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CALIFORNIA FISH AND GAME

"CONSERVATION OF WILD LIFE THROUGH EDUCATION"

Volume 4 Sacramento, April, 1918 Number 2

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CALIFORNIA FISH AND GAME

"CONSERVATION OF WILD LIFE THROUGH EDUCATION"

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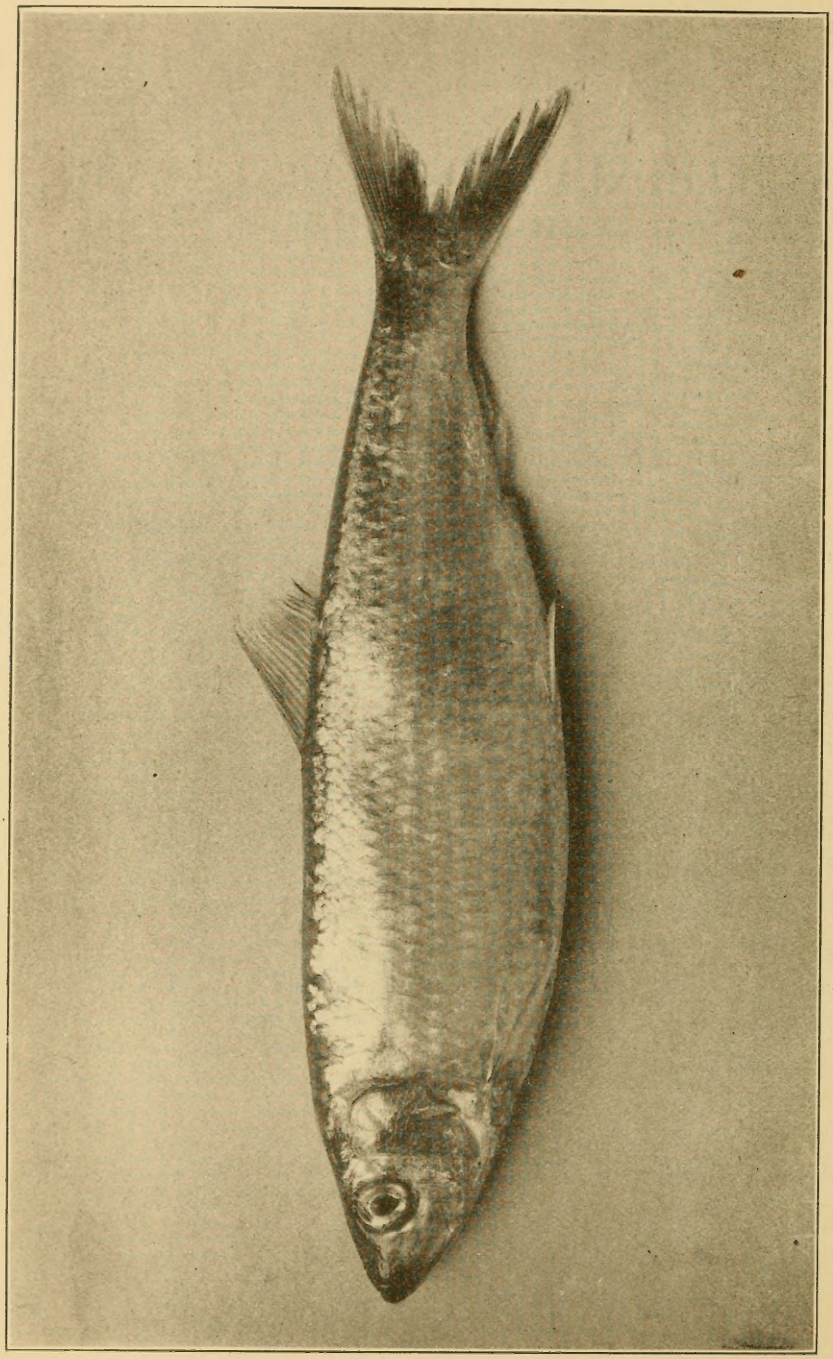

Fig. 34. The herring (*Clupea pallasii*). One of the most abundant small fishes found along our coast. Along with the sardine it is now becoming an important food fish.

THE HERRINGS AND HERRING-LIKE FISHES OF CALIFORNIA

By Edwin Chapin Starks, Stanford University.

This account includes the lady-fish, the herrings, the sardine, the shad and the anchovies. These fishes, though considered in three separate families are, nevertheless, rather closely related to each other. They are well separated as a group from other fishes, but mostly by internal characters that are of too technical a nature to be here included. They are rather closely related to the trout and trout-like fishes but lack the adipose dorsal fin.

Other groups of fishes contain more species than this group, but no other is represented by such a great number of individuals. They swim in immense schools in temperate and tropic regions. The world over they hold first place in commercial importance, though on our California coast this has only recently been true, for within a year or two the sardine has supplanted the salmon and tuna (albacore) in value.

The herrings and herring-like fishes are bright silvery, the head without scales, but the body covered with thin scales that are easily rubbed off. There is a single, short dorsal fin near the middle of the back. The ventral fins are back on the belly and not close under the pectoral fins as in the bass-like fishes. The fins are without spines and consist of soft rays only.

Considerable doubt seems to exist as to the relationship between the herring and sardine. The sardine is a herring but all herrings are not sardines. It belongs to the herring family (*Clupeidæ*) and hence may be correctly considered a herring.

GLOSSARY.

Anal fin. The single fin on the lower side toward the tail.

Caudal fin. The tail fin.

Dorsal fin. The single fin near the middle of the back.

Length of head. The distance from the tip of the snout to the hind edge of the gill cover.

Maxillary. The bone bordering the mouth above and extending backwards.

Opercle. The last bone of the side of the head covering the gills.

Pectoral fins. The paired fins just behind the head.

Ventral fins. The paired fins back on the abdomen.

In identifying any fish in this group it will be necessary to first find the family in the following key:

Families of California Herrings and Herring-like Fishes.

The body nearly as wide as it is deep. The snout pointed, cone-shaped, and projecting beyond a small mouth. The maxillary not reaching backwards behind the eye. *The Lady-Fishes (Family Albulidæ): Page 60.*

The body deeper than wide. The snout not cone-shaped and not projecting beyond the mouth in front. The maxillary not extending backwards behind the eye. *The Herrings (Family Clupeidæ). Page 60.*

The mouth extremely large, with a pointed snout projecting beyond it. The maxillary reaching backwards behind the eye nearly to the gill opening. *The Anchovies* (*Family Engraulidæ*). *Page 63.*

THE LADY-FISHES.

(*Family Albulidæ.*)

The Lady-fish (Albula vulpes).

The body is nearly as wide as it is deep and the head is wedge-shaped with a pointed snout that overhangs the small mouth. The top of the head between the eyes is flat, and the sides are nearly vertical. The maxillary does not reach back to opposite the eye. The eye is nearly covered with a thickened, transparent membrane. This is a very brilliant silvery fish, dark olive-brown on the back and with faint streaks following the rows of scales. It reaches a length of 3 feet and is common in tropical seas. On our coast it is not very uncommon in San Diego Bay and has been taken as far north as Monterey Bay. In most localities it is little valued for food, though this is not always an indication of the real food value of a fish.

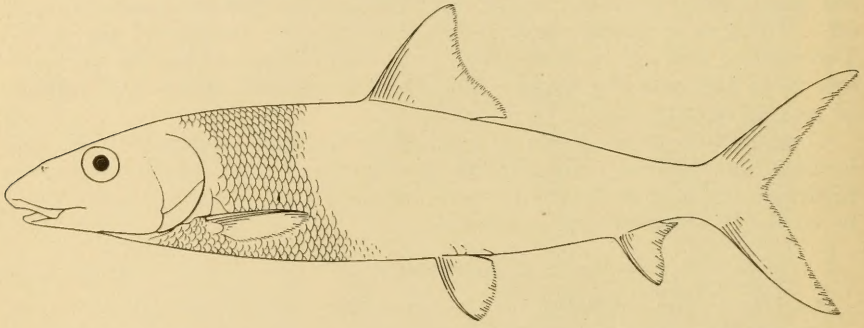

Fig. 35. The lady fish (*Albula vulpes*).

The young of this fish pass through a metamorphosis. They are for a time elongate, small-headed, band-shaped and composed of very loose, colorless, transparent tissue, so clear as to be scarcely seen when in the water. From this condition they become gradually shorter and more compact, shrinking from 3½ inches in length to 2 inches. Then commences their real growth and soon they assume the adult form. In the Gulf of California where the lady-fish abounds, these band-shaped young are often thrown on the beaches in great masses by the waves.

THE HERRINGS.

(*Family Clupeidæ.*)

The Japanese Herring (Etrumeus microps.)

This herring may be known from others of its family by the ventral fins being entirely behind the dorsal, rather than partly or entirely under it, and by the short base of the anal fin which is less in length than the diameter of the eye. The head is a little longer than the

depth of the body. The eye is covered with a transparent, thickened membrane. The color is bright silver with each scale on the back having a large brown spot.

This fish is more nearly round in section (cigar-shaped) than are other members of its family on our coast, the width of the body being about two-thirds of the depth. Next in order in this respect is the

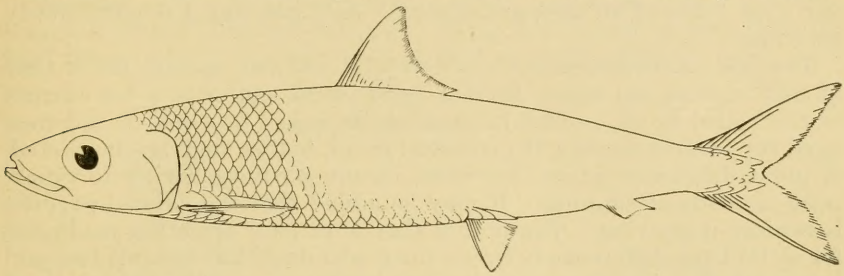

Fig. 36. The Japanese herring (*Etrumeus microps*).

sardine, which is considerably plumper than the herring, and deepest of all is the shad, which is very much deeper than wide.

The Japanese herring is a common species in the Hawaiian Islands and in Japan. Specimens have been taken at San Diego, and a few years ago two specimens were sent to Stanford University from that locality with the statement that it was not rare in certain seasons. It should be looked for and its appearance and abundance reported to the State Fish and Game Commission.

The Sardine (Sardinia cærulea).

The sardine may be known by the opercle having a few raised lines or ridges running obliquely downward, the head longer than the depth of the body, and the breast and belly not drawn to a sharp, saw-toothed edge. The ventral fins are under the base of the dorsal fin, and the base of the anal fin is twice or more times longer than the diameter of the eye. The maxillary reaches to below the middle of the eye. The

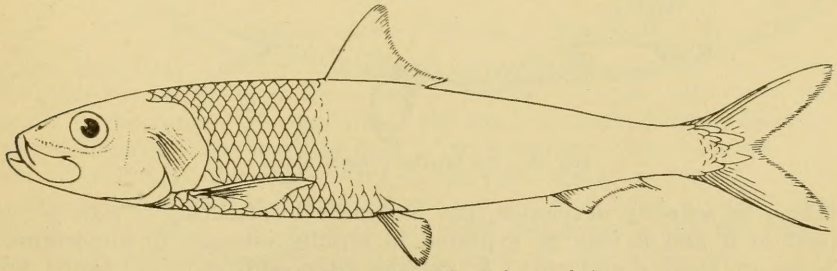

Fig. 37. The sardine (*Sardinia cœrulea*).

color is bluish on the upper parts and bright silvery below with metallic reflections. A series of large dark spots is usually present along the side, but often they are absent, especially in large individuals.

The sardine occurs in great abundance along the entire west coast of the United States and southward on the coast of Lower California. It is taken the year around and is especially abundant from Septem-

ber to December. It spawns in the spring. It is an oily, delicately-flavored fish that resembles very closely the European sardine (*Sardinia pilchardus*). On the coast of South America is a sardine that is almost identical with it, but that differs sufficiently to regard it as a separate species. In Europe the small sized fishes only are canned, though the European species grows to be nearly as large as ours. On our coast fishes of all sizes are canned. As a pan fish it is particularly delicious.

The best canned sardines are carefully cleaned, soaked for a time in cold running sea water, surface dried in the sun or in a hot current of air, boiled in oil, packed in cans, again cooked in a retort, and then aged for several months, if preserved in oil, before they are marketed. A great difference exists, however, in our sardines, owing to quick, poor methods of canning. It may be added that the canned product is rapidly improving. The brands that were poor are being made better so that the difference between them will doubtless become less and less marked. Among our west coast sardines are some that are not surpassed by any in the world.

The Herring (Clupea pallasii).

The opercle has no raised ridges as in the sardine, and the head (in specimens over 5 or 6 inches in length) is about equal to the depth of the body. The ventral fins are under the base of the dorsal fin, and the breast and belly are not sharply saw-toothed. The color is silvery on the sides and lower parts and slate-blue above. The tip of the snout and lower jaw are dark.

The herring is widely distributed on both coasts of the Pacific and is found along our entire west coast southward to San Diego Bay, but it is not at all common on the southern California coast. The herring

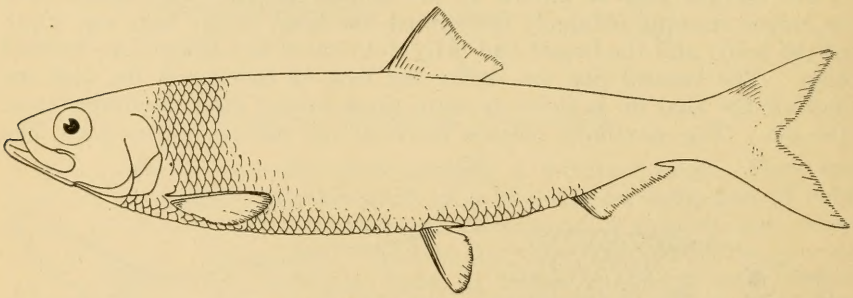

Fig. 38. The herring (*Clupea pallasii*).

fishery is scarcely developed, but considerable attention is now being paid to it and it may be expected to rapidly increase in importance. Some are smoked and cured in various ways, and many are salted for bait by the line fishermen. A part of the fishes that are cured and marketed as herring, however, are not this species, but are sardines. As a pan fish the herring is very good, but drier and not so richly flavored as the sardine, which makes it preferable to some people. It is only taken from December to April, when it enters the sheltered bays to spawn. Its whereabouts is not known for the balance of the year. The herring reaches a length of 18 inches.

