, this hatchery being the most difficult to handle of any in the state, on account of the temperature (38 F) and quality of the water. I also placed Mr. Land there for the purpose of establishing and operating spawning stations along the Gunnison river, and he has been very successful with this work. With two such men as Mr. Kincaid and Mr. Land there is no reason why the fish business in this state should not be a complete success.

Although state spawning stations were established on the Gunnison River as early as 1897, it was not until 1903 and later, under Scott Land's leadership, that sufficient numbers of rainbow trout eggs were secured, which permitted the initial stocking of this species in many of Colorado's streams and lakes, especially in West Slope waters. The Gunnison Tribune (1903 May 29) remarked:

> The spawning station on North Beaver Creek was closed last Friday by Superintendent Land, of the hatchery. The month's work resulted in catching 3,232 rainbow trout, from which 2,000,000 eggs were taken and placed in this and the Denver hatchery. This breaks the record in any of the states of the union in state or national work, with the exception of California.

A week before this, the Gunnison News-Champion reported that S. E. Land had procured 10,000 eggs from a 13 pound rainbow trout taken at the spawning station. Historically, this is the largest rainbow trout that has ever been taken from the Gunnison River drainage. In 1904, the spawning crew at Beaver Creek took nearly 3,000,000 rainbow trout eggs. Scott responded to the cold-water problem at the Gunnison hatchery by privately purchasing the warm springs near Pitkin in 1906 where he constructed a hatchery 18 x 32 feet and 12 feet high with a capacity of a million eggs per year. The Gunnison News-Champion (1906 May 11) explained that Supt. S. E. Land of the Gunnison State Fish Hatchery planned to send both rainbow and native trout eggs, collected at Gunnison, to these warm springs for eyeing and then return them to the state hatchery to grow. Land said he could gain several weeks in size for the small trout when time came to turn them loose in the streams. The Gunnison Republican (1907 Jun 6) noted that the Pitkin Hatchery was shipping rainbow trout eggs to Japan. Scott probably sold this hatchery to R. L. McKnight because Color-

[13] The RMN (1941 Feb 20:16) said that Mrs. Scott E. Land was born at Burlington, Ontario, Canada, in 1855 and moved to Denver in 1877.

ado's 1911-12 biennial (p 18) mentions that Colorado was paying a yearly rental to hatch fish at Mr. McKnight's private hatchery near Pitkin. They further stated that "Our legislature should take some action toward giving us a suitable hatchery on the Western Slope, either by purchasing the new Pitkin Hatchery and site from Mr. McKnight, or by making the necessary appropriation for the purchase of a new site, and the erection of a new hatchery and superintendent's residence, for the Gunnison country."

W. H. Corum replaced Scott Land as Supt. of the Gunnison Hatchery in 1907 when Land was appointed Supt. of the Denver Hatchery, a job he retained until sometime in 1909. He then became Supt. of the Marvine Hatchery and remained at that post until being appointed State Supt. of Fish Hatcheries at Denver in 1913, a position he held until his death in late Aug. 1923 at the age of 73.

Professional writings by S. E. Land include "Feeding trout fry, or the food problem solved," (Trans. Am. Fish. Soc. 1897 1898 26:128-130), while he was a culturist for Wyoming; "The black-spotted mountain trout (Salmo stomias and related species)" (Trans. Am. Fish. Soc. 1912 1913 42: 183-198), a paper presented by Scott when this society held its annual meeting at Denver in 1912; and "Fishcultural Queeries," published in Outdoor Life (1923 Apr p 264-265). Mr. Land was a member of the American Fishery Society, the American Assoc. for the Advancement of Science, the Woodsmen of the World and was a noted authority and lecturer on fish culture. According to the RMN (1923 Aug 29) less than a week before his death from apoplexy at the Conejos fish hatcheries, near Antonito, Colorado, he gave an address at Boulder on fish culture to the Conference on Nature Protection and Conservation. No doubt, Scott was instrumental in the preliminary work on Commissioner Parvin's 20-year hatchery building and retaining-pond programs. Old and new hatcheries were then being reconstructed or built of waterproofed cement blocks on a solid foundation. Troughs made of wood were replaced with steel ones. Rearing young fish in retaining ponds increased survival of hatchery fishes.

Gordon's nephew, Emory Scott Land, a son of Scott Ephraim and Jennie Taylor (Emory) Land, was born at Canon City, Colo., Jan. 9, 1879. After graduating from the Univ. of Wyoming with B.S. and M.A. degrees in 1898, Emory was appointed to the U.S. Naval Academy from the State of Wyoming and in 1902 was graduated from Annapolis with honors, sixth in his class. In 1907, he earned an M.S. degree at the Massachusetts Inst. of Tech. after completing a postgraduate course in naval architecture. The culmination of Admiral Emory Land's 48-year naval career probably was when he replaced Joseph P. Kennedy as chairman of the U.S. Maritime Comm. (1938-1946) and headed the companion agency, the War Shipping Administration, which managed to get 55 million tons of ships built. Most authorities felt that this shipbuilding achievement, under Emory Land's leadership, contributed greatly to the Allied victory in World War II and Admiral Land's obituary (The New York Times 1971 Nov 28: 72) said that "this achievement, possibly more than any other single factor, won the global war." President Nixon remarked of this phenomenal shipbuilding feat: "Not only the nation but also the world will forever owe Admiral Land a profound debt of gratitude" (RMN 1971 Nov 29:40).

Emory married the former Elizabeth C. Stiles of Newton Center, Mass., on April 15, 1909; they had no children. Mrs. Emory Land died in 1956. Further biographical details of Emory can be found in the National Cyclopaedia of American Biography (1939-1942 F:380-381); Current Biography (1941 pp 488-490); Who Was Who in America 1969-1973 (v 5:412); Current Biography (1972: 465); and The New York Times (1971 Nov 28:74 In his genealogy, Lindbergh erroneously listed Emory Scott Land as a son of Scott A. Land, born in 1882. Emory's only sibling, a sister, Mrs. Maybell L. DeKay, was living in Laramie, Wyoming, at the time of her mother's death in 1941.

Mrs. Scott E. Land (1855-1941), a resident of Colorado since 1877, was a member of the women's club of Denver for more than 35 years. She was president of the Colorado Federation of Women's Clubs and a member of the Denver Federation of which she was chairman of its legislative department for many years. At the time of her death, she had two grandsons and two great granddaughters (RMN 1941 Feb 20:16). These offsprings no doubt were from the DeKay family.

Besides all of the early activities and fish-culture involvements that have already been presented on Gordon Land, FF (1891 Aug 22:5) remarked:

> The Antero Reservoir when completed will be the largest artificial lake, created for the purpose of irrigation, in America, and as a piece of engineering reflects great honor on the projector Gordon Land, who conceived the feasibility and devised every detail of the work.[14]

Gordon Land was listed as hydraulic engineer and fish commissioner in the Denver directories between 1889 and 1904. His name did not appear in the 1905 or 1906 directories. Gordon's first two terms as Colo. Fish Commissioner were between 1889-1892 while his third and last term was in 1895-96. SA (1892 Oct 9[5]:42) near the end of his second term remarked:

> Probably no State fish commissioner in the history of Colorado has done so much toward keeping our lakes and streams supplied with choice fish as the present commissioner, Gordon Land. His work has been persistent and earnest since his appointment and nothing that could be done has been left undone by him to make the fishing in Colorado second to none on this continent. That he is succeeding is

[14] Antero Reservoir was completed in 1913 with a capacity of nearly 11 billion gallons (Virginia Simmons Bayou Salado--The Story of South Park 1966 Century One Press, Colorado Springs, Colo. Pp. 253-254). By this time it probably was not the largest irrigation reservoir in America.

> admitted by every lover of the sport who has tried the fishing in Colorado.

Subsequently FF (1895 Jan 26:5) stated that Gordon Land was "the best posted man in Colorado on the habits and needs of fish." In the interim between his second and third term as Fish Commissioner, Denver's FF (1893 Oct 7:5) reported:

> Gordon Land of this city has invented a hydraulic ram of entirely new principal and it is said to excel anything of the kind ever invented. The hydraulic ram is a machine that is greatly needed on many farms in this country and Mr. Land, who is a hydraulic engineer of pronounced ability, has given us a great boon in this new ram.

According to the U.S. Fish Comm. Rep. 1894 (p 7), when the World's Fisheries Congress was preparing for the World's Columbian Exposition to be held at Chicago in October 1893, a large number of men prominent in fish-culture investigations in various parts of the world were invited to form an advisory council. Gordon Land was one of these men (Bull. U.S. Fish Comm. 1893 P 5).

Scott Land, although not on this council, was awarded several medals and diplomas at this World's Fair for his invention of containers for the transportation of live fish (Denver RMN 1903 Apr 19:2 c 5 and 1923 Aug 29:14). His invention, according to SA (1894 Jul 13[1]:55) was awarded the highest prize in that line at the World's Fair and was being used in several Western states. Scott, who was then superintendent of the State Hatchery at Laramie, Wyoming, constructed a new can for the transportation of young trout, which gave more satisfactory results than anything of the kind ever introduced into Wyo. SA further stated that "Mr. Land has received many flattering letters concerning the efficiency of his invention for trout transportation and many shipments have been made from one end of the State [Wyoming] to the other without the loss of a single fish."

Gordon's brother, Dr. Charles Henry Land, was also an inventor. He settled permanently in Detroit in 1871 after his dental office and personal effects were lost in the Chicago fire, and originated what was known as the "Land System of Dentistry." This system involved about twelve patented devices, including certain forms of gas and oil furnaces constructed especially for the convenient use of the dentist. His system also included the porcelain process of restoring teeth, originated by Charles in 1878. This process was improved and patented in 1886 and was used extensively throughout civilization. The first successful gas furnace used in dentistry was invented by Dr. Land in 1884 and was so nearly complete that by 1917 it was still unsurpassed for general utility (The National Cyclopaedia of American Biography 1917 4:331).