The Shad (Alosa sapidissima).

The body is deep and is drawn to a sharp saw-toothed edge on the breast and belly. The opercle usually has raised ridges somewhat as in the sardine, but less even and regular in arrangement. The length of the head is much less than the depth of the body.

The shad does not naturally belong to our west coast fauna, it having been introduced from the Atlantic. It has become one of our abundant food fishes but it is not appreciated as it is on the Atlantic coast, even

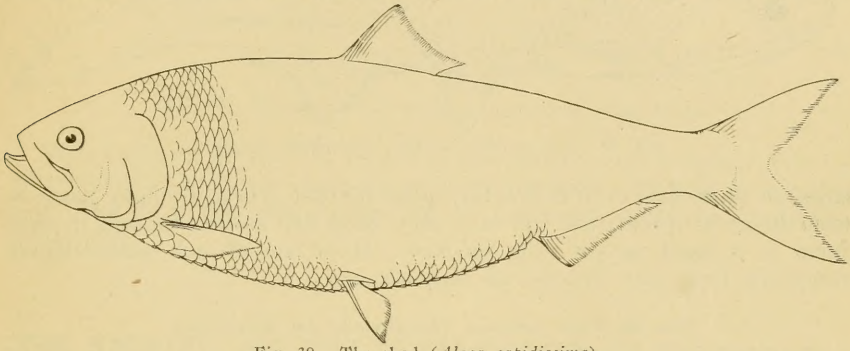

Fig. 39. The shad (*Alosa sapidissima*).

though the people there have a greater variety of good fishes to select from than we do. The shad baked or broiled is one of the most toothsome fishes that we have, and though it has a superabundance of small bones, its flavor more than pays for the trouble of removing them.

In the spring it ascends the streams to spawn and is then taken in abundance. In salt water it is not taken in any quantity, though occasional good-sized catches are made, especially in Monterey Bay. It is found in salt water as far southward as San Diego.

THE ANCHOVIES.

(*Family Engraulidæ.*)

The Northern Anchovy (Engraulis mordax).

The long head, slender body and short anal base separates this from the other two anchovies on our coast. The head is much longer than the depth of the body. The middle of the head is a considerable distance behind the eye. The anal fin base is much shorter than the head. In color it is bluish above and silvery on the sides and lower parts.

This is the largest and most valuable of our anchovies, growing to a length of 7 inches. It is found in great abundance along the entire west coast and is the only one found north of Santa Barbara. It is canned to some extent, but is inferior to the sardine, though inferior, perhaps, only because the proper methods of canning are not understood. As a pan fish it is exceedingly good when cooked until the bones are crisp, and it is difficult to imagine why it never appears in the fresh fish market. Its use in this form should be encouraged.

There is no reason why anchovies should not be pickled and packed, coiled in bottles as is done with its close relatives that we import from Europe. Nor is there any reason why it should not be made into a

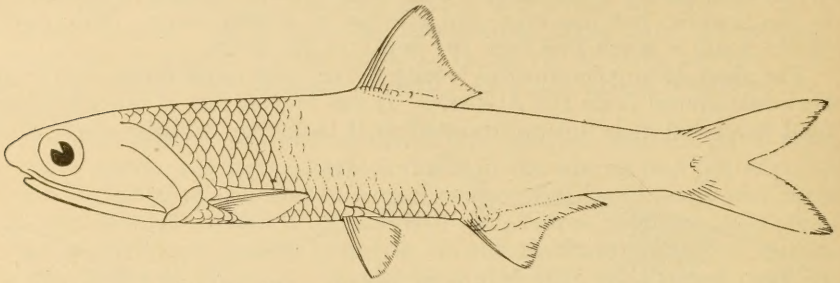

Fig. 40. The northern anchovy (*Engraulis mordax*).

superior paste and even find a European market, where anchovy paste is used in great quantities. It is a very good fish salted, though in this form it is used as yet only as bait. It is one of our undeveloped resources that may become of importance.

The Southern Anchovy (Anchovialla delicatissimus).

This anchovy has the length of the head about equal to the depth of the body. The middle of the head comes at the hind edge of the eye. The length of the base of the anal fin is equal to the length of the head,

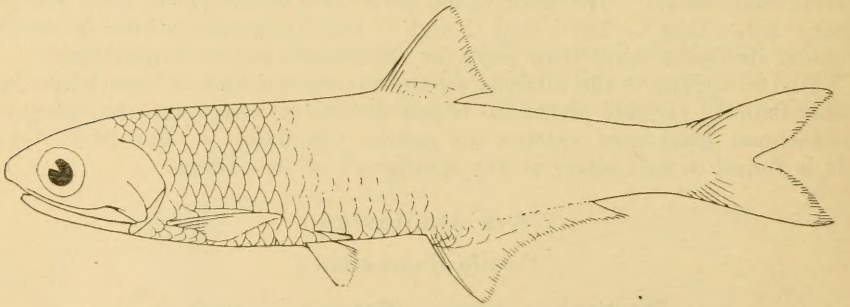

Fig. 41. The southern anchovy (*Anchovialla delicatissimus*).

or very slightly longer. The color is greenish and translucent; along the middle of the side is a silvery band.

This species is found very abundantly on the southern California coast. It does not much exceed 3 inches in length. Crisply fried in oil, this fish is all that its Latin name signifies—most delicate.

The Deep-Bodied Anchovy, or Sprat (Anchovialla compressus).

This anchovy may be known by its deep thin body and long anal base. The latter is very much longer than the length of the head, and considerably longer than in the preceding two species. It is pale translucent greenish in color with a silvery band along the side that shades downward on the lower parts.

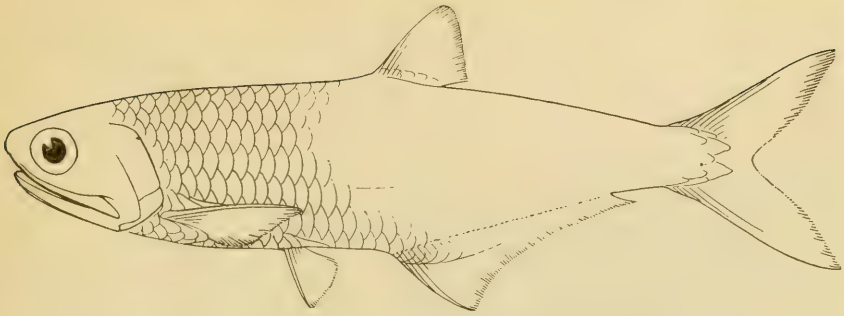

Fig. 42. The deep-bodied anchovy (*Anchovialla compressus*).

This anchovy grows to a length of five inches, and is found only on the southern California coast where it is abundant. Its flesh is thin and dry, and as a pan fish it can not be compared with the other two anchovies.

THE HERRING AND THE DEVELOPMENT OF THE HERRING INDUSTRY IN CALIFORNIA.

By N. B. SCOFIELD, in Charge, Department of Commercial Fisheries, California Fish and Game Commission.

The herring, of which there are several species, are found in the northern salt waters of both hemispheres. They are small silvery fishes, not usually exceeding twelve inches in length, but what they lack in size they make up in numbers, for they appear along the coast during their spawning seasons in vast schools and are caught by the fishermen principally at that time.

The herring catch in Europe in the year 1909 exceeded one and one-quarter billion pounds, valued at $21,500,000. The herring fisheries on the Atlantic coast of North America, while not as extensive as those of Europe, are, nevertheless, of great importance. In the state of Maine many millions of pounds of young herring are taken annually in traps or weirs and canned as sardines, but the principal herring fisheries are around Newfoundland, where the mature fish are caught and cured, either by salting or smoking.

The Pacific herring, *Clupea pallasii*, is found along the Pacific coast of North America from Alaska to Morro Bay in California, and south along the Siberian and Japanese coasts. Although a different species from that of the Atlantic, it is very closely related and is probably its equal in quality. So far the herring fisheries of the Pacific coast have not been greatly developed, for the reason that there is a prejudice against the Pacific herring, and the markets prefer the herring of the Atlantic, especially those coming from Scotland and Norway. This prejudice has, no doubt, been mostly due to lack of knowledge and a lack of care in preserving the fish on this coast. The first herring packed from British Columbia and Alaska did not come up to the standard of the European product and the trade immediately concluded

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that the Pacific herring was inferior in quality. For years the fishery was neglected; the only part of the industry of importance was the rough salting of herring for the Oriental trade. More recently different companies have begun canning the herring and the fishery has begun to

Fig. 43. Herring gill netters at Belvedere Cove, San Francisco Bay, January, 1918. Photograph by N. B. Scofield.

grow. The United States Bureau of Fisheries during the past summer sent experts to Alaska to demonstrate the Scotch method of curing herring and it is believed by these experts, after the favorable reception of this experimental pack, that the Pacific herring can compete successfully with the herring of Europe.

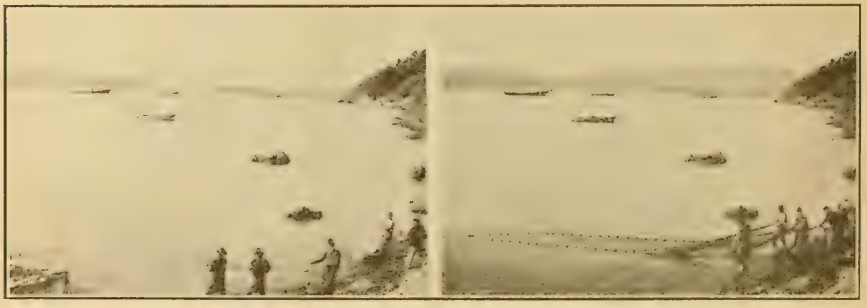

Fig. 44. Drawing a herring seine on Richardson Bay, January, 1918. Photograph by N B. Scofield.

In California very little has been done with the herring for their size is comparatively small and with the present methods of capture the fish are taken after they have begun spawning and are not in prime condition for salting or smoking.

The principal fishing is done in San Francisco and Tomales bays (see figs 43 and 44). The species of herring under discussion is reported to run in Morro Bay, San Luis Obispo County, and as far as is known that is the southern limit of its range. Going north from Morro Bay, the next point at which they are found is in Monterey Bay, where they enter Elk Horn Slough for the purpose of spawning. The schools are small and the fish themselves are of small size.

In San Francisco Bay the first schools appear in January and soon begin spawning. The eggs are attached to the rocks and seaweeds below low tide mark where they are supposed to hatch in a couple of weeks (see fig 45). The spawning continues until April, when the fish

Fig. 45. (*a*) Herring spawn on seaweed, San Francisco Bay, March, 1918. (*b*) A close view of herring spawn. Photographs by N. B. Scofield.

leave and are not seen again until the spawning season of the following year. The fish composing these schools are rather small, few of them reaching a length of ten inches.

The herring enter Tomales Bay a month earlier and schools continue to spawn at various places in the lower bay until March. They are considered the best herring in California and many of the fish reach a length of ten or eleven inches and are fatter than those found in other parts of the state.

Herring also spawn in Drakes Bay, Bodega Bay, Shelter Cove and Humboldt Bay. A careful survey will probably show that these fish are found in many other localities in northern California. The herring of Shelter Cove and Humboldt Bay are reported as being only seven or eight inches in length, which is smaller even than those farther to the

south. Size and fatness count for much in smoked and salted herrings and it is not likely that California will be able to do much in these lines on account of the small size of the fish.

It is customary to grade herring into four classes according to size. The largest, or number one, brings the best price. The majority of fish from Tomales Bay will fall into grades two, three and four, while those of San Francisco Bay will fall into grades three and four.

During the present season an expert of the Bureau of Fisheries supervised the packing of fifty barrels of herring on Tomales Bay after the Scotch style and it is expected that a good pack of Scotch cured herring will be put up on that bay next year.

In 1917 herring were canned for the first time in this state and for the first time fishing operations were conducted on a scale large enough to

Fig. 46. Transporting herring from Tiburon to the cannery at Pittsburg, January, 1918. Photograph by N. B. Scofield.

test the capacity of the fishery. There were taken in Tomales and San Francisco bays more than six million pounds of fish and it is estimated that these two bays can produce double that amount without overtaxing the supply. The size of the California herring makes it better for canning than for curing and we can look for the greater development along the canning line.

The methods of fishing, as in most of the other sea fisheries of California, are inadequate and can be improved greatly. On Tomales Bay small gill nets and beach nets are used and good catches can not be made until the fish have come into the shallow water to spawn, at which time they are less fat than when the roe and milt is not so fully developed. The herring enter and remain in the deeper part of the bay at least a month before they come inshore to be caught by the nets now in use. The fishermen realize this and are prepared to use purse nets and larger boats next year.

On San Francisco Bay the fishing methods are slightly better, but the introduction of purse nets or good-sized Lompara nets, would enable the fishermen to catch the fish before they are actually spawning.

The herring canning operations are so far being carried on at Pittsburg, at the junction of the Sacramento and San Joaquin rivers. Here canneries originally fitted for canning salmon and shad are being utilized and the fish are shipped to this point by boat from Sausalito and Tiburon. The herring from Tomales Bay make the first stage of their

trip by rail. So far herring canning has been somewhat in the nature of an experiment. If it proves to be a permanent industry, canneries will be built nearer the fishing grounds.