From Charles's biography in the above reference, additional information relative to his brothers, Frank, Gordon, and Scott, is inferred. Charles was born at Simcoe, Ontario, Canada, a son of John Scott and Sara (Hayden) Land on Jan. 11, 1847. His father was a civil engineer and was supposed to have been killed by the Indians on his way to Pike's Peak in 1863. Charles was educated in New York City public schools and at his father's private school at East Williamsburg. A biography of Charles in Who Was Who in America (1897-1942 1:700) mentioned that he attended public schools in New York and Brooklyn and the private school conducted by his father in Williamsburg, N.Y. Lindbergh (p 53) mentioned that John Scott Land (Gordon's father) moved from Hamilton, Ontario, in the 1850's and lived with his family in New York City and in Keokuk, Iowa. Hamilton **is where Land ancestors established "Landholm(e)" a residence used by Land relatives until the early twentieth century (Can. Mag. 1928 Aug:10).**

Lindbergh also said that about 1861, John Scott abandoned his family either to join the Union Army and was killed in the Civil War, or that he went to Pikes Peak and was lost. In any event, his family never heard from him again. Frank Land (1843-1921), born Francis Albert Land in Ontario, Canada, probably emigrated to Colo. about 1866 and spent time in Chaffee County, Leadville, and Cripple Creek. He married a widow, Helen M. Harrington (1845-1920) in 1877 and they had three children, F. A. Land, Jr., Harry E. Land, and Mrs. Winona B. Kutzleb. Frank was followed to Colorado by Gordon and then by Scott. They may have emigrated here in search of their lost father. Lindbergh noted that one of Charles's brothers became a Union soldier. In 1861, F. A. Land enlisted in Company C, Third Maryland Regiment (The Salida Mail 1921 Jan 28:1 c 1). That Gordon had spent some time in Ontario, Canada, as a boy or young man was extracted from a letter he wrote, which was published in FS (1877 May 31:261).

> That I know what an eel is when I *see* it, I will only aver that I was one of those boys who went "bobbing for eels" nearly twenty years ago. Since then I have found eels in the Grand River--a stream which empties into Lake Erie from the Canadian side near Port Colborne. They were taken at Brantford in the old canal just below the lock gates, this being some sixty or seventy miles above the Welland Canal.

According to Who Was Who in America (p 700), Charles Land studied dentistry under Dr. J. B. Meacham, of Brantford, Canada, in 1864-1866, and in the offices of Drs. M. B. Sherwood, L. P. Haskell, and W. W. Allport of Chicago during 1868-1871 before establishing in Detroit.

William R. Scott, one of Colorado's early fish culturists, explicity opposed at times the views and policies of his friend, Fish Commissioner Land. In SA (1898 Oct 21[4]:290) he wrote:

> Gordon Land, one of the most able Fish Commissioners Colorado ever had, is still in the land of the living, but he tells me that he has severed all connections with trout culture as a profession, and devotes himself exclusively to hydraulic engineering. He speaks with satisfaction and gratification concerning the different waters he stocked with trout, and his grey eyes gleam with delight as he tells of the big fellows he has caught in waters where there was not a fish until he planted the fry.

APPENDIX D
EARLY COMMERCIAL FISHING

From U.S. Fish Comm. Rep. 1903 (pp 115-118):

FISHERIES OF COLORADO.

The fisheries of Colorado, recently investigated by Mr. E. A. Tulian, in 1900 gave employment of 565 persons, of whom 546 were fishermen and the remainder shoresmen. The investment was $128,568, which included 101 boats, $2,400; 615 hand lines, $3,610; 16 seines, $1,755; 47 gill nets, $415; shore and accessory property, $118,888 and cash capital, $1,500. The products aggregated 1,360,166 pounds of fish, valued at $185,493 [Table D-1]. The catch with seines was 823,585 pounds, valued at $13,146; with gill nets, 14,980 pounds, valued at $3,645, and with hand lines, 521,601 pounds, valued at $168,702 (Table D-2]. The more important species taken were black-spotted trout, 208,655 pounds, $70,925; brook trout, 189,901 pounds, $59,512; carp 658,950 pounds, $7,430; and rainbow trout, 130,155 pounds, $41,547. Black bass, catfish, crappie, Loch Leven trout, suckers, and yellow perch were caught in small quantities.

An interesting fact in connection with the fisheries of Colorado is that the catch is comprised largely of introduced species. The yield of native species, black-spotted trout and suckers, was only 290,390 pounds, valued at $72,146, while that of introduced species, consisting of black bass, brook trout, carp, cat-fish, crappie, rainbow trout, Loch Leven trout, and yellow perch, amounted to 1,069,776 pounds, valued at $113,347.

The fisheries are prosecuted in a large number of streams, creeks, ponds, and reservoirs, some of which are public waters, while others are ponds constructed and owned by individual citizens.

The following tables show the number of persons employed, the number and value of boats, apparatus of capture, the value of shore and accessory property, the amount of cash capital, and the quantity and value of the products of the fisheries of Colorado in 1900:

TABLE D-1. Persons, apparatus, capital, and total yield (by counties) in the fisheries of Colorado, 1900.

County	Persons (fishermen)	Apparatus: Boats No.	Boats Value	Hand lines No.	Hand lines Value	Seines No.	Seines L(yds)	Seines Value	Capital employed: Gill nets No.	Gill nets L(yds)	Gill nets Value	Shore and accessory property	Total investment	Total yield: Pounds	Total yield: Value
(A,B,D,J,L,W)[a]	134[b]	33	$1,100	120	$775	3	3,150	$1,530	21	2,550	$135	$52,173	$57,213	910,160	$39,876
Clear Creek	31	3	75	32	275							5,500	5,850	15,530	6,183
Dolores	10			10	50								50	3,750	1,125
Eagle	12	9	100	22	107							4,900	5,107	14,586	4,814
Garfield	32	2	50	32	255								305	36,400	18,200
Gilpin	25	5	100	65	350							2,500	2,950	13,025	6,135
Grand	50	10	200	50	300							250	750	19,900	5,970
Gunnison	133	2	50	130	650	3	175	75				2,000	2,775	157,750	47,220
Hinsdale	26	22	415	25	200				22	1,100	240	22,350	23,205	34,765	10,430
Lake	3	1	10	4	10	1	35	20				1,800	1,840	750	275
La Plata	11	2	50	10	35	1	100	40				1,800	1,925	4,350	1,580
Mineral, Rio Grande	13	2	50	25	175				4	200	40	9,165	9,430	87,200	26,150
Montezuma	10			10	50								50	2,300	690
Montrose	18			20	90							1,150	1,240	7,250	2,175
Otero	2	3	30	2	3	3	170	90				5,000	5,123	7,700	770
Pitkin	5			6	20							300	320	2,550	1,020
Saguache	40			40	200								200	36,100	10,830
San Miguel	9	4	120	9	45								165	5,000	1,500
Summit	1	3	50	3	20							10,000	10,070	1,100	550
Total	546	101	$2,400	615	$3,610	16	3,630	$1,755	47	3,850	$415	$118,888	$128,568	1,360,166	$185,493

[a] Arapahoe, Boulder, Delta, Jefferson, Larimer, and Weld counties.
[b] Includes 18 shoresmen.
Includes $1,500 cash capital.
Includes 1 shoresman.

TABLE D-2. Yield[a] of fisheries (by species and apparatus) for counties in Colorado, 1900.

Apparatus and county	Species										
	Black bass	Black-spotted trout	Brook trout	Carp	Catfish	Crappie	Loch Leven trout	Rainbow trout	Suckers	Yellow perch	Total
SEINES											
A,B,D,J,L,W[b]	11,250 (730)			658,950 (7,430)	21,800 (915)	22,000 (660)			81,735 (1,221)	18,500 (680)	814,235 (11,636)
Gunnison			2,650 (690)								2,650 (690)
Lake			200 (70)								200 (70)
LaPlata			500 (150)								500 (150)
Otero	2,250 (225)				3,750 (375)						6,000 (600)
Totals	13,500 (955)		3,350 (910)	658,950 (7,430)	25,550 (1,290)	22,000 (660)			81,735 (1,221)	18,500 (680)	823,585 (13,146)
GILL NETS											
A,B,D,J,L,W[b]		6,765 (1,190)									6,765 (1,190)
Hinsdale		6,515 (1,955)									6,515 (1,955)
Mineral & Rio Grande		1,700 (500)									1,700 (500)
Totals		14,980 (3,645)									14,980 (3,645)
HAND LINES											
A,B,D,J,L,W[b]	4,500 (595)	32,585 (10,390)	30,250 (9,520)		750 (60)			17,075 (6,145)		4,000 (340)	89,160 (27,050)
Clear Creek		4,100 (1,635)	9,520 (3,790)				270 (108)	1,640 (650)			15,530 (6,183)
Dolores		3,750 (1,125)									3,750 (1,125)
Eagle		7,690 (2,600)	3,581 (1,092)					3,315 (1,122)			14,586 (4,814)
Garfield		30,350 (15,175)	2,400 (1,200)					3,650 (1,825)			36,400 (18,200)
Gilpin		7,150 (3,550)	2,950 (1,275)					2,925 (1,310)			13,025 (6,135)
Grand		19,900 (5,970)									19,900 (5,970)
Gunnison		3,750 (1,125)	89,400 (26,820)					61,950 (18,585)			155,100 (46,530)
Hinsdale		22,750 (6,825)	3,200 (960)					2,300 (690)			28,250 (8,475)
Lake			550 (205)								550 (205)
LaPlata		2,000 (800)	1,600 (555)					250 (75)			3,850 (1,430)
Mineral & Rio Grande		46,000 (13,800)	3,500 (1,050)					36,000 (10,800)			85,500 (25,650)
Montezuma		2,300 (690)									2,300 (690)
Montrose		4,950 (1,485)	1,550 (465)					750 (225)			7,250 (2,175)
Otero	1,700 (170)										1,700 (170)
Pitkin		900 (360)	1,350 (540)					300 (120)			2,550 (1,020)
Saguache			36,100 (10,830)								36,100 (10,830)
San Miguel		5,000 (1,500)									5,000 (1,500)
Summit		500 (250)	600 (300)								1,100 (550)
Total	6,200 (765)	193,675 (67,280)	186,551 (58,602)		750 (60)		270 (108)	130,155 (41,547)		4,000 (340)	521,601 (168,702)
TOTAL	19,700 (1,720)	208,655 (70,925)	189,901 (59,512)	658,950 (7,430)	26,300 (1,350)	22,000 (660)	270 (108)	130,155 (41,547)	81,735 (1,221)	22,500 (1,020)	1,360,166 (185,493)

[a] Pounds of fish and dollar value (below) in parentheses.

[b] Arapahoe, Boulder, Delta, Jefferson, Larimer, and Weld counties.

APPENDIX E

CHRONOLOGICAL LISTING OF EGG-COLLECTION STATIONS USED BY LEADVILLE HATCHERY, 1890-1931

TABLE E-1. Cutthroat trout.

Location	Fiscal year(s) used[a]	Likely subspecies handled[b]
Station brood fish at Leadville (initially obtained from Twin Lakes). Additional fish trapped from Lake Creek below Twin Lakes in 1892. Acquired Dr. Law property at Evergreen Lakes in April 1894.	1890-1895	Greenback and few yellowfin (possibly some Colorado River trout after 1892). Because of heavy mortality in their ponds, 700 2-yr-old yellowfins were moved on Dec. 18, 1893 from Leadville station to Lower Evergreen Lake.
Twin Lakes	1890, 1892, 1894-1897	Greenback and few yellowfin
Black Lake in Summit County owned by Gen. A. H. Jones	1892	Colorado River cutthroat
Sweetwater Lake	1893	Colorado River cutthroat
Freeman Lake near Wolcott	1895-1900	Colorado River cutthroat
Grand Mesa Lakes		Colorado River cutthroat (possibly some yellowfin or hybrid with rainbow contamination)
Grand Lake	1905-1909	Colorado River cutthroat (some rainbow contamination possible)
Piney Lake	1912	Colorado River cutthroat
Seven Lakes (probably Pikes Peak area)	1912-1914, 1917-1918	Greenback and/or Yellowstone X GB mix
Antero Reservoir	1918-1920	Greenback and/or Yellowstone X GB mix with rainbow contamination
Mount Massive Club Lakes	1927	Probably Yellowstone or VS X GB mix
Continental Reservoir	1930-1931	Probably Rio Grande or RG X CR mix with rainbow contamination

[a] No egg collection data available for FY's 1903, 1904, 1906, 1911. Fiscal years of no collections in Colorado by Leadville station: 1915, 1916, 1921-1926, 1928-1929. Native distributions by Leadville Hatchery in those years were primarily from eggs secured by other federal stations in Yellowstone Lake and its tributaries. Some Pyramid Lake natives (Lahontan) were handled by Leadville and Creede substation in 1931.

Federal records are not very clear as to subspecies except in a few years for yellowfin trout distributions. Blackspotted trout is the term most often used in the records, so the indicated subspecies is speculation on my part based primarily on the drainage of the egg-collection site correlated with known distributions or stockings in the egg-collection lake(s). In the 1910 FY Propagation and Distribution Report (p 10) mention is made that Wellington Lake and Grand Mesa Lakes, heretofore the most productive sources of the Colorado station for eggs of the blackspotted, brook and rainbow trout, had to be given up to private enterprise. Emphasis was to be placed on blackspotted trout from Yellowstone Park as a source of supply for the Leadville, Spearfish and Bozeman stations. Further examination of the federal "species reared list" which appeared in most FY Propation and Distribution Reports after 1901 showed the following: last year of rearing of Colorado River cutthroat was 1910 FY; last year for Greenback (Arkansas River trout) was 1906 FY; and the last year published for rearing yellowfin trout was 1905 FY. There were no federal records for rearing of the Rio Grande cutthroat, but the Creede substation, after its completion in 1930, may have found private sources and reared this subspecies before the unit was closed in the mid 1960s.

TABLE E-2. Rainbow trout.

Location	Fiscal year(s) used[a]
Station brood fish at Leadville (source not known for sure)b	1893, 1895, 1898, 1901
Uneva Lake, Summit County	1895-1897
Twin Lakes	1896, 1897, 1899, 1900
Lake Loveland	1898- 190 1
Ridgeway's Pond (Salida)	1900, 1902, 1908
Lake San Cristobal	1905
Leo, Colorado	1905
Gunnison River	1905
Cheesman Lake	1907-1910, 1912-1916
Grand Mesa Lakes	1908-1910
Miklich Lake (Ridgway)	1909
Grand Lake	1909
Antero Reservoir	1914-1917, 1919-1920
Stonewall Lake	1915
Evergreen Lakes (on station grounds)	1924-1925
Baker Lakes near Jefferson	1925-1927
Bolts Lake	1926-1928
Red Feather Lakes	1927
Mount Massive Club Lakes	1927
Hosselkus Lakes	1928
Trinchera Reservoir	1930

TABLE E-2. Continued

Location	Fiscal year(s) used[a]
Eagle Nest Lake, New Mexico (Creeds substation)	1930-1931
Mount Home Reservoir	1931

[a] Data unavailable for FY's 1903, 1904, 1906, 1911, 1920. Fiscal years of no rainbow collections by Leadville Hatchery: 1890-1892 even though the station had five breeders in 1891; 1894, 1918, 1921-1923, 1929.

The initial rainbow fish or eggs of the Leadville station probably were acquired from Dr. Law's stock at Evergreen Lake. Dr. Law is known to have acquired 2,000 rainbow fry from the Colorado State Fish Commissioner in 1888 for supplying native trout eggs to the Commissioner. Some early shipments of rainbow eggs to the Leadville station from other federal facilities were as follows: an unknown number could have been shipped from the Wytheville, Va. station (not published) in 1892 FY; 20,000 rainbow eggs were received from Neosho, Mo. station on Jan. 18, 1894 with 5,000 of the resultant fry stocked in Lower Evergreen Lake on April 19, 1894, along with 6,000 planted in Lake Creek. About 126,000 rainbow eggs were shipped to Leadville from Neosho, Mo. station in 1895 FY and an additional lot of 55,000 eggs from Neosho were received in Feb. 1896.

[15] Specific records not published after FY 1931.

TABLE E-3. Brook trout.

Location	Fiscal year(s) used[a]
Dr. John Law's stock fish from Evergreen Lakes	1890-1893
Station brood fish[b]	1890-1902, 1918
Uneva Lake (Summit County)	1893-1902, 1914, 1917
Twin Lakes	1895-1896, 1907-1909
Aspen Lake	1895
Wellington Lake near Buffalo	1894-1902, 1905, 1907-1909, 1914-1915
Nasts Ponds	1896
Gale's Ponds	1896-1898
Smith's Pond	1897-1902, 1905, 1907, 1913-1917
Ridgeway's Ponds (Salida)	1897-1901, 1907-1909
Decker Lake	1897-1901
Young Lake near Leadville	1897-1902
Musgroves Ponds near Union Gulch	1898-1902, 1905, 1907-1910, 1912-1918, 1921-1924
Derry Lake near Leadville	1899-1902, 1905, 1907
Black Lake, Summit County	1901, 1902
Lake Alicia near Thomasville on Fryingpan (Woods Lake)[c]	1905
Lake Edith near Idaho Springs	1905, 1907-1910, 1912-1916
Lake Eldora near Boulder	1905, 1907, 1908, 1912-1914
Leo, Colorado	1905
Zoeble's Lake	1905, 1907-1909
Engelbrechts Lake on Lime Creek	1907-1910, 1912-1919, 1921-1928
Darrah Lake near Leadville	1908, 1910
Grand Mesa Lakes	1908-1910
Miklich Lake near Ridgway	1909, 1912, 1913
Woodbridge, Colorado	1910
Hallans Lake	1912
Stotts Ponds	1914
Turquoise Lake	1914-1919, 1921-1931
Northfield Lakes near Woodland Park	1915-1919, 1921-1922
Woodland Park Lake	1915-1919
Hosselkus Lake near Creede	1916-1917, 1927
Kellys Lake	1916
Crystal Lake near Malta	1917-1919, 1921
Evergreen Lake	1919, 1921, 1922, 1924
Carrol Lake near Woodland Park	1921-1923, 1925
Hen and Ford Lake	1921
Big Creek Lake in North Park (Saratoga, Wyo. Station)	1921, 1923-1931
Fred Neal Lake	1922-1923
Wurts Lake	1924-1930
Marma Lake	1924
Mount Massive Club Lakes	1925-1931
Hermosa Lake	1928
Mount Princeton Lake	1929, 1931
Mason Lakes near Creede	1930
Rainbow Development Lakes	1931
Hartner Lakes	1931

[a] No records available for 1903, 1904, 1906, 1911, and 1920.

[b] Initially obtained from Dr. Law and from Rock Creek above Twin Lakes. Some eggs from Northville, Michigan, Station in 1890 and from Caladonia, New York, in 1891. Dr. John Law's facility was acquired by the government in April 1894.