When the fish arrive at the Pittsburg cannery, they are put through a revolving scaler. They are next cleaned by hand, the work being done by girls and women. After a thorough washing they are next carried on belts through a drying chamber through which a blast of warm air is driven. This is to remove the excess moisture and to dry the surface of the fish so that they will not disintegrate when cooked and appear unappetizing in the can. They are next packed in one pound oval cans, seasoned with oil and spice or tomato sauce, then passed through an exhaust box for a preliminary heating. The covers are next crimped on the cans by machinery. They are now ready for the final cooking, which

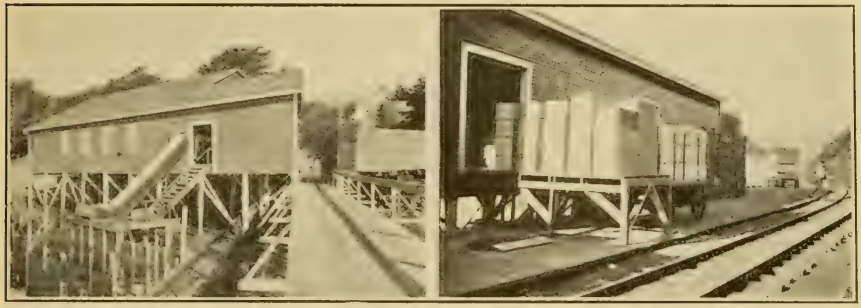

Fig. 47. (*a*) Booth herring saltery at Hamlet, Cal. (*b*) Herring boxed for fresh fish market. Photographs by N. B. Scofield.

is done in closed retorts where the cans are kept the required length of time under a pressure of a few pounds. After labeling, the cans are packed forty-eight in a box and are ready for the market.

Another favorite method of putting up the herring is to kipper them before canning. This is accomplished by taking the fish, after they have been cleaned, and hanging them in the smokehouse for about an hour. This dries them sufficiently and imparts to them the smoked flavor so agreeable to most of those who have eaten smoked fish. They are then packed in the cans and cooked as described above.

One of the most popular methods of curing herring is that of smoking. In this process the larger fish are placed entire in brine for 24 hours, then they are strung on slender three-foot sticks by running the stick through one gill opening and the mouth. These fish are then hung in the smokehouse, which is so built in sections or "bays" that the sticks on which the fish are strung may be placed in tiers. Beginning at the top, each "bay" is filled in succession. When the smokehouse is full the fish are smoked for about four weeks. They are packed in small wooden boxes and are then ready for the market. The larger California herrings are fairly good for smoking and when the fishing methods are improved so that the fish are caught while they are yet fat, a much better product can be turned out.

More herring should be used fresh in this state. The fish are of excellent flavor and, containing as they usually do the roe and milt, have a high food value. They can be had in large numbers during at least

five months of the year and the price is very low in comparison with other fish. With all this to recommend the fish, but very few are sold in the fresh fish markets. The public objects to the many fine bones which require time and effort to remove. While herring have been retailing for five cents per pound this winter, the public has spent much time and effort in complaining of the scarcity and high cost of fish.

Fig. 48. Herring smoke houses at Pittsburg, Contra Costa County, California, March, 1918. Photograph by N. B. Scofield.

DUCKS VS. RICE.

By GEORGE NEALE, Assistant, Sacramento Division, Fish and Game Commission.

A number of complaints having been made to the Fish and Game Commission of the destruction of rice by wild ducks, Mr. F. M. Newbert, president of the Fish and Game Commission, instructed me to make a full investigation of the same, learn the extent of the alleged damage; also to seek some method of defense against the loss. After a series of experiments conducted by myself and Mr. T. R. Cooper, of Gingg & Cooper, large rice growers near Live Oak, Sutter County, I am in a position to state that destruction of growing rice crops by blackbirds and waterfowl, if properly controlled, can be prevented. The only method heretofore utilized to obtain relief has been to use what is known as "fixed ammunition," or the regular shotgun loads of smokeless powder, with bird shot.

I do not hesitate to say that this method of securing relief is ridiculous on the face of it; for, to obtain relief, it can be seen that it would be necessary to kill every blackbird, duck and mudhen in the country, which is an impossibility and unnecessary. And, again, for the reason that smokeless powder is made to kill and not to frighten.

The waterfowl are on their regular migration southward and, finding the water and feed conditions favorable, they remain in the vicinity of the rice fields until driven south by lack of water, feed, and by weather conditions. Probably two-thirds of all the ducks in California are centered in the rice-growing area. The rice grower has a remedy at hand, but it must be used by concerted action on the part of all the growers, or the grower who does not co-operate will be the only sufferer.

It is known that for some reason ducks, mudhens and blackbirds attack certain rice fields while other rice fields are perfectly immune. Gingg & Cooper were perhaps the greatest sufferers last season (1916), and seeing the impossibility of obtaining relief by the use of smokeless powder and shot, and also not wishing to bring down upon their heads the state and federal officials, under whose jurisdiction the protection of waterfowl now comes, sought assistance from the Fish and Game Commission.

After a number of experiments with rockets, bombs and other explosives, a certain form of bomb was selected to do the work. Mr. Cooper ordered four dozen of these bombs at $5.00 per dozen, for use as an experiment on his fields where the birds were most abundant. He fired several bombs after dark, also at daylight, and two or three while the birds were in the air. He did this for three days and nights, with the result that there was a great decrease in the number of birds at every shot. He met with such success that he ordered five dozen more as an emergency.

In an interview with Mr. Cooper on September 26 he authorized the statement that there were no ducks or mudhens to be seen in his rice fields; that he had not killed a bird. (Also supplemented this statement later by saying that he had been unable to kill a duck on his land after the open season because the ducks were afraid to come on his place. Also that he had not used any quantity of the emergency purchase of five dozen bombs).

Certainly these birds were somewhere in the vicinity. Now, if there is co-operation among the rice growers to use these bombs simultaneously on the rice fields, the birds will leave for new grounds and will be driven to the overflow tule lands, where they will remain, *unless forced by hunters to return to the rice fields, which will occur if the open season is made at an earlier date than now, as is proposed by some.*

Many rice growers claim that at certain stages of growing rice, under certain conditions, the ducks are injurious to growing rice. Others deny this statement and say that while the ducks do injure the rice they are very beneficial to them, as they eat quantities of water grass and other noxious weed seeds. Be that as it may, the greatest hue and cry is made by the man who has no rice and because he can not wait for the open season on these birds. A number of such men were arrested this season while shooting ducks in closed season and not one of them owned an acre of rice. The rice grower will not permit trespassing on his fields at growing time.

President Newbert states that the Fish and Game Commission wishes to co-operate with the farmers and agriculturists and will always render them assistance in behalf of their great interests, but co-operation must come from the really interested man and not from a certain element whose only interest is to eat ducks before the season opens.

To obtain the most effective results in the use of the bombs *it is most important that they be used according to the following directions*: As large a number of ducks, mudhens and blackbirds as possible should be allowed to gather in the particular field which is to be bombed. Fire a bomb from each side of the field, at a low elevation, so that it will cover as great an area as possible. Have them fired at a certain given time, all at once. As soon as the birds rise in the air, slightly elevate the bombs to explode higher in the air than the previous ones and, if possible, shoot them into the birds. The bomb will not kill them, but will so demoralize them that very few will return. This should be done at daybreak, at noon and after dark. If done as directed every duck will be driven away and will remain away. New arrivals that have not taken this degree will of course have to be bombed away, but ordinarily two or three days and nights will rid the fields of all birds. This is also effective if used to drive geese from grainfields.

The name and address of the manufacturers of the bombs used in this experiment, together with prices and full information, can be obtained from Racliff Sales Co., 146 Davis street, San Francisco, California, or Ernst Behr, secretary Pacific Rice Growers' Association, Willows, California.

A LOOKOUT'S VIEW OF TRINITY GAME REFUGE.

By Frank Hoffman.

During the fire seasons of 1915, 1916 and 1917 I have acted in the capacity of lookout at the Hayfork Bally Lookout Station, which is situated near the center of the Trinity Game Refuge. Because of its location, Hayfork Bally might justly be termed the pivotal point of that refuge. Its altitude of approximately 6,262 feet affords an excellent view of the major portion of the area, which the deer have already learned to look upon as a haven.

During the period of my service at that station I have made a study of the conditions, both in the refuge and in the adjoining territory, and have kept in close touch with the stockmen and others who have occasion to travel through it. The present article is based on notes of my own observations and on information derived from the above-mentioned sources.

Excellent judgment was displayed in the selection of this area as a protected breeding ground, for it would have been difficult to find a more ideal location for that purpose. There is an abundance of all types of feed available at the various altitudes during the different seasons of the year, and ordinarily deer do not suffer because of lack of food during the winter months. But during the occasional severe winters a considerable number of them die of starvation, and as they increase in numbers, it will be necessary to provide a certain quantity of feed and thus enable them to weather these periods of stress. The deer, despite the occasional raids of poachers, are rapidly increasing in number, and if unmolested, the overflow will provide a continuous source of supply for the neighboring hunting grounds. Practically every mature doe that I have seen this season is the proud mother of two

fawns, and Mr. Fisher, the government trapper, reports that the same holds true in that portion of the refuge lying north of the Trinity River.

Coyotes and other predatory animals are quite numerous, and the fawns fall an easy prey to these beasts. Mr. Fisher reports having seen the carcasses of five deer, and upon investigation he placed the responsibility for their death upon coyotes.

Mr. Fisher is an industrious individual, thoroughly understands his business, and is making good as a destructive agency among predatory animals in the refuge. He is laboring under adverse conditions, for the deer and range cattle insist upon disturbing his "sets," but even so, since he has been operating here there are many familiar voices missing that one time gave tone and volume to the melancholy chorus, as the coyotes held their nightly concerts far out upon the distant ridges.

This area is amply provided with natural salt licks, but they are all situated in the lower altitudes, and the deer that frequent the higher levels are compelled to travel a long distance to reach them. During my terms of service on Hayfork Bally, I have salted the deer in that section, and I find that they patronize the licks freely during the summer months. The young deer visit the lick practically every twenty-four hours, and the large bucks and does visit it on an average of four times each week. I am firmly convinced that the deer I have salted do not go below the 2,500-foot level during the entire summer. The bucks, during the warm weather, love to roam in the cool regions of the high altitudes, and as food is abundant, they will remain there until the rutting season, if provided with salt.

Owing to the fact that I am able from my point of vantage to hear nearly every shot fired in the southern and central portions of the refuge, poachers do not often venture in during the months I am on duty, and by salting the deer at that time, they are kept out of harm's way, for it is a deplorable fact that some of the deer that go to the river licks never return. Mr. G. O. Laws, the excellent and efficient local representative of the Fish and Game Commission, recognizes the necessity of attending to this phase of the salting question, and has, at his personal expense, left a standing order at the Big Bar store for all the salt I might require for this purpose. With some of this salt, I have constructed a new lick near the spring where the deer water, and it was found and used by them the second night after being placed. At this date, about two weeks after I received the salt, there are seven large bucks and several does with their little ones who make almost nightly visits to the lick within fifty yards of my quarters.

The average resident of this district did not take kindly to the refuge idea, their principal cause of complaint being that it deprived them of their best hunting ground, but the contiguous territory is so well stocked with game that it is only a matter of their going in an opposite direction to hunt. However, the majority of them, if they do not approve of the idea, have learned to tolerate it, and respect the will of the majority. We are troubled by the presence of a few chronic offenders and malcontents, but that is an ailment which is prevalent in all small communities. That the present generation has no right to exploit the earth's resources at the expense of those who come after, interests these people but little. They have not as yet reached that state of near-perfection when one, by properly schooling himself, is enabled to overcome that

little mite of selfishness, which, alas, exists in us all. They are unalterably opposed to any measure that curtails their self-granted privileges, and the restrictions placed upon them by the enactment of game laws, they view in the light of an infringement upon their inalienable rights.

However, if it is impossible to educate them, a serious check may be placed upon their future activities. The rigid and impartial enforcement of the game laws by the resident deputy, and the ever-increasing sentiment in favor of game protection serves this purpose admirably, and while it may not result in their complete reformation, it compels them to proceed with more than ordinary caution.

But it is logical to assume that the offspring of this line, will, if no attempt is made to curb them, follow the footsteps of their fathers. The sympathy and understanding of the child is fundamental to the attainment of the conservation measures of the future. In some of our isolated school districts no attempt is made of adequately teaching nature study. In conducting the campaign of education along conservation lines it behooves us not to ignore the little mountain school ma'am. She is, potentially, a most important factor in the dissemination of knowledge along the desired lines. It is not only necessary to acquaint her with the names and habits of the different forms of wild life, but she must be made to understand the full significance of the word "conservation" as applied to them. It would be an excellent step in the right direction if the Forest Service, acting in cooperation with the Fish and Game Commission, could have the district ranger or other persons familiar with the subject visit these schools at least once each month and arrange field trips so that children might be more acquainted with the out-of-doors. I am convinced that the results attained would prove very encouraging.

CONSERVATION OF FORESTS INCREASES GAME.

By GEORGE W. COURTRIGHT, Deputy Fish and Game Commissioner.

Personal observation in Modoc and Lassen counties dating back to 1890, at which time forest fires were permitted to spread and destroy the reproduction of the forests, has convinced us that the present method of forest conservation is the correct one and that game increases with forestation.

We have personal knowledge of a forest fire which swept over almost the entire area of 14 townships in the fall of 1892. This was not at all exciting to the settlers for the reason that forest fires could be sighted at all times in the mountains. Fires were often willfully set. Hunters finding a secreting place for deer, such as an area of brush where they were hard to find, would simply set a fire and burn this hiding place.

In the 90's all reproduction through the forests of Modoc and surrounding counties was very small and cattle and horses could be sighted at a distance of a mile in some parts of the forest; in fact, it was a very uncommon thing to find young trees in the forests at all. Deer were scarce in the forested areas where they had no hiding places except in the shade of a large pine tree.

We were through Modoc County daily between 1896 and 1904. While we had plenty of grass and water, as we have today, we had practically no brush or forest reproduction. We had also very few mule deer, which is considered the most popular game animal of the western states.

We have more than two hunters now where there was one in the 90's, and yet the entire forested area of the county has now a growth of pine, fir and cedar, young trees that range in height from 4 to 12 feet. The reason for this young growth is due solely to added fire protection and scientific conservation of the forests. At present hunters have no difficulty in finding the mule deer. However, the hunter must be a good marksman if he gets a deer, because of the splendid cover afforded by the forests. Between 1890 and 1904 one could walk or ride for ten miles over most parts of Modoc County without even seeing a deer trail. At the present date it is quite common to hear a rancher say: "There are fifteen or more deer feeding on my meadow; we see them nearly every day somewhere about the ranch." These deer go back to the edge of the forest and rest in the brush during the heat of the day and feed early and late. They are found in the shade of thickets of young pine trees, which make a fine resting place for them. Were these sheltering trees and bushes burned, the deer would leave that locality.

We have observed that if the area is thickly forested, even where young brush and grasses, which are the natural food of deer, are entirely lacking, there are sure to be mule deer. We have never known of deer standing out in the open, say in a grainfield, where they could see for a mile in every direction; the thick timber is their natural habitat. Consequently, we believe that forest conservation has proved a great factor in the protection of game.

Further protection for the deer of this region is found in the fact that the officers of the Modoc National Forest are all game wardens, and that they have convinced the public that they are here to enforce the laws. The Forest Service thus becomes of double utility in game protection.

SUPREME COURT DECISION ON PARCEL POST SHIPMENT OF GAME.

(Reported 170 Pac. Rep. 412)

In re FRANK PHOEDOVIUS, on *Habeas Corpus*.

Application for Writ of *Habeas Corpus*.
For Petitioner—Nathan Moran.
For Respondent—Carl Westerfeld.
W. H. Lamar, Solicitor for the Postoffice Department, Washington, D. C., *amicus curiæ*.

The petitioner was convicted of a violation of the provision of section 627*b* of the Penal Code, which declares that "any person who ships any of the wild birds or wild animals or fish by parcel post is guilty of a misdemeanor," and adjudged to pay a fine of $25.00, and in default of such payment to be imprisoned. Held in the custody of the sheriff of San Mateo County by virtue of this judgment, he seeks his discharge on *habeas corpus*, claiming that this provision of law is invalid.

Said section 627*b*, as amended July 27, 1917 (Stats. 1917, p. 651), contains various provisions as to the conduct of common carriers and individuals in the matter of the shipment and the receiving for shipment of wild birds, wild animals and fish, and the transportation thereof, violation of any of which provisions is declared to be a misdemeanor. These provisions, which prohibit the receipt by a common carrier

from, or the transportation for any one person of more than the legal limit of game allowed to be taken or killed by one person, or the shipping or offer for shipment by an individual of any such excess, and which also require every common carrier to keep all shipments of game in open view, labeled with the name and residence of the shipper and of the consignee, and the exact contents of the package, were designed, of course, to prevent shipment of wild game illegally taken and to enable the authorities to more easily discover violations of the game laws, all with a view to the proper preservation of the wild game of the state for the people of the state. The section, as so amended, contains the provision involved in this proceeding, one entirely new in this state, but obviously having the same purpose as the other provisions. It is urged on his behalf in this proceeding that the provision of the statute is void as being both an unlawful interference with a federal instrumentality, viz., the postal service of the United States, and an attempt to regulate interstate commerce. Petitioner also claims that it constitutes an unlawful interference with the property right of citizens to use the United States mail, and that it is in violation of section 11 of article I of our own constitution, which requires that all laws of a general nature shall have a uniform operation.

Of course, no one disputes the proposition that the postal service is a federal instrumentality under the exclusive jurisdiction of Congress, and that a state may in no way regulate or burden the operation thereof. It is this very fact which furnishes the basis for the discrimination against the use of that service by our citizens in the shipment of "wild game" (included in which is fish, *People* vs. *Truckee Lumber Co.*, 116 Cal. 397), and in favor of other methods of shipment. When game is deposited in the parcel post it is at once subject to the exclusive control of the postal authorities under the statutes of the United States and regulations of the Postoffice Department, and absolutely free from state inspection and control. For reasons which are obvious the federal government could not tolerate the slightest interference with its officers and employees in the handling and delivery of the mail. For the purpose of protecting the game of the state for the use of the people of the state, the legislature has enacted many laws relative to the taking of game, some prohibiting the taking of certain kinds at any time, others prohibiting the taking of certain kinds except during a certain time known as the "open season" for such game, others limiting the number of certain kinds that may be taken by one person during a stated time, and so on. As a method of guarding against illegal taking of game it has been provided that the Fish and Game Commissioners of the state shall see that the game laws are strictly enforced, and "shall inspect all buildings, other than dwellings, and all receptacles, other than the clothing actually worn by a person at the time of inspection, where game or fish may be stored or placed, and all boxes and packages containing fish or game that are held for transportation by any transportation company or common carrier; * * * to inspect regularly * * * all boxes and packages, containing fish or game that are held for transportation by any transportation company or common carrier." Also to "seize and take possession of all game or fish," which has been illegally taken, killed or had in possession, or has been shipped or offered for shipment contrary to any of the laws of the state. It is necessarily conceded that these provisions as to inspection and seizure by the state officers of game shipped or offered for shipment can not be enforced as to shipments by mail. Any attempt to so enforce them would indeed be an attempted unlawful invasion of the exclusive federal jurisdiction. If these provisions for inspection and seizure of game found to be illegally taken are valid enactments of state law, the fact that they can not be enforced as to game delivered to the postal service for transportation furnishes a sufficient basis for excluding the parcel post from the means by which game may be shipped, in so far as any objection of special legislation or want of uniformity in operation under our state constitution is concerned.

The argument of learned counsel for petitioner in support of the proposition that the provisions as to inspection, etc., are invalid as improperly interfering with property rights, and that the provision here involved which precludes petitioner from using the United States mail for the shipment of game is in effect a deprival of his property right to use the United States mail without due process of law, to our minds fails to give due effect to the well settled doctrine as to the nature and extent of one's property right in wild game. That doctrine was stated by this court through Mr. Justice Van Fleet in *Ex parte Maier*, 103 Cal. 476, 483, in language subsequently approvingly quoted by the Supreme Court of the United States in *Geer* vs. *Connecticut*, 161 U. S. 519, 529, as follows: "The wild game within a state belongs to the people in their collective, sovereign capacity; it is not the subject of private ownership, except in so far as the people may elect to make it so; and they may, if they see fit, absolutely prohibit the taking of it, or any traffic or commerce in it, if deemed necessary for its protection or preservation, or the public good." The offense there charged was that of selling deer meat in violation of a state statute which prohibited any such sale in California. The meat sold was cut by the defendant from the carcass of an entire deer theretofore brought by him from the state of Texas, in which state it had been lawfully killed. It was contended that the statute did not and could not prohibit the sale of meat lawfully taken in another state. It was

held that the statute both did and lawfully could prohibit such a sale, and that while the law was of course intended only for the protection of the game of *this* state, the intention was to accomplish that very end by prohibiting the sale wherever game was in fact obtained, and that such a law was reasonably adapted to that end. All state laws reasonably looking to this end have consistently been maintained by the courts, the theory being that the ownership of the sovereign authority being in trust for all the people of the state, it is the duty of the legislature to enact such laws as will best preserve the subject of the trust and leave the beneficial use in future to the people of the state. In *Geer* vs. *State of Connecticut*, 161 U. S. 519, the Supreme Court of the United States upheld a statute of Connecticut which forbade the transportation without the state of game lawfully killed or taken within the state, or the having of such game in one's possession with the intent to procure its transportation beyond the state. In *Ex parte Kenneke*, 136 Cal. 527, a statute prohibiting the buying or selling of quail was upheld by this court. The court, through Mr. Justice McFarland, said: "Wild game belongs to the whole people, and the legislature may dispose of it as may seem to it best, subject only to constitutional limitations against discrimination. Within those limitations the legislature, for the purpose of protecting game, may pass such laws as to it seem most wise; and the measures best adapted to that end are for the legislature to determine, and courts can not review its discretion." It was held that the law did not destroy a right of property, the court approvingly quoting from *American Express Co.* vs. *State*, 133 Ill. 649, as follows: "The fallacy of the position consists in the supposition that the person who may kill quail has an absolute property in the dead animals. * * * The legislature has the right to permit persons to kill or take game upon such terms and conditions as its wisdom might dictate, and that the person killing game might have such property interest in it, and such only, as the legislature might confer. * * * The person killing quail under this statute has but a qualified property in the birds after they are killed. * * * But the law which authorized him to kill the quail has withheld the right to sell or the right to ship for the purpose of sale, and when such person undertakes to ship for sale he is undertaking to assert a right not conferred by law. The act, therefore, does not destroy a right of property, because no such right exists." In *State* vs. *Rodman*, 58 Minn. 393, it was said that the legislature may adopt reasonable regulations not only as to the time and manner in which game may be taken and killed, "but also imposing limitations upon the right of property in such game after it has been reduced to possession." It was further said that such legislation deprives no person of his property, because the person reduces game to possession "subject to such conditions and limitations as the legislature has seen fit to provide." (See, also, *Silz* vs. *Hesterberg*, 211 U. S. 31.) Such has been the uniform course of decision. We are, of course, speaking of regulations which may reasonably be held by the legislature to look to the preservation of the game of the state for the beneficial use of the people of the state. The person taking or killing game, takes or kills subject to the limitations of any such reasonable regulation by the state, and his right of property therein is qualified thereby. We can see no good ground for a claim that regulations subjecting such game to inspection by state officers when offered for shipment or when in course of transportation under shipment for the purpose of enabling illegal takings to be illegally taken, are in any way an unreasonable exercise of the power of the legislature in this behalf. Whatever rights the shipper has in game shipped by him are subject to these regulations, as are necessarily the rights of the transportation company and the consignee. And the same thing is necessarily true of the law here involved prohibiting the shipping of game by parcel post. It is a reasonable complement of the regulations as to inspection, without which the inspection in course of transportation could be had only as to such game as is shipped by some other means than the United States mail. The person having game in his possession which he desires to ship, acquires and holds it subject to the condition that he will not ship it by parcel post, and no property right in such game is violated by a law which makes it a crime for him to do so. We are entirely at a loss to see how a person's property right to use the United States mail for all lawful purposes is violated by a law which prohibits his use thereof for the purpose of transmitting property which he has acquired and holds subject to the condition that he shall not so transmit it.

The case of *Ex parte Knapp*, 127 Cal. 101 (involving the question of the validity of a *county ordinance*) relied on by learned counsel for petitioner in this connection is sufficiently distinguished as to such a case as this by what was said by the court in *Ex parte Kenneke, supra*, as follows: "There is no question in the case at bar as to the reasonableness of an ordinance as in *Ex parte Knapp*, 127 Cal. 101, and other cases cited; the provision attacked here is a law of the state passed by the legislature."

The claim that the state law here involved is an unauthorized regulation of interstate commerce is, we think, fully answered by decisions of the United States Supreme Court, the final arbiter on this question. A similar claim was made in *Geer* vs. *State of Connecticut, supra*, and held to be without foundation. The court, through its present chief justice, after exhaustively discussing the question of property in wild

game, said: "The right to preserve game flows from the undoubted existence in the state of a police power to that end which may be none the less efficiently called into play, because by doing so interstate commerce may be remotely and indirectly affected. * * * The exercise by the state of such power therefore comes directly within the principle of *Plumley* vs. *Massachusetts*, 155 U. S. 401, 473. The power of the state to protect by adequate police regulations its people against the adulteration of articles of food (which was in that case maintained), although in doing so commerce might be remotely affected, necessarily carries with it the existence of a like power to preserve a food supply which belongs to all the people of the state, which can only become the subject of ownership in a qualified way, *and which can never be the subject of commerce except with the consent of the state and subject to conditions which it may deem best to impose for the public good.*" [The italics are ours.] In another portion of the opinion the court speaks of the "consequent power of the state to follow such property into whatever hands it might pass with the conditions and restrictions deemed necessary for the public interest." In the later case of *Silz* vs. *Hesterberg*, *supra*, a similar claim was made, and the court held that the law (one prohibiting the possession of wild game during the close season, whether killed within or without the state) was not directed against commerce or any of its regulations, but only indirectly and remotely affected the operations of commerce, and was of obligatory force upon citizens within the territorial jurisdiction of the state. The court said: "That a state may not pass laws directly regulating foreign or interstate commerce has frequently been held in the decisions of the court. But while this is true, it has also been held in repeated instances that laws passed by the states in the exercise of their police power, not in conflict with laws of Congress upon the same subject, and indirectly or remotely affecting interstate commerce, are nevertheless valid laws." It is sought to draw a distinction between these cases and the statute here involved, in that our laws permit the shipment beyond the borders of the state of game killed within the state, thus making game, it is said, "articles of interstate commerce." We do not consider the distinction material. The difficulty with the argument is that we have not made wild game an article of interstate commerce in the full and unrestricted sense. For so long as it remains within this state, at least, it remains burdened with the conditions imposed for the purpose of protecting the game of the state, to the effect that it may be shipped only in certain ways. As to this the language of Mr. Chief Justice White in *Geer* vs. *Connecticut*, *supra*, that such game "can never be the subject of commerce except with the consent of the state *and subject to conditions which it may deem best to impose for the public good*" is specially pertinent. Our own case of *Ex parte Maier*, *supra*, is also in point to the effect that there is in our law no unwarranted interference with interstate commerce.

The principles controlling the determination of the question just discussed are equally applicable to the claim that the state law here involved is an unlawful interference with the postal service of the United States. As said by respondent, there is no attempt here to regulate the postal establishment or in any way or degree to affect its operations. Looking to the proper protection of the game of the state for its people, the legislature has prohibited any person within the state from shipping it by parcel post. It must be assumed here that such provision is reasonably necessary to such proper protection. The sole purpose of the enactment is the protection of game for the people of the state. The most that can be said in this connection is that the law may indirectly and remotely affect the postal department by depriving it of this patronage and the consequent revenue which would be paid as postage. But this, we think, in view of the decisions we have referred to, can not be held to make the law invalid as unlawfully interfering with the postal service. In a well considered opinion, the court of common pleas of Northampton County, Pennsylvania, reached a similar conclusion as to a recent statute of that state which prohibited shipments of game by parcel post. (See *Com.* vs. *Reimel*, 44 Pa. Co. Court Rep. 557.)