[c] See Carhart (Fishing in the West 1950 pp 44-45) for a description and history of this facility near the Fryinpan River. An item by C. F. Brown of Aspen, Colo. in Outdoor Life (1902 Sep) noted that P. J. Engelbrecht was the owner of Lake Alicia, better known as Woods Lake, located 9 miles up Lime Creek. Six brook trout ranging from 11-3 lbs, caught in 1.5 hours, are shown in a photo in this issue. It was reported that a brook trout of 4.5 lbs was the record fish for the previous summer at Lake Alicia.

APPENDIX TABLE E-4. Brown trout.

Location	Fiscal year(s) used[b]
Station brood fish Probably initially derived from a combination of the following egg sources: 20,000 Loch Leven from Northville, Mich. station in 1890 100,000 Von Behr from N.Y. Fish Comm. in 1891 50,000 Von Behr from Northville in 1892 25,000 Loch Leven from Northville in 1892[b] 21,400 Von Behr from Dr. Law's stock in 1892 75,000 Loch Leven from Northville in 1893 11,200 Loch Leven from Northville in 1894 10,000 Loch Leven from Northville in 1895 The stock of Loch Leven trout at Leadville died out in 1899 but was replaced from an unknown source with 35 brood fish by 1902--propagation to be discontinued because the fish had not proved very successful.	1896, 1898, 1902
Uneva Lake (Summit County)	1896, 1900, 1901
Twin Lakes	1896
Ridgeway's Ponds (Salida)	1899
Turquoise Lake	1921-1922, 1924, 1927-1929, 1931
Mount Massive Club Lakes	1931

[a] No records available for 1903, 1904, 1906, 1911 and 1920. Despite renewed interest in the propagation of brown trout after 1920, no field egg collections were made in FY's 1923, 1925, 1926, and 1930. Eggs were also obtained from several federal stations.

[b] During the latter part of brook trout spawning of the Leadville brood fish in FY 1892, a lack of male fish occurred and milt from male Von Behr trout (brown trout) of Dr. Law's stock were used to fertilize 21,500 brook trout eggs. It was reported that 2,000 were alive by the end of April and the 1893 fiscal report from the Leadville station mentioned that "hybrid trout" were distributed, but the official distribution records that year do not specify that "hybrid trout" were stocked (U.S. Fish Comm. Rep. 1892 [p LV] and U.S. Fish Comm. Rep. 1893 [p 1151]).

APPENDIX F
ACTIVITIES OF THE FISH COMMISSIONER, 1878 and 1890

From the Central City Daily Register--Call (1879 Jan 3:4):

Governor's Message

The last words of Governor Routt to the Legislature...on Fish Culture:

Many of the states fully appreciate the importance of increasing the supply of fish for food, realizing that whatever tends to cheapen the expense of living is of the utmost importance.

The appointment of a Fish Commissioner in accordance with an act of the last General Assembly, has already been productive of benefit, although the appropriation for carrying into effect the provisions of that act was of necessity, very small.

The Commissioner, in his report, acknowledges the uniform courtesy of the commissioners of other states, in promptly giving him the information which they had in regard to the artificial propagation of fish, and the varieties best adapted to our waters.[16]

Your especial attention is called to his recommendation that the owners of sawmills be prevented from depositing the dust from their mills in streams, on account of its destroying the fish, and also that an appropriation be made sufficient to build a hatching house for the artificial propagation of fish from the ova--a method less expensive than the purchase and transportation of young fish.

Prof. S. F. Baird, U.S. Commission of Fish and Fisheries, has promised a supply of German carp for our waters. These will be distributed as soon as received.

From The Silver World (1878 Nov 9, 4:2 c 5):

Senator Teller has made arrangements with the United States Fish Commissioner for shipping a large lot of young German carp to this state. The carp is a pond fish suited to our valley lakes. Notice will be published of their arrival, and people having ponds to stock will make application to the fish commissioner of this state, Mr. Wm. E. Sisty.

From the Georgetown Miner (1879 Jan 4:2 c 1) concerning fish:

Letter to Senator Teller from Spencer F. Baird.

Washington, December 3, 1878

Dear Sir:

Your letter of the 16th of November, in reference to carp for Colorado, was received at a time when I was extremely occupied and unable to answer it, and knowing that you would shortly be in Washington, I concluded to defer a reply until your arrival here.

I beg to say that it will give me very great pleasure to do all I can to meet your wishes and those of Mr. Sisty; and that whenever the young fish are ready for distribution, the claims of Colorado shall not be overlooked. I expected to have a supply ready for shipment to distant points during the present fall, but was unable to get the receiving tanks ready in time to allow the ponds to be drawn off. These tanks have been completed only within a day or two and I now find that the fish have gone into winter quarters, and any attempt at distributing them will be disastrous. I hope, however, that early next spring I shall be able to report progress. But few of last year's stock were breeders; but we hope to have a large supply the coming year, and that nothing will prevent our making a liberal assignment, if not in the spring then certainly in the fall.

Respectfully yours,
Spencer F. Baird, Commissioner

p.s. It will give me great pleasure to accompany you at any time to the carp ponds and explain personally their plan and operation.

Letter to W. E. Sisty from Senator H. M. Teller (December 3, 1878)?

Dear Sir:

I have seen Baird. He says we shall have some carp and perch next spring. They will be ready to deliver in April some time. He explained to me why he could not distribute this fall. As he has not distributed any, we cannot complain. We must have some in the spring. I hope your mining enterprise is doing well.

Yours respectfully,
H. M. Teller

Mr. Sisty's 1879-80 Biennial Report certainly documents the carp he obtained and distributed in the fall of 1879, but it does not mention his receiving any perch. This report also fails to mention Commissioner Sisty's stocking of brook trout in the fountain at the cafe of the Glenarm in June 1880 (Denver Tribune 1880 June 22:4 c 2). Furthermore, Sisty also did not mention in any of his biennial reports that he was sent 10,000 Schoodic salmon eggs (Atlantic salmon) on March 7, 1881, by the U.S. Fish Commission Station at Grand Lake Stream, Maine (U.S. Fish Comm. Rep. 1880 pp XL, 648-49). Also omitted from Sisty's reports was the fact that the state's Denver Hatchery was rearing lake trout in 1883 (Denver Republican 1883 Apr 12:8 c 1-2). Perch may have been brought into Colorado personally by Senator Teller who was known to do things on his own. In 1890, the Senator likely obtained brown trout eggs from Belgium; they were reared at the Denver Hatchery without ever being reported in a State Biennial Report (FF 1891 May 2:4). This likely was due to Gordon Land's failure to include the details of the distributions for 1889-90 in an alleged appendix, which was not in the Biennial Report for those years. The Gunnison Review Press (1890 Feb 1), in quoting Gordon Land mentioned that a lot of (25,000) trout eggs from Belgium had been promised to Colorado by United States Fish Commissioner McDonald. These were received by Fish Commissioner Land and sent to the various stations in the state (FF 1890 Feb 22:6). Mr. Land distributed carp, tench, and goldfish in Colorado late in the fall of 1890 and these were not shown in his Biennial (FF 1890 Nov 29:7 and 1890 Dec 6:5).

[16] This report is the only Colorado Fish Commissioner report that I was unable to locate, but it is apparent that it was written. A search of Governor Routt's personal file at State Archives was unproductive in this regard.

APPENDIX G
FIRST STATE-OPERATED HATCHERY NEAR DENVER [17]

From FS (1881 Sep 1, 17[5]:93):

THE COLORADO HATCHERY.--Fish Commissioner Sisty, of Colorado, has been looking for a site for a hatchery for some time, and having found a suitable location, it was generously presented to the State for the purpose mentioned by the owner, Mr. Wilson Waddingham. It is about six acres in extent, and is located eight or nine miles from Denver. A large spring rises on the property, and it is claimed to be an excellent place for a hatchery. Mr. Waddingham's generosity deserves hearty commendation.

Letter from William N. Byers to Editor of FS (1882 Jan 12, 17[24]:471):

COLORADO

Denver, Col., Dec. 31, 1881.

Editor Forest and Stream:

Our last legislative assembly made an appropriation of $5,000 from the State Treasury for the establishment of a fish hatchery and to begin the business. That was in February last. Several months passed before a location was made, but that was finally accomplished in the latter part of the summer by the donation of ten acres of ground eight miles north of the city. It is near Platte River, but far enough away to be safe from freshets, and embraces about two-thirds bottom land and one-third beach, or second bottom, about thirty feet above the bottom. About ten feet above the foot, in the side of the bluff, a great number of springs break out, supplying an abundance of water, at least for the present. The temperature is steady at 54 deg.

A few rods from the foot of the bluff is a long, narrow pond, filled with vegetation and admirably adapted for carp, but, unfortunately, it is now filled with catfish, wall-eyed pike and other native fishes, and it will be pretty hard to get them out. The little plant of carp furnished us by Prof. Baird some months ago has been removed to the ground and placed for the present in a very small pool near the spring, but it is too small and will be too cold for them in summer.

Between the bluff and the pond is a natural grove of cottonwood and box elder trees, and the hillside is covered with wild plum and other shrubs. About one hundred feet from the springs Commissioner Sisty has erected a frame building about 25 by 35 feet, in which are arranged sixteen hatching troughs of the latest and most approved plan. Early in the present week he laid down the first trout spawn (100,000) from New England, and will add a like number weekly for the next three weeks. He has placed in charge a practical fishculturist--a Mr. Bogart--from an Eastern hatchery. So we will soon see what can be done toward restocking our sadly depleted trout streams. A pleasant office is provided in the front part of the hatching-house, and Mr. Sisty says he can get through comfortably with his present plans upon the money provided him until the next meeting of the Legislature, January, 1883.