We see no good ground upon which the statutory provision attacked may be held invalid.

The writ is discharged and the petitioner remanded to the custody of the sheriff of San Mateo County.

ANGELLOTTI, C. J.

We concur:

SHAW, J.
SLOSS, J.
MELVIN, J.
VICTOR E. SHAW, J. *pro tem.*
WILBUR, J.

CALIFORNIA FISH AND GAME

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All material for publication should be sent to H. C. Bryant, Museum of Vertebrate Zoology, Berkeley, Cal.

April 15, 1918.

EAT MORE FISH.

THE UNDERLYING PURPOSE OF A "HERRING" NUMBER.

It is doubtless interesting and useful to anyone to know a herring when he sees it; to know where and when it is to be found and what are its nearest relatives. It is also instructive to read of the herring fishery of the Pacific coast, of the methods of catching, canning and curing of the fish. It is more pertinent still to know by actual test that herring and sardines are splendid food and that they are among the cheaper kinds of fish.

The "Herring Number" will fulfill its purpose only, if it interests its readers in the herring as a tasty meat substitute in the present war emergency, and consequently finds a larger place in our bill of fare.

SUPREME COURT UPHOLDS STATE LAW PROHIBITING SHIPMENT OF GAME BY PARCEL POST.

A case in the Supreme Court to determine the validity of the law passed by the last legislature prohibiting the use of the mails in the shipment of game resulted in a decision upholding the law. This law has been declared by many to be unconstitutional, and after its passage a ruling of the postal authorities which received wide publicity, prevented the search of parcel post shipments of game with the result that market hunters quickly took advantage of this opportunity to make illegal shipments. Frank Phoedovius, having been duly convicted of a violation of the provision of section 627*b* of the Penal Code, which declares that "any person who ships any of the wild birds or wild animals or fish by parcel post is guilty of a misdemeanor," took an appeal to the Supreme Court. The decision concurred in by all of the judges sitting in bank is printed in full on page 75 and should be read by everyone.

This decision is the fourth important one relating to game in California. Of prime importance was the decision in *Ex parte Maier*, 103 Cal. 476, 483, that "wild game within a state belongs to the people in their sovereign capacity" and is not "the subject of private ownership." A decision upholding a statute prohibiting the buying or selling of quail was handed down in connection with *Ex parte Kenneke*, 136 Cal. 527. The handling of game by "transfer companies" was held invalid in the Superior Court by the Honorable Judge Frank J. Murasky. As a fitting climax to these cases comes this decision on the shipment of game by parcel post (*In re Frank Phoedovius*, on *Habeas Corpus*, Crim. No. 2108. In bank, January 17, 1918; Pacific Recorder, Vol. 170, p. 412).

MARKET HUNTERS MAKE CAPITAL OF THE PRESENT EMERGENCY.

On the plea that letting down the bars on fish and game will help furnish additional food supply, a dangerous attempt has been made to destroy the protection which has taken years to build. The conservationists in almost every state have had to fight these attempts to break down protective laws. Many persons even, from lack of appreciation of the consequences, have espoused the attacks on protective laws. As one editor points out, "To suspend the fish and game laws would be like deciding to kill all of the hogs and cattle at once, to avert starvation before feeling the pangs of hunger, and thus insuring shortage at a later period when hunger might be felt."

Typical of those who would make capital of the present emergency is a spokesman of the fish industry in Texas who exclaimed, "Damn posterity; lets get the fish." Unfortunately, this is the

attitude of some commercial interests. A great pretense of being interested in conserving the supply in order to insure their own interests is made, but under this veneer is avarice and selfishness.

This is what the commercial interests in Texas demanded:

1. Suspension of the closed seasons for the period of the war.
2. Removal of restrictions on weight, size, the use of seines and the dredging of oysters.
3. The drafting of new fish and game laws.
4. Removal of protection from fish-eating birds.

To the credit of Governor Hobby of Texas no change in the laws has been made, but so plausible was the plea made by the commercial fishermen that the removal of restrictions was narrowly averted.

Every conservation unit should be mobilized and held ready to withstand a similar attack in this state. Already slight skirmishes with the enemies of wild life have been recorded.

FISH LAWS MODIFIED BY FOOD ADMINISTRATION.

At an important meeting, charged with great interest to the consumers and producers of sea fish held Saturday in Federal Food Commissioner Merritt's offices in San Francisco, the first definite action towards speeding up California's fish production was taken.

It was found that the state laws in the main do not restrict the full development of the fisheries and it was further found that in only a few cases, do they prevent fish from being generally used as food. For example, in order to protect certain game fish, their sale has been prohibited. It was deemed wise during the period of the war to remove such restrictions. Under authority an act of Congress entitled "An act to provide further for the national security and defense by encouraging the production, conserving the supply and controlling the distribution of food products and fuel," approved August 10, 1917, President Wilson issued a proclamation empowering the Food Administration to annul any restrictive legislation whose conservation features seemed to the Food Administration less essential during the present crisis than the incidental curtailment of food supply in the present days of international need.

After a lengthy discussion the following changes in the state law were decided on:

1. California whiting, also known as corbina or surf fish, yellow-fin croaker and spot-fin croaker, the sale of which is now prohibited by the state law, may until further notice be sold.

2. The possession of paranzella or trawl or drag nets shall not be unlawful while in transit over the waters of Fish and Game District 19, as defined by the state laws, but such nets must not be used or dragged within said district under penalty of revocation of the federal license.

3. Bait nets may be used in Fish and Game District 20 (Santa Catalina Island) for the purpose of taking bait only.

4. Halibut below the four-pound minimum weight prescribed by the state law may hereafter be sold provided they are caught in conformity with the laws of this state as above modified.

The attention of all fishermen is particularly called to the regulation requiring every salt water fisherman to procure a license from the United States Food Administration, application for which can be had at the Food Administration's offices. The license of any fisherman violating any of the federal or state laws as above modified or any rule or regulation issued by the United States Food Administration will be revoked and such fishermen will not thereafter be permitted to engage in the vocation of fishing.

DISCRETIONARY POWERS INSURE BETTER CONSERVATION.

Many Eastern states are finding it advantageous to grant sufficient discretionary powers to the fish and game commission to allow a change in seasons and bag limits when unusual conditions arise. Immediate protection is sometimes necessary and a wait of one or two years for a session of the legislature is often dangerous. Here in California we persist in delegating to the legislature every change in the game laws. No matter what the emergency, no lawful change can be made in the fish and game laws except at the biennial meeting of the legislature. If

deer are practically exterminated by disease in Trinity County, hunters are allowed, under the law, to take the same toll as is taken in other counties. If quail in Inyo County are endangered because of severe winter weather no relief can be given until the following meeting of the legislature and then the necessary legislation may not pass.

The best conservation policy is found in immediate protection whenever conditions warrant it. The legislature should delegate to the Fish and Game Commission sufficient power to efficiently administer wild life resources. A check on any change may easily be provided for by requiring petitions with a set number of signatures or by insisting on the signature of the governor.

Watch the next number of CALIFORNIA FISH AND GAME for more information on the subject.

INCREASED SHEEPING ENDANGERS WILD LIFE.

Great pressure is being brought to bear to so change the regulations regarding grazing in the national forests as to allow sheeping in national parks and increased sheeping in national forests. This may sound favorable so far as increased meat supply is concerned, but anyone who has seen the deep traces left in sections where sheep have grazed will shudder to think what results are to be expected. Many are the wornout meadows, deeply gullied, which now testify to the past inroads of herds of sheep, and many the depleted game covers where the trampling of nests and the destruction of food has reduced upland game birds to the minimum. These are dangerous times and every conservationist must help form the army of defense needed to save wild life in this emergency when special opportunity to devastate wild life resources is given the enemy.

FEDERAL MIGRATORY BIRD LAW BEING ENFORCED.

In spite of the lack of funds and lack of legislation backing the Migratory Bird Law, a report from the Chief of the Bureau of Biological Survey shows that many arrests have been made and that the law is being enforced. The 16 inspectors and 186 federal wardens have reported during the last year 208 cases of violations of the regulations. Since the law became effective prosecutions have been made in 29 cases, resulting in impositions of penalties in all but five.

That the violations reported by no means approximate the number that have occurred is to be expected and is due to the impossibility in many cases under the law of securing evidence sufficient to convict. Possession of wild fowl during the closed season is not a violation under the federal act, and there must be evidence of actual shooting or capture on which to base prosecution. Furthermore, inspectors and wardens appointed under authority of the law have no power of arrest, and hence many violators escape.

Notwithstanding the difficulties attending enforcement, the present law is very generally observed, and communications received from fish and game commissioners and other persons contain incontrovertible evidence that since the law became effective a very marked increase in the number of waterfowl and shorebirds has been noted in most of the states; that wild fowl have become unusually tame in spring; and that many thousands of waterfowl are breeding in certain localities where they had not nested for many years. The consensus of opinion attributes these greatly improved conditions to the abolition of spring shooting and the general observance of the regulations.

STILL IN THE SAME CLASS.

The Sportsmen's Review of February 16, 1918, comments thus on the sale of game:

WAKE UP.

In all this fair land there are still two states, Louisiana and North Carolina, which permit the hunting of game for market.

In all this fair land there is no state which has enough game left to feed it to epicures who are too lazy to go out and get it themselves.

In all this fair land there is no real sportsman who would allow market hunting in his native state without a protest.

We suppose that our partial prohibition of the sale of game saved us from being included with Louisiana and North Carolina. So long as we continue the sale of ducks and geese we in reality belong in the same class. Wake up! California!

COUNT THE DUCKS.

The accompanying photograph was taken on the overflow from Butte Creek, just northwest of the Marysville Buttes, on February 2, 1918. The picture gives evidence that two days after the season closed there were still plenty of ducks left in this vicinity despite the toll taken by numerous gun clubs. At least 98 per cent of the ducks in the picture were mallards. A slight sprinkling of pintails, baldpates and green-winged teal was noted. Beyond the birds in flight was a mile of water, black with ducks. Although geese were not numerous at the same date the picture on page 84 shows that a few still remained on the loafing grounds in the vicinity. There is a notable concentration of ducks in this vicinity, probably occasioned by the abundant food supply furnished by grain and rice fields.

Fig. 49. Mallards and still more mallards. A photograph taken at the mouth of Butte Creek, near Pennington, Sutter County, California, two days after the 1917–18 season closed. Photograph by H. C. Bryant.

ANOTHER EDITOR WONDERS.

The tedious routine of an editor's life is often enlivened by his exchanges. The apparent lack of proof reading in one exchange that comes to our desk so invariably furnishes amusement that it is scanned as one would read a funny magazine. Here is the latest on the front page:

FEBRUARY.

February is the month for Owls. It is this month that the big North American owls of various species collect their nesting site, and frequently lay their eggs.

A day's wondering through the woods is likely to result in the addition of one or more sets of rare eggs to the collection of the wonderer.

Take the advice of the editor and wonder.

CONSERVATION SENTIMENT GROWS.

We do not have to go very far back in the history of our state to find the time when a game warden held a political job. The first warden in the state was a market hunter himself and, instead of prosecuting offenders, profited by added protection. He marketed 107 25-pound sacks of game during the first year of his appointment. Contrast this condition with the situation at the present time and you will discover that conservation sentiment has grown rapidly. Now wardens are appointed on merit and their sole duty is to enforce the fish and game laws. That they actually do enforce these laws is evidenced by the number of convictions obtained from month to month, reports of which are always to be found in CALIFORNIA FISH AND GAME.

NEW PATROL BOAT "MAKES GOOD."

"Albacore," latest acquisition of the Fish and Game Commission for commercial fisheries research and regulation work in southern California ocean waters, has taken up the business for which she was built, and is now patrolling the waters between the mainland and the channel islands, devoting a great deal of her time

to careful scientific investigation of the many marine problems which are of greater interest to the growing canning industry and the fish-consuming public today than ever before.

The new boat has acquitted herself thus far even better than Captain Nidever had dared to hope. Having superintended every detail of her construction and feeling confident of her seagoing qualities, Nidever stood out from under the lee of Catalina Island at the height of the heaviest storm of the winter and gave his command a full-speed drive right into as rough a seaway as ever she is likely to find in the regular course of duty. "Albacore" stood up to her work splendidly; kept above everything but spray, shipping no solid water at all.

In design, while following in general the approved practice of the most successful fishing-boat builders for southern conditions, the "Albacore" departs somewhat in behalf of greater speed without sacrifice of sea-keeping ability, attained largely through a refinement of lines. Much more in the way of human comfort has been built into her also, as the state men, wardens and investigators who must live and labor aboard for days at a time are to make of her a floating home and workshop combined. Especially when making experimental hauls of scientific gear to prospect the sea floor the boat is designed so as to use a sail and make use of favorable winds, thus saving distillate.

The commercial fisheries research department of the Fish and Game Commission has laid out a comprehensive program of investigation work for the year, fraught with prime importance to the fishing industry and through it, the entire public. Mr. William F. Thompson, ichthyologist, has been busy with studies of the albacore, halibut and sardine, striving to free the atmosphere of some of the theories prevalent by finding out the exact facts, some of which can be ascertained with convincing certainty. He has been working on the boat much of the time. The Japanese albacore experts from the Imperial Fisheries College of Japan have made numerous trips upon the new boat whose name commemorates the wonderful fish that in a few short years has succeeded from the status of once despised by all, to the exalted plane of premier commercial importance in the South, a standing testimonial to the pitiful truth that the American food-consuming public doesn't know a good thing when it sees it, but has to be convinced by barrels of printer's ink, and the adoption of a different name!

Quite a lively interest attaches to the work of the Japanese albacore fishermen, whose experiments with long-line and deep-trolling methods are being embodied in an exhaustive report.

In the South, the public long since has learned to take the little brown men mighty seriously as fishermen; and in going to Japan for the most advanced scientific thought in marine fisheries methods, the Fish and Game Commission sought to standardize the production of albacore by demonstrating methods to catch them in winter. This was an intelligent following-up of Mr. Thompson's summer work in demonstrating that the albacore merely descend to lower levels in the colder weather, rather than migrate as many previously had supposed. The value of a discovery that would stabilize the albacore supply is so well appreciated by the big southern fish packers that every detail of the work of the state toward this end is being watched with keenest interest by these men who have put southern California on the map as a source of seafood supply for the world.