Some of the German carp sent here and distributed to private parties are reported as doing remarkably well, but the public stock, I am sorry to say, have not grown to be whales by a long shot. First, they were kept for a time in a spring pool at the foot of the mountain, in water that was very cold and densely shaded. Next, they were transferred to a newly-excavated pond in which there was no vegetation, and no food was given them. Of course, they had to "rustle" for a bare living. Now, at last, they are in better quarters, but yet not good, and they go for the water cress with a vim.

W. N. B.

From FS (1882 Jun 1, 18[18]:348 c 3):

FISH FOR COLORADO ANGLERS.

Editor Forest and Stream:

Sportsmen and others interested in the preservation of game and fish have just completed the organization of "The Colorado Game and Fish Protective Association." The call for a meeting for the purpose, which, by the way, I see copied in the last FOREST AND STREAM, brought an unexpectedly large number of gentlemen together, representing all the more populous counties of the State. Much interest was manifested, and the organization starts out with enthusiasm and most encouraging prospects. Its membership will embrace the entire State, reinforced by local gun clubs in the various counties. Its first object is to enforce present game and fish laws and secure their improvement when the Legislative Assembly meets next winter.

It is evident that our trout streams are being fast depleted--a loss that is felt more than the destruction of game. It is done by market fishermen, who use dynamite and giant powder for the purpose, thereby killing all the fish within its reach. We did not exactly wait until the horse was stolen before attempting to lock the stable door, but that result was fast impending, and, in fact, actually exists to-day in many of our trout streams and lakes.

The 300,000 New England brook trout hatched out at the State hatchery in January last have nearly all been distributed in the streams on the eastern slope of the mountains and in San Luis Valley. A few are still held to be taken over the range. They have done remarkably, and suffered hardly any loss. Some of those yet at the hatchery are said to be three inches long, though but four months old. Ten thousand rainbow trout from California, received recently, have hatched with a loss of less than two hundred. Commissioner Sisty is making a fine success of his nursery. B.

Denver, Colorado, May 20.

(The officers of the Colorado Game and Fish Protective Association are: President, W. N. Byers, Postmaster of Denver; First Vice-President, D. H. Dougan, Mayor of Leadville; Second Vice-President, Charles L. Hanna, of Greeley; Third Vice-President, T. T. Beaty, of Pueblo; Treasurer, J. Cook, Jr., of Denver; Secretary, J. S. Sedam, of Denver. For membership apply to J. S. Sedam, Secretary.)

Letter from W. N. Byers, president of the Colo. Game and Fish Protective Assoc. printed in FS (1882 Jun 29, 18[22]:425 c 3):

[17] George Feltner wrote an excellent account of the early days of this hatchery in an article entitled "The First Fish Hatchery" (Colo. Outdoors 1970 Jan-Feb Pp 42-44). He presented some 1920 photos of this facility and also covered the fate of the hatchery. Feltner previously wrote an informative biographical sketch of Wilson E. Sisty (Colo. Outdoors 1962 Nov-Dec Pp 24-25)

FISH AND GAME IN COLORADO.

I have just returned from a short trip to Middle Park, having taken over 4,000 young New England trout and liberated them in the waters of Grand River. They were the first to cross the dividing range in this State. Only three were lost in transit, although taken over on the second day after the road was opened through the snow for travel. Mountain streams are all very high from the late and heavy spring snows and frequent rains since. This gives assurance of good fishing after the season fairly opens, say by the 10th or 15th of July.

There is plenty of game in the park. Residents say it is more plentiful than a few years ago. I found the people using wild meat almost exclusively, and there is doubtless some waste that ought to be stopped. I heard of some slaughter of elk and deer for their hides the past winter and spring, and saw one wagon load of elk hides brought in that could hardly all have been taken from animals necessarily killed for meat, as they represented but a single family of persons. I was told of another party who killed about seventy-five elk for their hides.

I saw two men who were trapping beaver. They had several fresh skins, but complained of poor success. Another party of three men came in while I was there with their season's "catch." They wintered, about Egeria Park and on the headwaters of Yampa River, and complained of doing badly. The reason they gave was that a party of trappers from Utah worked over all that part of the country last summer, from Green River eastward to the Gore Mountains, and then backward in the fall over the same ground. They swept it clean. This trapping of fur-bearing animals in the summer season, when they are raising their young, ought to be prohibited by the severest penalities.

The same party told me that trout had been almost totally destroyed last season in the Roaring Fork of Grand River by blasting. Also, that the same practice had greatly reduced their numbers in Eagle River and William's Fork of the Grand. The development of new mining camps in the vicinity is the cause.

Denver, Col., June 21, W. N. B.

From FS (1882 Nov 9, 19[15]:291 c 1-2):

RAPID GROWTH OF TROUT IN COLORADO

Denver, Colorado, Oct. 29, 1882

Editor Forest and Stream:

I drove down to-day to the State fish hatchery, and there learned some facts which are so astonishing to me that I take the liberty of dropping you a note in the belief that they may interest some of your readers. The enterprise of artificially hatching trout, to maintain in some measure the stock in our mountain streams, was started about one year ago, under the appropriation of $5,000 from the State Treasury, to last two years. A site was secured eight and a half miles down the Platte from Denver, where some springs break out along the foot of a low bluff bordering the river bottom. The first shipment of 150,000 trout eggs was received from New England Dec. 28, 1881. A second like shipment came two weeks later. Mr. Bogart, who was placed in charge and has so remained ever since, says the hatching was very speedy, and reached ninety-nine and eight-tenths per cent of the eggs: 285,000 of the fry were distributed in various streams of the State, and the remainder are at the hatchery. There has been scarcely any loss. They occupy a ditch about three hundred feet long and from one to four feet wide into which a dozen or more springs flow directly, and the outlet of which would probably fill a three-inch pipe. These fish, now from nine to nine and a half months old, are from seven to ten inches long, and there are many among them at half a pound weight each. They are making spawning beds, and will doubtless deposit some eggs this fall. Is not this a rapid growth and speedy maturity for trout? It seems so to me, and Mr. Bogart says he will challenge the world to beat it. He thinks no State ever before made such a success of its first attempts in fishculture.

It is true these fish have been well cared for and well fed. They suffered for about one month from over-crowding before the distribution was completed, when there were over 150,000 in the space now occupied by the 15,000. I think the latter are too much crowded now. The more open water is literally filled with them, and as a stranger walks along the bank they fairly make it boil. They are fed twice a day on beef liver and lungs chopped up with a hatchet. Mr. Bogart says any of them will eat from his hand. A few thousand of the California rainbow trout were hatched, but they did not prove so satisfactory. Nearly all were distributed to three or four localities, and the largest lot was lost entirely in transit. Their growth has not been as rapid as that of the New England trout, and Mr. B. says they are not so good a fish--that we do not want them.

Looked at in a pecuniary light, this trout experiment figures about as follows: $5,000 appropriated; ten acres of land secured, with all needed springs and water supply, worth $500; improvements worth $2,000, with capacity for half a million fish at a brood; 15,000 fish on hand that would bring in the Denver market before New Year's Day $3,000; 285,000 fish placed in the streams of the State, and enough money yet on hand for this winter's hatch and to carry the concern along until next June. Pretty good. Or figure it this way: If the entire hatch could have been preserved and cared for as the 15,000 have been, there could have been cleaned up from the investment in one year $60,000. It looks profitable. We have been hearing for two or three months past that troutlings liberated in mountain streams in May and June last were being caught.

There are a few carp in a pond at the hatchery, but they do not grow very rapidly. Mr. Bogart says the water of this country is too good for them; that the trout is as easily raised and infinitely better, and where they will not live the black bass is the next best. He goes East soon for a supply of the latter.

The temperature of the springs at the hatchery is 54 deg. The head of water is three and a half feet. In the ditch where the trout now are the temperature has sometimes gone up to 56 deg. I didn't mean to string out so much. Pardon.

W. N. B.

From FS (1882 Dec 21, 19[21]:411 c 3):

SPAWNING OF COLORADO TROUT.--Baird, Shasta County, Cal. Dec. 10--In FOREST AND STREAM of November 9 I notice an article by "W.N.B." on the growth of trout in Colorado. He says that the eggs were obtained in New England in December. I think they must have been dried the season before, as the trout do not spawn until December, and it then takes them from thirty-five to forty days to mature, which would bring them about the middle of January or later. He also cites Mr. Bogart as saying that the hatching was very rapid, and that he hatched ninety-nine and eight-tenths per cent. That beats anything I ever heard of. He says the growth is enormous, and the fish made spawning beds at nine months old. This is also new, as I never knew trout to spawn until three years old. Then he further says that he had some rainbow trout and did not like them. I have been engaged in fish-culture for seven years and have never heard such wild statements as the above.--J. B. CAMPBELL

From FS (1883 Jan 4, 19[23]:451 c 1):

SPAWNING OF TROUT IN COLORADO.

Editor Forest and Stream:

Mr. J. B. Campbell, of Baird, California, in FOREST AND STREAM of Dec. 21, questions my statements as to the hatching and growth of New England brook trout at the Colorado State Hatchery near this city. He says he "never heard such wild statements before." I will only add that each and every one of them can be proven by Hon. W. E. Sisty, State Fish Commissioner; Mr. E. V. Bogart, his assistant and one of the most experienced and successful fishculturists in the United States; by scores of other reputable citizens, and by the fish themselves.

I know the spawn came about the last of Dec. '81. I know that when I saw the fish on or about the 9th of Nov., 1882, there were plenty of them from eight to nine inches long, and Mr. Bogart pointed out to me upon a bed of clean gravel under some overhanging willows, where he stated the larger ones were making spawning beds. Mr. Sisty to-day confirms Mr. Bogart's statement upon this point. Mr. Sisty also furnishes me the following letters, with permission to copy.