Among other objects of the "Albacore's" work this summer is that of extending the known range of the rich and delicious sablefish to include the deeper off-shore banks of southern California. Rock cod fishermen get a sprinkling of fish they call "black" or "blue cod," and it has been noted that the rock cod seem to run larger on the deeper parts of a bank; so by systematically working the depths, the present small size of the sablefish may give place to a fish whose proportions are more nearly those of commercial requirements. The federal government made quite a publicity campaign in behalf of the sablefish some time ago; and the fish needs all the promotion it can get, as people in the South are not educated to it as yet, only a relatively few housewives understanding what a choice and always desirable boiling or broiling fish it is, the

larger ones being quite as choice for frying when filleted. Frying, despite all educated effort to the contrary, continues the popular method of cooking fish because easy. EDWIN L. HEDDERLY.

YOSEMITE HATCHERY PRACTICALLY ASSURED.

For many years different persons have suggested to the Fish and Game Commission that a state hatchery be placed in Yosemite Valley. On the earnest solicitation of those interested, a careful investigation of the situation was made by Commissioner Bosqui, W. H. Shebley, in charge of fishculture, and Field Agent E. W. Hunt. Convinced that proper facilities were offered and that such a hatchery would be of great educational value in demonstrating the work of the commission, plans were made for the immediate installation of a suitable hatchery plant. The site was even selected. Governor Stephens, who happened to be in the valley at the time of the investigation, approved the plan. Supervisor Lewis of the park has also been a strong advocate of a Yosemite hatchery.

After considerable delay arrangements are now being consummated with the Department of the Interior so that a fine hatchery building will probably soon be under way. At first it seemed that on account of the plans of the Bureau of Fisheries a hatchery built by the state commission would be impossible. A letter from Alexander Vogelsang, first assistant secretary of the Department of the Interior, clears the situation and makes proposals which should prove satisfactory. The state commission will be able to obtain a lease for a term of years and sufficient water rights to properly provide for a hatchery. This same letter also suggests the possibility of a new hatchery in the Sequoia National Park. An investigation is soon to be made to ascertain whether this is feasible.

GEESE DAMAGE CROPS NEAR TULARE LAKE.

The unusual conditions arising from the lack of rain caused serious damage to the crops in the vicinity of Tulare Lake during February. Great numbers of geese concentrated in this vicinity, fed in the grainfields and destroyed the grain as it appeared above the ground. After the close of the season the geese became very tame, and it was difficult to herd them from the fields. Ranchers appealed to the State Council of Defense and to the Fish and Game Commission with the result that an investigation was instituted and arrangements made so that crops could be protected.

Fig. 50. Geese on loafing grounds near Pennington, Sutter County, California, February 2, 1918. Photograph by H. C. Bryant.

During normal years these same birds feed on native plants and grasses and what little damage is done to grain is so distributed over a wide area that no one takes notice of it. This year the only green feed in the vicinity was to be found in the grainfields sprouted by irrigation.

Existing conditions made the problem a difficult one. Ranchers, urged to raise a maximum crop of wheat, believed protective game laws prevented their protecting crops. Of course the rights of the farmer were immediately championed by townspeople who thought they saw an oppor-

tunity to hunt geese out of season, but few took into consideration the conservation of the geese. Geese are very greatly diminished in numbers, and they are in need of careful protection in order that the necessary breeding stock be maintained. Promiscuous spring hunting would necessarily endanger breeding stock.

A misleading statement which appeared in newspapers to the effect that, owing to damage to grain crops by the geese near Tulare Lake, people would be allowed to kill geese, brought countless inquiries to the Fish and Game Commission offices and stirred up "a tempest in a teapot." The statement suggested that under the circumstances the Fish and Game Commission would "wink at the law" giving protection to geese. A treaty with Canada, the federal Migratory Bird Law, and a state law all provide for an open season of three and one-half months, from October 15 to January 31, inclusive. It would take both federal and state enactments to provide a longer open season. Under such circumstances, even under the pretext of an emergency, the Fish and Game Commission had no power to change the present law. Furthermore, the Commission, knowing the resulting difficulty of law enforcement, refused to "wink" at any law on the statute books. It was of interest to find that, although geese were causing real damage, the rancher neither wished to slaughter the geese nor to allow others to slaughter, but simply wanted to protect his crops. By far the greater complaint of damage came from townspeople who, under the pretext of helping to protect crops, desired a chance to hunt geese out of season.

Fortunately, a rain scattered the geese soon after agitation was at its height and ranchers had little difficulty in protecting crops. Herding the geese from the fields with rifles and frightening them with bombs were the two methods most widely used.

A NEW AQUARIUM FOR SAN FRANCISCO.

Mr. Sigmund Steinhart, a philanthropic citizen of San Francisco, provided in his will sufficient funds to build a fine aquarium. The building is now nearly completed and will cost $250,000. Both fresh and salt water fish will be displayed. Outdoor pools will be provided for seals, sea lions, porpoises and other aquatic mammals. The aquarium is situated in Golden Gate Park and is to be under the direct control of the California Academy of Sciences. The funds for the maintenance and the operation of the Steinhart Aquarium will be furnished by the city of San Francisco. A charter amendment submitted to the voters of San Francisco in November, 1916, directs the supervisors to include an item of not less than $20,000 in their annual budget to be used for the maintenance of a public aquarium. This aquarium should do much to educate the people of the state regarding fish life and fisheries.

MANY TONS OF SHARKS MARKETED.

Large catches of sharks were reported during the last two weeks of January, 1918. The greater number of these sharks were the well known dog fish but a few Henlis sharks were also taken. These fish averaged from four to six pounds. Such a large number were caught that many were thrown overboard and doubtless the total catch was well up to the 100,000 pound mark.

A NEW HATCHERY ON KLAMATH RIVER IS PLANNED.

A law recently passed by the legislature provides that when it is proved unfeasible to install a fish ladder over a dam, a power company will be required to install a fish hatchery instead. A similar law has been in operation in Alaska for several years. The first hatchery to be erected under this law will probably be placed on the Klamath River near Copco, where the California-Oregon Power Company has a 130-foot dam. Experts have proved that a fish ladder over this dam would be impracticable. The California-Oregon Power Company has therefore agreed to the erection of a hatchery on its property on Fall Creek. The United States Bureau of Fisheries which has operated a spawning station lower down the Klamath River has given up its work at this location and relinquished control to the California Fish and Game Commission.

The solution of the problem arising from the Copco dam has thus been solved and improved fishing conditions on the Upper Klamath River are to be expected.

BURLINGAME PUBLIC

FEW STURGEON LEFT.

During August, 1915, a giant sturgeon was caught in the Feather River, two miles east of Live Oak, by W. A. McAuslin. With the aid of J. J. Haken, Mr. McAuslin soon landed the fish. Small white fish baited to three bass hooks at the end of a common chalk line were used in its capture. The sturgeon swam into shallow water and after shooting it several times the men had no difficulty in landing it. This fish, a male (see fig. 51) was seven feet long and weighed one hundred and sixty pounds. Another fish, evidently its mate, was seen in the river at the same time.

This fish was caught before the sturgeon was given total protection. Once extremely abundant in our larger streams and considered poor food, the sturgeon, now that it is the nearest extinct of all of our food fishes, is considered a delicacy and every attempt is being made to increase its numbers.

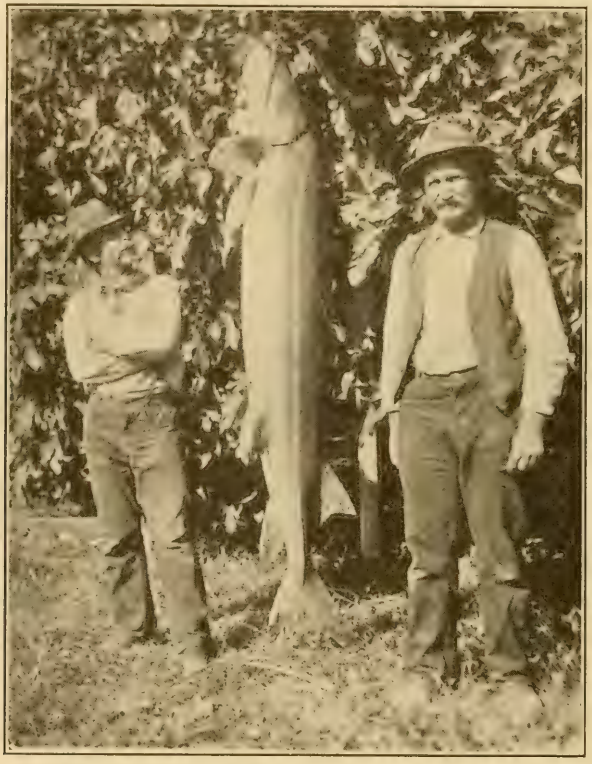

Fig. 51. Giant sturgeon weighing 160 pounds, caught near Live Oak, California, in August, 1915. The sturgeon is so nearly extinct in waters of this state that it has been given total protection.

AN ALL-WOMAN JURY CONVICTS NIGHT SHOOTERS.

In January a jury of twelve women, the first jury so far as is known made up entirely of women to try a fish and game case in California, heard the evidence and brought in a verdict of guilty, at Willows, Glenn County. Four Colusa duck hunters were arraigned on the charge of night shooting. On January 4 they were tried by a jury of men who disagreed seven to five in favor of acquittal. The new trial was set for January 14, and twelve women were seated as jurors. The case being historical it may be of interest

to record the names of the women selected. They were as follows: Mesdames Lulu B. Burgi, Ellen Hunter, Eva O. Halterman, Hattie Luce, Jane E. Bielar, Bell C. Feige, Francis J. Davis, Katherine A. Keim, Annie C. Lohse, Laura Cummings, Sallie Wood, and Ida Cook. Each promised to support the law on the evidence presented, and the result was a verdict of guilty. Although the atttorney for the defense, charging fraud, petitioned for a new trial, the petition was denied and sentence of $100 each or one hundred days in the county jail was imposed.

An astonishing plea in behalf of the defense by Attorney Belieu was made. He argued that in view of the fact that the 287 ducks which were confiscated from the hunters and donated to charity were worth between $150 and $200, a lenient fine should be imposed on account of the value of the ducks contributed to the county. This argument was met by Attorney Duke of the Fish and Game Commission in the reply that game illegally killed is not the property of the defendants in any case and can not be used in partial payment of their fine any more than it would appear feasible to allow a convicted chicken thief to present his booty as part payment of his fine.

WHALE MEAT NUTRITIOUS.

Analyses of whale meat made at the University of California Experiment Station show that this meat is very nutritious. It contains 23.31 per cent protein, a larger percentage than is contained in average beef. Other constituents of whale meat are: water 71.22 per cent, ash 1.02 per cent, and undetermined substances .21 per cent. Whale meat is as easily digested as beef and, like other meats, is more readily digested than eggs.

There are tough cuts as well as tender cuts in whale meat. Its preparation should, therefore, vary accordingly. Whereas, tender whale steaks can be broiled, savory stews should be made of the tougher portions.

LION BOUNTIES IN 1917.

The complete returns on the number of mountain lions upon which bounties were paid in 1917 show that the decrease of several years ago has changed to a slight increase. During 1917 a bounty was paid on 188 lions as against 179 in 1916 and 162 in 1915. The number for 1917 is only about half of the total paid in 1908 when the bounty law first went into effect. If the number of bounties paid is any criterion of the abundance of lions, Humboldt County must be considered the state with the largest lion population, for the total bounties paid to residents of Humboldt County is 534. The nearest competitor for this honor is Siskiyou County with 240. Trinity is a close third with 234. The total number of bounties paid up to the end of 1917 was 2,713.

NEW GOOSE DISCOVERED IN CALIFORNIA.

In a state where ornithology is so widely studied as California it seems incredible that so large a bird as a goose should remain unknown to science until this late date, but such is the case. Two well-defined subspecies of the white-fronted goose (*Anser albifrons*), called by the hunters, speckled-bellied goose, occur in California during the winter months, where but a single race has been heretofore recognized, according to a paper written by H. S. Swarth and Harold C. Bryant (Univ. of Calif. Publ. Zool., Vol. 17, pp. 209–222, October 9, 1917).

The new "tule goose" or "timber goose" is distinguished from its relative, the common white-fronted goose by its greater size, its call notes, its browner tints, its yellow eye ring, and the possession of a greater number of tail feathers. To anyone handling the birds in the flesh the differences between the two are obvious beyond dispute.

The specimens of tule goose obtained for study were all taken near West Butte, Sutter County, California, and are all winter birds. No breeding birds were available for comparison, thereby making it impossible to indicate the summer ranges of the two forms. However, the following theoretical breeding ranges are suggested by the authors. The white-fronted goose is known to breed in western Alaska and it is probable that the breeding grounds of the tule goose are to be found further to the eastward in Arctic America.

While the tule goose seems to occur regularly in Sutter County during the winter, there is no data demonstrating its

presence at any other point in the state. However, a rumor persists among market hunters of the Los Banos region that a large form of white-fronted goose exists and has been killed there.

It is said that the tule goose is never seen in such large flocks as is customary with the white-fronted goose but is most frequently noted singly or in pairs, also that it is pre-eminently a denizen of open water or ponds and sloughs surrounded by tules and willows.

It was interesting to find that the original description of the American white-fronted goose by Hartlaub more nearly fits the tule goose and that consequently the name *Anser albifrons gambeli* must be made to apply to the tule goose, the common white-fronted goose assuming the name *Anser albifrons albifrons* in common with the white-fronted goose of Asia.

Waterfowl hunters will hereafter be justified in giving the large white-fronted goose with bill 53–62 millimeters in length the name of tule goose and the smaller white-fronted goose with bill 44–52 millimeters long the name of white-fronted goose.—Amy M. Bryant.

FAIR PLAY.