Plymouth, Mass., Oct. 30, 1882

Mr. W. E. Sisty:

Dear Sir--As the season for selling trout eggs is near at hand, I thought I would write to ask you if you shall want any this season. I am taking eggs quite freely, and shall probably take 1,000,000. I shall be ready to begin to ship early in December and through January. I will guarantee the eggs to reach you in good order. Please let me hear from you.

(Signed) W. L. Gilbert.

Plymouth, Mass. Nov. 16, 1882.

Mr. W. E. Sisty:

I will furnish you two or three hundred thousand trout eggs of my latest taking. I think I can ship as late as the last of January, and perhaps into February, your waters being quite warm (54 deg.) forces them along very fast. If you had water as cold as say 40 deg. they would be three times as long hatching and absorbing the sack. I can hatch the eggs until the eye-speck shows and then pack them in tin boxes in ice or snow, and keep them back for a month more. They do this with whitefish eggs and keep them back so that they will not hatch until March. I send all my eggs to Europe in the steamer's ice house packed all around with ice. One degree in temperature makes six days difference in their hatching, and the same in absorbing the sack. Eggs would hatch in your water in about thirty-five days after taking. My water is 49 deg., and it takes sixty days to hatch and about the same time to absorb the sack, making some four months from the time the eggs are taken until the young fish begin to feed *** I am glad of such good success, and it beats anything I have been able to do. * * *

(Signed) W. L. Gilbert.

The above may also read a little "wild" to Mr. Campbell, but I think it contains items of information that will interest many of your readers and I have therefore made liberal extracts.

Mr. Sisty has already received and laid down 100,000 eggs of this year's crop and they are not "dried ones" either. They will produce fish that in September and October next will take the fly, as last January's hatch did in the autumn of this year. I have heard repeatedly of their being taken in various streams of the State that never contained an Eastern brook trout until last May.

Wm. N. Byers.

Denver, Colo., Oct. 29, 1882.[*1]

Editor Forest and Stream:

In FOREST AND STREAM of Dec. 21, I notice an article by J. B. Campbell, in which he doubts that New England trout eggs could be received in Colorado in December.

As I had the pleasure of furnishing the eggs I think I am able to give the facts of the case. I sent the first lot of 100,000 eggs to Colorado Dec. 21; the second lot of 100,000 Dec. 28, and the third lot of 100,000 Jan. 17. The eggs were taken from Nov. 15 until Dec. 1 previous, making them about thirty-six days old when shipped, and the eye-specks showing plainly.

The temperature of the water at the hatchery at Colorado is 54 degrees Fahrenheit, which caused them to hatch in a few days after being placed in the trays.

Mr. Sisty wrote me that the eggs were received in good order and that over 99 percent hatched.

Mr. Campbell also says New England trout do not spawn until December. Last year my trout began to spawn Oct. 19, and this year Oct. 21. They are nearly through spawning Dec. 1.

W. L. Gilbert.

Plymouth, Mass., Dec. 30, 1882.

A reporter wrote a lengthy article entitled "Facts About Fish," describing a tour that he made through the State's Denver Hatchery (Denver Republican 1883 Apr 2:8 c 1-2). Portions of his script are not legible on the microfilms I examined; therefore I have not included this article verbatim. As he moved through the facility with Mr. Bogart, he talked of the different species of fish seen in the hatchery troughs (brook trout) and rainbow trout in the ponds. He mentioned carp, crappie, bass, and a large number of channel catfish that were to be added soon to one of the ponds. He stated that "there were several thousand young siskowet or lake trout class in one of the ponds." This, to my knowledge, is the earliest documentation of lake trout rearing at a state-operated hatchery and is the first mention of the state rearing channel catfish. Commissioner Sisty never mentioned in any of his biennial reports of having had lake trout nor that he planned to rear channel catfish. Similarly, Mr. Byers in the article that follows does not mention these two species either, but he had previously mentioned catfish being present in one of the ponds before the hatchery was built. From FS (1884 May 1, 22[14]:269-70):

FISHCULTURE IN COLORADO

A few days ago I again visited the State fish hatchery, about eight miles down the Platte River from this city, and will report briefly to FOREST

[*1] The date of Mr. Byers's letter is in error. He had to have written it sometime after December 21, 1882, when the Campbell letter appeared in FS.

AND STREAM past progress and present condition of the establishment. The hatching house, water supply and situation have been before described, but it may be well to state briefly the work thus far accomplished. Dec. 28, 1881, the first trout spawn were received, 100,000, from Plymouth, Mass. About a week later there came another 100,000, and at the end of another week a third lot of the same number. Of these 300,000, 99 1/8 per cent were successfully hatched. This result was determined by actual count of the spoiled eggs withdrawn, and is not guess work. About 285,000 of the young fry were, in the months of April, May and June, distributed to various streams of the State. In the fall of the same year specimens of them were frequently taken with the fly of from six to eight inches in length. The few thousands retained at the hatchery having been well fed and cared for, were considerably larger, and many of them cast spawn in the ditches where confined.

The next year's spawn was not received until after the 1st of January, 1883, when 150,000 came from Plymouth, Mass. They were laid down and hatched about as well as the year before. It is proper to state that all the spawn received from Plymouth was "eyed," had been carefully picked over before shipment, and was in first-class condition, which accounts measurably for the exceptionally large percentage of the hatching. After the first shipment early in January, 1883 something happened to the Plymouth establishment which prevented getting any more spawn from there, and 175,000 eggs were then ordered from Cedar Rapids, Iowa, and they came, but in very bad order. The loss in hatching these was very great. Later 25,000 eggs were ordered from Caledonia Springs, New York, which came in good order and hatched well. As in the year before, most of the young fry were distributed to various streams throughout the State; only ten or twelve thousand being kept for breeding purposes.

On November 15, 1883, Mr. Bogart, who has had charge of the hatchery from the beginning, began taking spawn from the fish hatched in January and February, 1882, then about twenty-one months old. He continued taking spawn from time to time up to Feb. 10, reaching about 500,000 in quantity, which, he says, might have been increased to 1,000,000. Of this spawn 50,000 were sold to a party on Gunnison Rtver, whose hatchery failed to work. He then placed them in a spring brook and lost them all. The other 450,000 were laid down in the hatchery from time to time, and turned out from eighty to eighty-five per cent of fry from the gross product of spawn. They are all hatched now, and the young are in excellent condition.

The "two-year-olds" are now being marketed, and will all be killed, except a few for experiment and observation. Among them are many of two pounds weight each, and a greater number that will weigh one and a half pounds each. The great majority, however, range between half a pound and one pound in weight. These weights are not guessed at, but proved by the scales, and in the presence of myself and others. The pound and a half and two-pound fish are about twenty-two months old, and are New England brook trout. Mr. Bogart says, however, that he can pick out no less than four varieties of types among them. Next year's spawn will be taken from the fish that are now yearlings.

In the spring of 1882 there were also obtained 10,000 spawn of the California rainbow trout. They hatched well but have not grown as rapidly as the Eastern variety. The largest specimens, now a little under two years' old, probably do not exceed a pound and a quarter each. They are now spawning, and fighting viciously over their spawning beds in the common preserve of the "two-year-olds." If present care is maintained in the future, this hatchery and its preserves will furnish much valuable information relative to the growth of trout. Mr. Bogart says it is the most favorable place to hatch, and that the trout grow faster than in any other place he has ever known.

There are some carp at the hatchery in ponds provided for them, ranging up to six pounds weight, but the day being cloudy there was little chance to see them.

Half a mile further down the river is the farm of J. M. Broadwell. He has the same kind of water supply (from springs) as the State hatchery, and has entered somewhat into trout culture. He began some years ago with native brook trout, but suffered many disasters and much discouragement, chief of which was the destruction of his fish by muskrats. One spring they destroyed over 20,000 fry, and he finally killed one of the animals in the act of entering the hatching box. For some days before the droppings of muskrats had been found in the troughs along with dead fry and fragments of the same. Three or four hundred muskrats and a few minks have been killed about the State hatchery since its establishment, but the persistent use of traps and dogs prevent the pests from doing much harm. The last two years Mr. Broadwell has purchased fry from the hatchery. He is now marketing two-year-old trout at seventy-five cents per pound.

Gordon Land, a fishculturist of long experience, who has in the last few years started a number of private preserves for various parties in this State, some months ago pre-empted a small sheet of water high up on the eastern slope of the Blue River Mountains, in Summit county, this State, known as Cataract Lake. It was naturally well stocked with native trout. On the bank of the lake are springs supplying water very favorable for hatching purposes, and he has arranged properly for their use. Last season he took spawn from wild fish and in a letter recently received from him he says: "My young S. fontinalis have done exceedingly well; I will have a trifle over 225,000 to place in the lake as soon as it opens. There are quite a number of albinos, or white trout among them. I kept eleven young trout of last year's hatching in one of my vacant troughs where they could get no food except such minute particles as that afforded by a stream passing through a quarter inch augur hole, until they were a year old. Nine of the eleven survived, and were of perfect form; the largest one being 1 3/4 inches and the smallest 1 1/4 inches in length. I had at another place a few of the same age that had been regularly fed at least once each day during the same period, of which the largest weighed 7 1/2 and the smallest a trifle over 4 ounces, actual weight, not fisherman's weight. From all of which I infer that an abundance of food has much to do with the size of trout. I can grow all the native trout in the summer that this lake will sustain and they are good enough."

W.N.B.

Denver, Colorado, April 16.

When the fifth General Assembly was in session early in 1885, a considerable amount of political hassling ensued that involved both the state hatchery at Denver and the appointment of Colorado's Fish Commissioner. At no time before this had either the hatchery or the Fish Commissioner's position been given notoriety by the Denver press. I chronologically examined the events that evolved.

The Denver Times (1885 Jan 3:1 c 4) reported (Saturday) that several of the state officer reports were being printed, and that Hon. W. E. Sisty's Fish Commissioner Report was to be done by Tuesday (Jan. 6, 1885). The Denver Times was to remain relatively "neutral," apparently the only paper not endorsing a favorite candidate that year.

A few days later Opinion (1885 Jan 10:2 c 2), a comparatively new and highly political-oriented Denver weekly newspaper, remarked:

> It has been stated that Fish Commissioner Sisty would not be a candidate for re-appointment. This is not true. He will be a candidate, and, as he is the only man in the State who thoroughly understands the fish question and the hatchery, he should receive a re-appointment.

Denver's Tribune-Republican (1885 Jan 12:4 c 2) endorsed J. D. Babcock, a nephew of Seth Green, who was formerly of Golden, but was then operating a private hatchery at his home in Troutdale in the Bear Creek drainage above Morrison. Babcock was said to have been a student of fish propagation for years, and his hatchery second in importance to the State Hatchery. The following day the RMN (1885 Jan 13:4 c 4) endorsed W. E. Sisty for reappointment.

> There is a general desire amongst those interested in the propagation of fish in Colorado to have Colonel Wilson Sisty reappointed to the position he now holds and has held ever since the office of fish commissioner was created. The colonel has gained distinction and fame since he has been working for the interests of the state, but has spent his salary in improving and making beautiful the fish hatchery of which he is in charge. His friends therefore feel that he should be reappointed to his present position, and there will be a loud call on Governor Eaton for that favor.

Gordon Land, who had been homesteading and operating a large fish facility at Cataract Lake, apparently moved to Denver with his wife because both their names appeared in the Denver Directory for 1885. Furthermore, Land wrote a very long letter entitled "The Fish Commissioner," in the Tribune-Republican (1885 Jan 15:5 c 4). Although portions of this article were not legible on the microfilms I examined, it was a detailed analysis and somewhat unfavorable critique of Sisty and his biennial reports. He noted some discrepancies regarding the numbers of fish Sisty had reported being stocked or delivered to private culturists. Land also questioned, like J. B. Campbell had done earlier in FS, the exceptionally high percentage of egg hatch reported by Sisty. He further mentioned that fish culturists usually experienced about 15 percent loss after hatching and before stocking, thereby again questioning some of Sisty's published reports. Land said that Sisty had no prior hatchery propagational experience before his appointment. Although Land did not specifically say he was seeking the job of Fish Commissioner, it appeared to me that he had such aspirations at that time.

Neither of the papers that endorsed Commissioner Sisty for reappointment (RMN and Opinion) directly answered Land's accusations. Both papers (RMN 1885 Jan 17:4 c 4 and Opinion 1885 Jan 17:1 c 1) carried the following item:

> A republican representative caught onto a News man last night, and talked to him about Colonel Wilson E. Sisty, the present Fish Commissioner.
>
> There is a man Governor Eaton should re-appoint. He is an old-timer in Colorado, a thoroughbred, a Republican, and a man who knows all about the business. Governor Grant, a Democrat, recognized his fitness, and appointed him to the position, although there was a strong pressure brought to bear against him by the Democrats. I knew there was a committee of Democrats visited the Governor, and tried to induce him to appoint a Democrat, but the Governor refused. He said the man who occupied that place should be fitted for it by education, and he knew of no one in the state who was as eminently qualified for the place as Mr. Sisty.
>
> I have heard that there are various applicants for the position, and that they all want to go in on their Republicanism. If that were the only test Colonel Sisty would stand even with the others, being a thorough Republican, but as it isn't he is head and shoulders above all the rest. Colonel Sisty should be continued in office.

The following week Opinion (1885 Jan 24:2 c 2) remarked:

> Governor Eaton's common sense may be relied upon. He will undoubtedly appoint Colonel Wilson E. Sisty the State Fish Commissioner in spite of the factional fight which has been made upon him. Colonel Sisty has served in the office for years without pay, and he is the author of all the fish legislation there has ever been in this state. He has a knowledge of the subject vastly greater than that of any one who pretends to the place, and there need be little fear of the result of the small fight which has been made upon him. The various fish-pond amateurs who obtained all their information on the subject from Sisty will hardly be called upon to succeed this old and tried servant of the people. Governor Eaton's strong suit is his practical knowledge of what the public wants.

Regarding the above item, I would hasten to recall the sportsmen's group involvement in proposed legislative fish laws during 1879. Furthermore, Gordon Land, if he truly was an aspirant for the Fish Commissioner position in 1885, had obtained his early fish culture experience "stateside" at a time when Sisty was in Colorado. Land could not, therefore, be included in Opinion's "fish-pond amateurs" who obtained all their information on the subject from Sisty.

Mention was made in Opinion (1885 Jan 31:2 c 1) that Colonel Wilson E. Sisty had an exceedingly strong petition for reappointment as Fish Commissioner. "It may be relied upon as certain that Governor Eaton will take the proper view of it." The next week Opinion (1885 Feb 7:1 c 3) informed its readers in detail regarding this petition:

> The petition which went in for Colonel Wilson E. Sisty's reappointment as Fish Commissioner was probably the strongest petition ever sent to a Colorado Governor. It contained the names of all the senatorial candidates except Hill, the names of the majority of the members of the State Senate, a long list of House members, newspaper men of both parties, and the majority of our thoroughly solid citizens. A petition a mile long could have been obtained had it been deemed necessary, but it was determined that a strong one would be of more value than a long one. Sisty has spent for the preservation and propagation of fish

[19] This would have been early in 1883 when the Fourth General Assembly was in session.

> more money than all the appropriations ever made by the State total up. He obtained the present site of the hatchery by personal application without a dollar of cost to Colorado. He has a record which is absolutely straight for probity. He understands the subject thoroughly. He has prepared every fish bill ever introduced in the Colorado Legislature. He is strong with the best element in the community who know the man's genuine worth. Whether he is appointed or not the petition which has been sent in for him is a splendid personal tribute of which any man would feel proud.
>
> As far as the office itself is concerned Mr. Sisty is not especially anxious. His friends rather hoped at first that he would not take it. It was only after attack after attack had been made upon him that they became thoroughly aroused and insisted that he should present himself for reappointment. These attacks with scarcely an exception, were made by applicants for the position. Leaving out the question of courtesy and decency altogether the rank impudence of an attack upon a rival aspirant is enough of itself. If it had not been for Sisty there would have been no fish hatchery and no discussion of the subject at all. He has spent thousands of dollars in advancing the interests of the State in this direction, and he is entitled to more consideration than the whole raft of applicants put together. We are entirely willing to have the matter rest with Governor Eaton's supreme practical common sense. [20]

Apparently Governor Eaton heeded the above petition because Opinion (1885 Feb 21:2 c 1) reported:

> In the reappointment of Colonel Wilson E. Sisty the Governor showed that he had a thorough idea of what ought to be done. He voiced the sentiment of the State in making the appointment.

Despite this apparent appointment of Sisty, opponents were successful in getting two bills introduced into the Colorado Legislature soon thereafter. One bill was to eliminate the one-man salaried Fish Commissioner position, whereby it was proposed to have three non-salaried Fish Commissioners. Another bill called for leasing the hatchery to someone who would agree to furnish a given number of fish to the state every year. Opinion (1885 Mar 7:1 c 5) said:

> Colonel Sisty's nomination as Fish Commissioner has been held back pending the consideration of a bill to appoint three commissioners to serve without pay. The bill will probably be defeated, as it is generally conceded that what is everybodys business is nobody's business. The best thing that can be done with the hatchery is to lease it to someone who will agree to furnish a certain number of fish to the State every year. There is a bill in to this effect now, and it would be a good idea to pass it.

Remembering that the state Senate had favored Sisty's reappointment as Fish Commissioner in the earlier petition to Governor Eaton, it was not surprising to me when the RMN (1885 Mar 19:4 c 3) explained:

> The bill to lease the state fish hatchery was lost in the Senate yesterday, and the office of Fish Commissioner remains. Colonel Wilson E. Sisty was around smiling last night, and couldn't do too much for his friends. A Senator says that the Governor has made some appointments that didn't suit him exactly, but if he will re-appoint Colonel Sisty he will forgive him.

Who would have thought that Governor Eaton, who had appointed Sisty as Fish Commissioner in Feb. 1885, would on Apr. 6, 1885, submit for nomination the name of J. D. Babcock for Fish Commissioner? According to the Tribune-Republican (1885 Apr 7:2 c 3), the Senate went into executive session and when the doors were opened, the Senate refused to confirm the nominations of R. W. Woodbury for Railroad Commissioner and J. D. Babcock for Fish Commissioner. At 2:45 am (Apr 7) a private message was received from the Governor and the Senate again went into executive session. When the doors were opened, the nomination of Judge W. B. Felker for Railroad Commissioner, a Senate favorite for that job according to the Denver Times (1885 Apr 7:3 c 1), was confirmed, as was General John Pierce for Fish Commissioner.

Apparently, if Governor Eaton could not have his man, J. D. Babcock for Fish Commissioner, the Senate was to be denied their favorite, W. E. Sisty. To my knowledge, General Pierce had not been mentioned by the Denver press as an aspirant for the position, and his credentials at that time were tersely alluded to only in the Denver Times (1885 Apr 7:4 c 1), which mentioned "that General John Pierce, the new fish commissioner, is one of the most experienced and the best angler in the state." Pierce, according to FF (1886 Jan 23:3) had four private fish hatcheries in Colorado. He also had previous governmental experience because President Lincoln had sent him here as surveyor general of the territory in the spring of 1862. His executive ability was exemplified by being president of a Denver bank for many years. Also, according to FF (1900 Mar 31:6) General Pierce was largely credited with getting the first railroad into Denver, the Denver Pacific from Cheyenne. He spent the winter of 1869 in New York making negotiations with the Union Pacific for the funds, and the following winter in Washington arranging the transfer of the land grant from the Kansas Pacific to the Union Pacific.