(A page of criticisms and answers.)

RAISING RICE FOR WILD GAME CONSUMPTION.

Editor *The Chronicle*—Sir: I bought a wild duck in a market in Sacramento a few days ago and when I dressed it I found at least a half ounce of rice in its craw, and many grains embedded tightly under each wing, showing beyond a doubt that it had beaten the rice stalks down in order to get at the grain. If this were called to the attention of Mr. Newbert, president of the State Fish and Game Commission, he would likely explain by saying that some mudhen had stuck the grains of rice under the duck's wings while in deadly combat with the duck.

W. D. Bludworth.

Sacramento, January 28, 1918.

—*S. F. Chronicle*, Jan. 31, 1918.

THEY DINE ON THE LEAVINGS.

Editor *The Chronicle*—Sir: My attention has been called to a little item which appeared in the Safety Valve column of your paper of January 31. It was headed "Raising Rice for Wild Game Consumption," and bore the modest signature of W. D. Bludworth of this city. Mr. Bludworth asserts he bought a wild duck in the market recently and he found at least a half ounce of rice in its craw and many grains of the cereal embedded tightly under each wing, showing beyond a doubt that the duck had beaten the rice stalks down in order to get at the grain. I would share Mr. Bludworth's apprehension and indignation were it not for the fact that my knowledge of ducks goes slightly beyond "craws." It may interest Mr. Bludworth to know that ducks do not have craws, they have gullets. Craws are peculiar to chickens and turkeys. The rice crop was fully matured and cut by November 1 (over three months ago) and was threshed, sacked and stored more than one month ago, so the duck mentioned by Mr. Bludworth apparently had "put one over" on Hoover and had hoarded that rice under its wings for three months after the crop was in. The rice found in Mr. Bludworth's duck can be accounted for by the fact that there is a large amount of rice lost in harvesting the crop. This lost rice serves as food for many varieties of birds and if left on the ground it would grow into a form of water grass that is particularly obnoxious to rice farmers. On the whole, if Mr. Bludworth's statement is to be accepted without question, I would say he had purchased not a duck but a pin-feathered freak of nature. Mr. Bludworth says it was a wild duck. It's enough to make any duck wild. The question is "When is a duck not a duck?" Answer: when it's a quack.

George Neale.

Sacramento, February 6, 1918.

—*S. F. Chronicle*, Feb. 10, 1918.

FACTS OF CURRENT INTEREST.

The new commercial fisheries patrol boat was successfully launched at San Pedro, December 27, and is now in commission.

The fishing season opened auspiciously April 1, a return to an earlier date after a try at a May 1 opening.

More than four thousand ducks and geese, illegally taken or shipped, were confiscated during the past open season and donated to charity.

All deep-sea fishing is now under government control. Each fisherman is under license and an attempt is being made to reduce the price of fish to the consumer.

Five aliens convicted of killing songbirds recently paid fines approximating $200.

Striped bass market fishermen persist in violating the law, as is evidenced by the confiscation of 5,644 pounds of this fish during November, December and January. All of this fish was donated to charity.

At the Mount Shasta Hatchery there are 13,000,000 young salmon awaiting distribution.

During January the first jury made up exclusively of women to try a game case brought in a verdict of guilty and the four Colusa hunters convicted of night shooting were sentenced to $100 fine or 100 days in the county jail.

The largest albacore ever taken on rod and reel was secured by Mr. Elijah Pringle of Tuxedo Park, New York, on February 14, 1918, while fishing near Catalina Island. The fish, which weighed 81 pounds, took twenty-nine minutes to land. Two other albacore recently caught weighed over fifty pounds. The record albacore previous to the Pringle fish weighed 67 pounds and was taken by Tad Grey on January 11, 1918.

Until this year it was believed that the albacore entirely disappeared from the waters of southern California during the winter season. Investigation has shown that a few large fish of this species remain each winter and the former theory is entirely upset by the large catches of several hundred fish weighing over forty pounds which have been taken this past winter.

Severe penalties were recently meted out to two trappers who had failed to secure licenses. One paid a fine of $15 and the other was sentenced to 40 days in the county jail, it being the latter's second offense.

HATCHERY NOTES.

W. H. SHEBLEY, Editor.

MOUNT SHASTA HATCHERY.

With the completion of the work of distributing the 1917 hatch of fish from the different hatcheries, work on preparing for the collection of trout eggs for the season 1918 was immediately commenced.

The buildings, hatching troughs and pond system have been given a general overhauling; work was completed before the winter storms set in.

Fig. 52. Seining spawning salmon at Bryan's Rest Egg Collecting Station on Eel River, Humboldt County, California. Photograph by S. Campbell.

Thirteen million salmon eggs were received at this station, and the resulting fry are now being reared for distribution in the upper reaches of the Sacramento and Klamath rivers. A portion of these fry will be distributed during the coming spring and the balance held over summer in the three large rearing ponds and planted during the fall of 1918.

The taking of Loch Leven and Eastern brook trout eggs from the adult fish carried in the ponds at Mount Shasta Hatchery was very successful this year; 1,850,000 Loch Leven fry and 1,350,000 Eastern brook fry were hatched from the eggs secured. These fry hatched out in excellent condition and will be ready for distribution during the middle or latter part of May.

Rainbow egg-collecting operations were commenced during the fore part of February at Mount Shasta hatchery and at the Klamath River stations; to date approximately 500,000 have been taken. While the season is late, owing to very unusual weather conditions, we believe that the operations on the Klamath River will result in an average take of rainbow trout eggs.

MOUNT WHITNEY HATCHERY.

The 150,000 Eastern brook and Loch Leven eggs which were shipped to Mount Whitney Hatchery have hatched out and are doing nicely. It is proposed to ship a sufficient number of rainbow and steelhead trout eggs to the Mount Whitney Hatchery from other hatcheries and egg-collecting stations to supply 1,500,000 trout for distribution in southern California counties.

BEAR LAKE HATCHERY.

On March 4 a crew of men left for San Bernardino en route to the Bear Lake Hatchery. Every effort will be made to collect a large number of rainbow trout eggs at the North Creek spawning station. During the past summer and fall extensive repairs and improvements were made at the North Creek station and with the new thirty-trough hatchery at that point we will be able to handle a much larger number of eggs than in former seasons.

TAHOE HATCHERIES.

Arrangements have been made to open the Tallac Hatchery on March 18 or 19 and plans have been made to take the usual number of eggs from the black-spotted trout of Lake Tahoe.

WAWONA HATCHERY.

A lease has been obtained from the Wawona Hotel Company, and contract has been let for the construction of a small, modern hatchery. Unless this work is delayed by a heavy fall of snow, the hatchery will be ready for operation during the fore part of April, and 250,000 trout eggs will be shipped to that station, and the resulting fry distributed in the streams of Mariposa and Madera counties.

ALMANOR AND DOMINGO SPRINGS HATCHERIES.

Arrangements have been made to send a crew of men into Plumas County to open up the Almanor and Domingo Springs hatcheries on March 11. All repair and improvement work was completed at these stations last fall, after the completion of the fish distribution operations, and everything is therefore in readiness for this season's operations.

FORT SEWARD HATCHERY.

In addition to 300,000 quinnat salmon eggs taken at the Bryans Rest Station on Eel River, Humboldt County, approximately 90,000 quinnat salmon were shipped to the Fort Seward Hatchery from the Mount Shasta Hatchery. The fry resulting from these eggs are doing nicely and will soon be ready for distribution. As the fry reach the proper stage, they will be distributed in the Eel River and tributaries and other streams in Humboldt County.

Fig. 53. Quinnat salmon taken at Bryan's Rest Egg Collecting Station on Eel River, Humboldt County. Photograph by S. Campbell.

SNOW MOUNTAIN STATION.

The Snow Mountain station was opened during the fore part of January. Owing to extreme drought, the spawning steelhead have not ascended Eel River as far as Cape Horn dam, at which point our egg collecting station is located, in any considerable numbers, and therefore the collection of eggs has been very much delayed. However, should there be sufficient rainfall during the coming month, we will undoubtedly be able to obtain an ample supply of steelhead trout eggs at this station.

BROOKDALE AND SCOTT CREEK STATIONS.

The same climatic conditions have obtained in Santa Cruz County as at the Snow Mountain station, and the collection of steelhead trout eggs at the Scott Creek station has been very small. Only a little over 300,000 eggs have been collected to date. However, our assistants report that there are large numbers of spawning trout at the mouth of Scott

Creek, and that the first storms will in all probability bring them up to our station. We anticipate collecting the usual number of eggs at this hatchery.

SCREEN AND FISHWAY SURVEYS.

A number of new surveys for fish ladders have been made during the winter in Santa Cruz, Siskiyou and Mariposa counties. New notices to install screens have been served during the past six months on nearly every ditch owner in the state who has not heretofore installed suitable screens. Among the more important screens which have been installed during the past winter are those of the Northern California Power Company, in Shasta and Tehama counties. The commission has been endeavoring since 1912 to have the large canals of this company properly screened, but it was not until the last couple of months that our efforts were successful. The screens installed are, with one exception, of the Southern California Edison type and are of first class construction.

The Anderson-Cottonwood Irrigation Project is at the present time constructing a three-unit screen, each unit of which will be 12 feet 5 inches in diameter and 9 feet long. This installation is also of the Southern California Edison type. The construction of the screen will be completed before the water is turned into the canal.

The Stanford University Vina Ranch has let contracts for the construction and installation of the new type of Requa automatic cleaning screens for all of their ditches.

COMMERCIAL FISHERY NOTES.

N. B. SCOFIELD, Editor.

ADDITIONAL INFORMATION ON HERRING.

There is a great mass of literature on the herring fisheries and on the life history of the Atlantic herring but very little has been published on the Pacific herring. Those interested may find the spawning habits of the Pacific herring described in a paper by Dr. C. M. Frazer, published by the Biological Board of Canada (University of Toronto Press, 1916).

For information as to what the scope of a fisheries investigation should be, read "A Contribution to the Life History of the Pacific Herring: Its Bearing on the Condition and Future of the Fishery," by W. F. Thompson, in the Report of the Commissioner of Fisheries, British Columbia, for 1916.

A full description of the Scotch method of curing herring may be obtained from the United States Bureau of Fisheries, Washington, D. C.

SHAD SEASON APPROACHING.

The herring season has about come to a close and the shad, a near relative, will take its place. People will continue to talk of the high cost of fish, and of bones, and the shad taken in California will continue to travel across the continent to those who appreciate a good fish.

FRESH SARDINES NOT APPRECIATED.

The California sardine is a splendid fish to fry in the pan, and is abundant and cheap. During what has been termed the "fish famine" of the past winter, sardines could have been obtained almost without limit, but, except as a canned product, there was no sale for them.

CLAMOR FOR STURGEON.

Whereas the sardine catch in California is over one hundred million pounds annually, there is a clamor for the removal of fishing restrictions from the now nearly extinct sturgeon.

SALMON CATCH IN 1917.

The catch of salmon on the Sacramento and San Joaquin rivers, including San Francisco Bay, from January to December, 1917, inclusive, was 7,219,846 pounds.

The catch of salmon on Monterey Bay for the same year was 3,981,670 pounds.

PATROL BOAT "ALBACORE" BUSY.

The fish and Game Commission's new patrol boat "Albacore" is now in commission, and under Captain H. B. Nidever will take care of the fisheries and kelp patrol work, and lend assistance in the investigation work being carried on by the commission. The boat's headquarters will be at Long Beach and its territory will be the state waters from Ventura to San Diego.

ANCHOVIES WILL BE SALTED.

Santiago Briones, Inc., fish packers of New York, have established a plant at Monterey and are preparing to put up salt anchovies on a large scale. The fish will be packed in 5-, 14- and 28-pound cans.

THE ANCHOVY A FINE FOOD FISH.

The anchovy is one of our best food fishes and is delicious fried in olive oil or butter. It is found along our shores the year round in immense numbers and the markets could sell it very cheaply if the public would use it.

MACKEREL DELICIOUS BUT SELDOM EATEN.

The coast of California for a good part of the year swarms with mackerel. They are found close to shore, where any one may easily catch them. They are food fish of the highest quality, but the fishermen do not catch them, for they can not sell them.

TUNA INVESTIGATIONS.

The Fish and Game Commission in its investigation of the tuna, under the supervision of Mr. W. F. Thompson, has added several assistants in order that the work may be hurried along. A laboratory has been opened at Long Beach in close proximity to the tuna canneries in order to facilitate the gathering of data and the handling of cannery statistics. The scope of the work has been extended in order to include the sardine and herring.

The objects of this investigation work are to establish a basis on which the future of the fisheries may be judged and to determine if they show evidence of depletion, also to assist in the more rapid development of the fisheries. The work has been well organized along the lines of similar investigations in Europe and with the intention of continuing it indefinitely.

The commission is co-operating with tuna packers in carrying on experimental fishing on rather a large scale. Two well trained Japanese fisheries experts are employed and already we feel assured that new methods of tuna fishing can be profitably introduced and the fishing season considerably extended.

BETTER FISHING METHODS NEEDED.

The meatless days and the high price of meats have increased the consumption of fresh and canned fish throughout the state, but there has been no material increase in the consumption of salt or smoked fish. During the winter months the fishermen have not been able to supply the public with the species that are more commonly used fresh, such as California halibut, salmon, striped bass, sand dabs, sole and rock cod. The reason for the shortage of fresh fish this winter was due mostly to the inefficient fishing methods employed, which proved inadequate to supply the increased demand during what is termed the "off season" for fish. The shortage of fish in northern California was caused mostly by the poor catches of the trawl or paranzella nets, which failed when most needed.