Like Sisty, Pierce also donated his salary for state fish culture activities. He established within months of his appointment, a hatchery at Twin Lakes near Leadville. Bourgeois (Judge Lewis B. France) in a letter dated July 25, 1885, and published in American Angler (1885 Aug 8, 8[6]:81-83) as "Twin Lakes, Colorado," remarked that Commissioner Pierce and his assistant arrived too late to make much headway that season, but a small house was erected and some 20,000 trout were hatched out and the young trout were feeding only 35 days after the spawn was taken. The lake water used varied between 62-64°. France also mentioned three different varieties of trout in the lakes, one of which no doubt was the yellowfin (spots are perfectly round and smaller than the finest shot), but erroneously referred to these as the greenback variety.

[20] The chronology that I previously gave indicated the attacks came after Opinion stated that Mr. Sisty would be a candidate for reappointment and not before as is suggested here.

Commissioner Pierce appears to have been the first State Fish Commissioner to have given a public fish exhibit using aquariums as reported in FF (1886 Jan 23:7):

> General John Pierce, fish commissioner, has consented to make a display of all of the varieties of trout now being propagated by the State, at the Poultry Show next week. He has the eastern brook trout, the salmon trout, the Rocky Mountain trout and the California trout. The aquariums are now being constructed for the purpose.

Similarly the RMN (1886 Jan 25:7 c 3) said that the finest breeds of fowls and various species of dogs and fish would be exhibited at the Poultry Show. For the fish exhibit, 30 feet of tanks were built, in which a number of varieties of trout, carp, and other fish suitable for Colorado waters were to be placed. They also noted that the show was to open Jan. 26 at the Denver rink--corner of 16th and Tremont Streets--and remain open day and night until Saturday (Jan. 30, 1886).

The Tribune-Republican (1886 Jan 26:8 c 1) described the fish exhibit at the rink thusly:

> ...At the northwest corner, the State Hatchery, under the direction of General Pierce, has ten glass-faced tanks holding each thirty gallons of constantly changing water. These tanks are inhabited by German carp weighing from five to ten pounds each, aged one, two and three years; Eastern brook trout from the Plymouth, Massachusetts, hatchery, one to three years old and weighing eight ounces to two pounds; one to three years old rainbow brook trout from California, weighing up to three pounds; imported English brook trout, and a few crappies and gold fish. A miniature hatchery will be on exhibition today, showing the various stages of fish hatching from the freshly deposited spawn up to the full fledged fish.

The following day the RMN (1886 Jan 27:6 c 5) reported:

> Mr. E. V. Bogart, superintendent of the state fish hatchery, has given a great deal of time and attention to the fish display. There are a large variety of trout displayed, among some of the best is a tank filled with English trout 3 months old, hatched from spawns sent from England, California mountain trout, Eastern brook trout and Colorado brook trout. Also a number of German mirror carp. It takes about forty-five days for the eggs to hatch when placed in water of the proper temperature. There are a few eggs on exhibition in process of hatching. [21]

The fish exhibit was not without mishap. According to the Tribune-Republican (1886 Jan 27:8 c 1-2), the glass front to one of the tanks broke while the exhibitor was pointing out the beauties of the finny floppers, letting ten gallons[22] of water down his shirt front, besides wetting the legs of numerous public spirited citizens. The Denver Times (1886 Jan 27:1 c 4) reported that Fish Commissioner Pierce's enthusiastic explanations were appreciated and that some of the aquariums broke but they were mended. Two days later, the RMN (1886 Jan 29:7 c 3) stated that "Mr. Bogart, the superintendent of the fish display, has been very unfortunate in having most of the fish tanks break. They were made with light glass, which would not withstand the pressure of the water, and nearly all of them broke."

I have been unable to obtain much information on the expertise of Fish Commissioner George F. Whitehead who replaced General Pierce in April 1887. Whitehead had been a traveling correspondent for the RMN and was originally from Kentucky (RMN 1882 Dec 20:7 c 3).

Like Pierce, however, Commissioner Whitehead and Superintendent Bogart also exhibited state-reared fish. When the Colorado state floral and fruits exhibition was given in a large pavilion at 16th and Broadway in Denver during mid-June 1888, the state hatchery displayed Eastern and California trout in various stages of development (RMN 1888 Jun 15:9 c 4). Several other fishes, principally from private exhibitors, were also shown--pickerel, black and white bass, gold fish, three kinds of carp, catfish, and pike RMN 1888 Jun 14:6 c 3).

Earlier, the RMN (1888 May 30:8 c 1) reported that Mr. Bowles, a propriator of a "pisciculture station" 14 miles south of Denver, would furnish an attractive fish exhibit at the coming fruit, strawberry, and flower show. The manager of the Bowles Lake, Mr. B. E. Butz, was said to have been the pioneer who first introduced the system of supplying the Denver market with live fish. Other warm-water fishes not reported by the RMN at the June exhibit, but which were reared at the Bowles facility, and likely shown, included "croppies," ring perch, sunfish, and "river bass." These "river bass" probably were the white bass displayed at the pavilion, and the earliest known reference for the species in Colorado.

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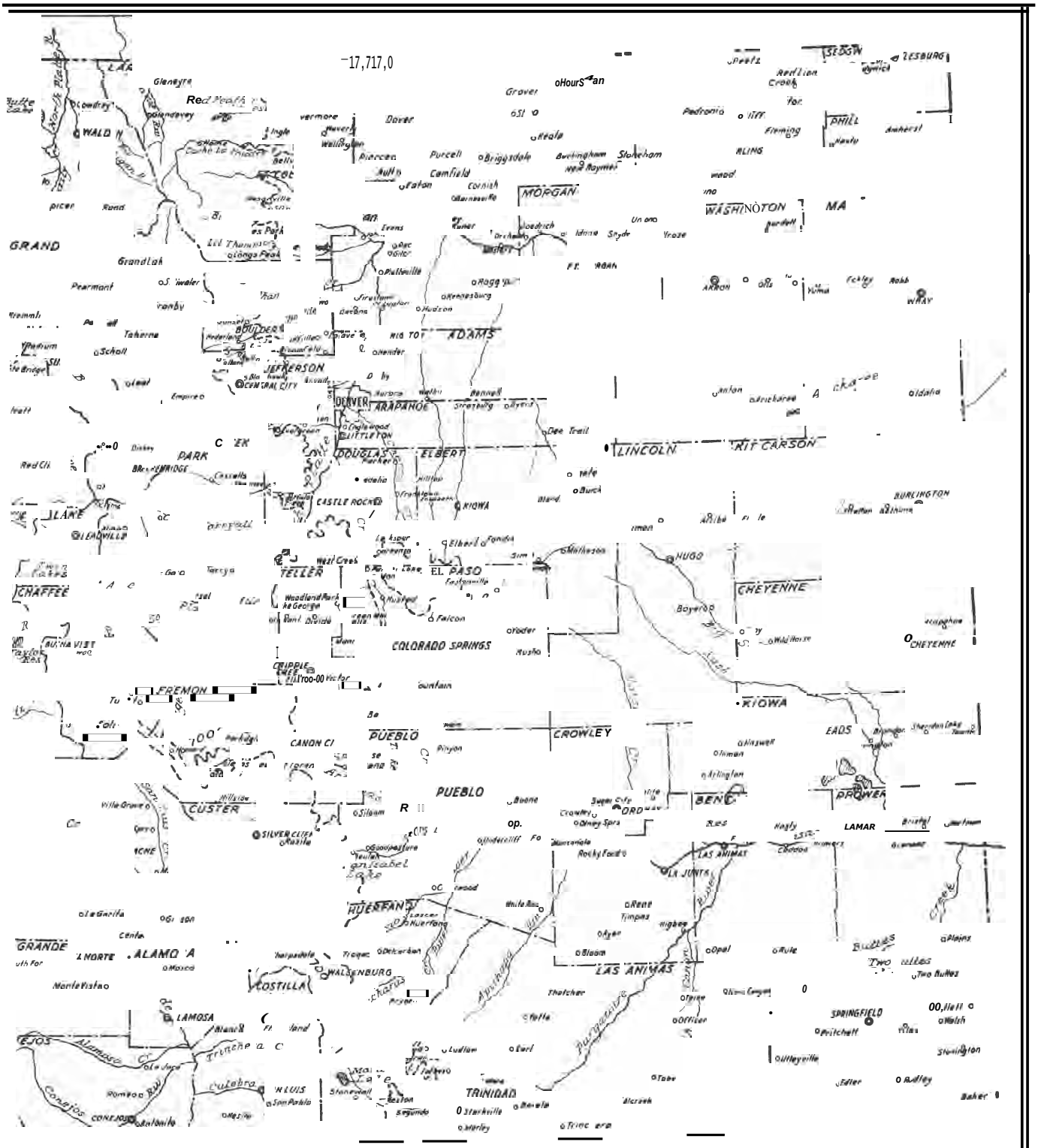
[21] This is the earliest historical account of brown trout being in Colorado that I have found.

[22] The same paper the day before reported the tanks were of 30 gallons capacity.

[23] This man is believed to be Joseph W. Bowles, biographical details of whom are reported in Colo. Mag. (1925 2[1]:45-49).



BACK COVER--Stocking the Poudre River with legal-size trout. (Photo by George Andrews from Colorado Conservation Comments 1950 Jul p 8)