Three years ago the editor of this department read a paper before the Pacific Fisheries Society in which he had the following to say about improved methods and the future of trawl fishing in California:

> "As to the future of trawl fishing in California, it is safe to say the otter trawl will in time be adopted, for it can be operated more economically and will do better work. It can be operated at night and the fish landed fresh for the morning market. The paranzella can not very well work at night. The otter trawl can work in much deeper water, thus greatly extending the fishing area. It can work near submerged rocks and close to rough bottom by virtue of the fact that the net follows directly behind the boat and by taking soundings the rocks or rough bottoms are detected before the net reaches them and the course can be altered or the net raised. By fishing adjacent to rough bottom this trawl will catch a greater variety of fish. It can work in the stormy weather of winter when the fish bring a good price. The boats would be larger and

more seaworthy and have better accommodations for the crew. They have room to clean and ice the fish at sea and on that account can make a longer trip. An otter trawl of a size sufficient to do the work of one of the San Francisco paranzella outfits could be operated at two-thirds the expense.

"California will never be the home of a great trawling industry, for the trawl fishing grounds are too limited. On account of the rapid deepening of the ocean floor to the west of the continent, the bottom suitable for trawling is a very narrow strip. This strip extends from Point Concepcion to our northern boundary, but only in two or three places will it exceed five miles in width and most of it is one to three miles wide. Otter trawls from San Francisco could fish this entire distance if the market would take the fish. The three San Francisco paranzella outfits and the four smaller outfits at Santa Cruz, with their comparatively primitive methods, can for the most of the year easily over-supply the market. By adopting the improved methods of handling fish, in use elsewhere, interior markets could be reached. But our people are not fish eaters and unless the public takes more kindly to a fish diet, our trawling grounds will be sufficient for many years to come, as in the past forty years they have been only scratched in two or three places."

THE GOVERNMENT CONTROL OF FISHERIES.

Some apprehension has been felt in regard to the announcement issued from Washington that the government was to take over the control of the fisheries and remove fishing restrictions. On February 10, the United States Food Administrator for California issued the following:

"San Francisco, Feb. 10, 1918.—Attention of salt water fishermen throughout California was called today to the following statement issued by the United States Food Administration at Washington warning fishermen regarding procuring of licenses to do business:

"Under a recent proclamation of the President, the second issued by him on control of the fish industry, salt water fishermen, generally, must be licensed by the Food Administration. By the first proclamation, effective November 1, 1917, it was made compulsory for all wholesale fish distributors, brokers and commission men to secure licenses; but those catching fish were not included unless they were also in one of the classes named. By the new proclamation of January 10, 1918, 'all salt water fishermen, whether fishing independently or on shares,' must secure licenses if 'engaged at any period of the year in the commercial distribution including catching or selling, of any or all varieties of salt water fish, including menhaden, and of shellfish and crustaceans.'

"These licenses must be secured on or before February 15, 1918, and are issued without charge or fee of any kind. The term 'salt water fishermen' includes all (except those employed for wages only, without a share in the proceeds) who are engaged in catching salt water fish or producing any other kind of sea food, including lobsters, crabs, shrimps, oysters, clams, etc. Also any person, firm, corporation or association engaged in production and employing any such fisherman or producer of sea food, whether for wages or on shares or both, must take out a license. These licenses can be secured from the Licensing Division of the Food Administration at Washington.

"This license system, as applied to the fisherman, is wholly for their benefit, not to affect their prices, not to limit their operations, but to extend them and to remove local restrictions that now prevent free and full development of sea-food production.

"The Food Administration does not intend to regulate the prices of fish and sea foods in the fishing districts; and distribution and prices, so far as fishermen and producers are concerned, will move along natural lines as before.

"By assuming this more direct control of salt water fishermen, the Food Administration will be able, where necessary, to supersede state laws and local restrictions by general regulations which will allow increased opportunity to fishermen and broaden their operations during the war. These local restrictions have discouraged fishermen, lessened their catches and limited the use of their most productive gear; nonresidents and aliens have been prevented from fishing in waters of certain states; closed seasons have been enforced on certain varieties of fish during their period of greatest abundance, and restrictions upon the use of purse seines have prevented utilization of this effective gear within the three mile limit. These and other restrictions on fishing have curtailed production and brought about a shortage in supplies of salt water fish when we need sea food more than ever before. These restrictions will be removed or modified under the new regulations, and this greater freedom for fishermen, with other measures for the benefit of the fish industry, should largely increase the supply of sea food by spring of 1918.

"At the same time, due regard will be paid by the Food Administration to any present restrictions that are vitally necessary to protect the fish supply of the future, and to prevent extinction or too great reduction in the number of any species valuable for food."

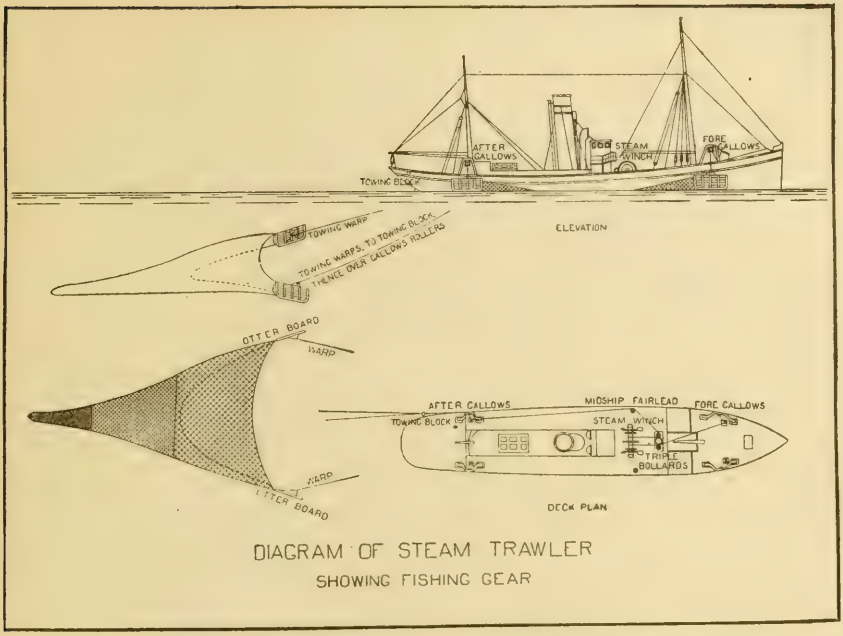

Fig. 54. Diagram showing steam trawler and otter trawl. Apparatus of this kind would improve our fisheries and assure the market fresh fish daily. (From United States Bureau of Fisheries, Document No. 816, p. 19.)

Later the California Food Administrator appointed a Fish Administrator for southern California, Mr. W. C. Crandall of the Scripps Institute, and on March 2, a conference was held at the Food Administrator's office at which were present representatives of the United States Bureau of Fisheries and the State Fish and Game Commission. After considerable discussion following a report by Mr. Crandall on conditions in southern California, it was determined that the state laws in the main do not prevent the full development of the fisheries. The restrictions on sea fishing which prevent the use of effective fishing gear, as condemned in the proclamation of the Federal Food Administrator, does not apply to California as it does to many other states. It is only in minor instances of a local character that restrictions need to be removed or modified. The Fish and Game Commission, or the governor of the state, do not have the power to set aside regulations passed by the legislature so that the opportunity to modify existing regulations or to issue new ones to meet rapidly changing conditions, is welcomed by the state.

The few changes in the state laws as indicated on page 80 were decided upon.

The State Food Administrator expressed himself as opposed to removing fishing restrictions from the species of fish that are being caught to the limit in this state at present, such as salmon, shad, striped bass and California halibut, while there are plenty of other good fish the people can use.

It was brought out at the conference that the salt water fishing boats and fishing gear are inadequate to meet the present emergency. This is especially true with regard to the trawl nets and rock cod or long-line boats. We need otter trawls of good size and larger long-line boats with power gurdies for working more lines and at greater depths. It was also brought out that we have many good species of fish which could be furnished the people in large quantities if they can only be induced to use them.

CONSERVATION IN OTHER STATES.

OCEAN FISH REFUGES.

The Bureau of Fisheries is placing subway stone and other refuse to a depth of eighteen inches, from Romer Shoals to Long Beach, New York. The ocean floor here is a hard, sandy bottom, and the rock piles will attract marine animal life upon which fishes feed. Captain J. Klein of Bergen Beach has experimented for many years with ocean rock piles, and in one area containing 300 square feet of such dumpings in 66 days of fishing two men, using hook and line, took seventeen tons of fish. This convinced Dr. H. F. Moore of the United States Bureau of Fisheries that such feeding grounds were worth making on a larger scale, and if the Romer Shoals-Long Beach newly made grounds produce results the idea will be applied elsewhere.—*The American Angler*, August, 1917.

FISH AND GAME ADMINISTRATION IN WASHINGTON.

The Fish Commission of Washington is made up of the state fish commissioner, the governor and the state treasurer.

In the state the county unit is most important in fish and game legislation. The fish commissioner and state game warden act in an advisory capacity to the various county fish and game commissions. The state receives 20 per cent of the fund from the sale of licenses, while the remaining 80 per cent is expended by the various counties.

WASHINGTON'S GAME REFUGES.

Instead of setting aside large areas as game refuges, the state of Washington creates refuges for wild fowl by preventing the killing of all waterfowl on the Columbia or Snake rivers or within a quarter of a mile of the shores thereof throughout several counties. This provides a safe breeding place and a sanctuary for many waterfowl.

NO INCREASE OF BOUNTIES IN PENNSYLVANIA.

The governor of Pennsylvania recently vetoed a bill providing for increased bounties on wildcats and weasels. His excuse for so doing is as follows:

1. Uneconomic conditions would be produced owing to the fact that idle and irresponsible persons are incited to waste time in the woods.

2. It would cause unnecessary drain on hunters' license funds. Noxious animals are, as a rule, overrated in their destructiveness. Nature's balancing of life, undisturbed by man, is, on the whole, wise and good.

In spite of forcible arguments advanced, many sportsmen in Pennsylvania are disappointed in the failure of the bounty bill to become a law.

$15,000 FINE PAID FOR TRAPPING WILD DUCKS.

A check for $15,000 from Henry C. Phipps, in settlement of a case against him for illegally trapping wild ducks upon his estate at Wantagh, Long Island, has been received by Conservation Commissioner George D. Pratt of New York. This is the second largest fine in a game case ever obtained by the commission, the largest having been for $20,000 for illegal sale of wild ducks in 1913.

The case began with a raid by Chief Protector Llewellyn Legge and a corps of game protectors upon Mr. Phipps' estate at Wantagh on February 20, when 442 live wild black ducks, 25 dead wild black ducks, 5 pintails and 1 wood duck were seized. A court of investigation was held the same day.—*Bull. Amer. Game Prot. Assn.*, May 1, 1917.

DOVE PROTECTION IN TEXAS.

At the last session of the Texas legislature a bill was passed extending for two months the open season during which doves may be killed. The main reason advanced why this change ought to be made was that sportsmen of north Texas were deprived of the sport of killing these useful birds and that the south Texas gunners got the best of the dove shooting. Because many farmers and others were opposed to changing the open season for doves to suit the convenience of some sportsmen, they were criticized and ridiculed, their motives impugned, their statements misquoted and misrepresented, and themselves contemptuously referred to as "silly sentimentalists," "extremists," "hayseeds," "bird cranks," etc., by many of those who proposed and advocated the amendment.

Many of the best sportsmen who are in favor of reasonable protection, with a view to preserving this valuable little game bird and preventing its extermination, are not in favor of commencing dove shooting in September, for the reason that doves are not through with their nesting season at that time of the year. In some parts of this state doves nest all through July and August; their eggs are frequently found in September, and occasionally as late as the middle of October.—H. P. Attwater.

PENALTIES FOR VIOLATION OF OREGON GAME LAWS.

The following interesting penalties are imposed upon the violators of game laws in Oregon:

"Any person killing any mountain sheep, mountain goat, antelope, elk, or moose, may be fined from $200 to $1,000 and imprisoned not less than sixty days nor more than six months."

"Besides fines, any one violating laws shall be subject to a civil liability ranging from $2 for each game bird to $300 for elk and mountain sheep; shall forfeit all guns, dogs, boats, traps, fishing apparatus and implements used in violation of laws, and shall forfeit his hunting license for the balance of the calendar year in which the offense was committed."

NEVADA PROHIBITS DEER HUNTING WITH AID OF DOGS.

Although both California and Oregon place certain restrictions upon hunting of deer with dogs, a provision of the Nevada law states:

"Sec. 46. It shall be unlawful for any person or persons, firm, company, corporation, or association, at any time of the year to hunt, chase, pursue, catch, or kill, any deer, antelope, caribou, elk, mountain sheep, or mountain goat, with or by the use or aid of any hound or hounds."

Another interesting provision of the Nevada law is that which protects the American eagle. The law states:

"Sec. 56. It shall be unlawful for any person or persons, firm, company, corporation or association to kill, destroy, wound, trap, injure, keep in captivity, or in any other manner to catch or capture, or to pursue with such intent the bird known as the American eagle, or to take, injure or destroy the nest or eggs of said before-mentioned bird."

VALUE OF WILD LIFE ENORMOUS.

Reduced to statistics the annual value of wild life assets of the state of Minnesota, after careful investigation and inquiry, are estimated as follows:

Food value of game and fish	$2,000,000
Furs, skins and pelts	1,300,000
Value of tourist trade	1,500,000
Value of commerce depending upon game and fish	3,000,000
Value to agriculture of insectivorous birds	2,500,000
Total	$10,300,000

Every effort has been made to make this estimate conservative, and doubtless some of the items should be much larger. —*Fins, Feathers and Fur*, December, 1916.

MINNESOTA COMMISSION REMODELS FISH AND GAME LAWS.

A commission created by the last Minnesota legislature is remodeling the fish and game laws of that state. The work of the commission will be to make a thorough study of the provisions of the laws governing fish and game and to revise and simplify them, striking out those laws which are ambiguous and conflicting.

A SUCCESSFUL SPARROW CAMPAIGN.

The Davenport Bird Club of Davenport, Iowa, has almost wiped out English sparrows in that city. Poisoned grain in the form of cracked corn and wheat screenings coated with strychnine-poisoned starch was used. After two months a careful count disclosed a reduction of 95% in the sparrows feeding in the streets. The club estimates that about 150,000 sparrows were destroyed during the winter. As far as is known only two or three native birds were poisoned.—*Current Items of Interest*, October 26, 1917.

NEW YORK HAS CONSERVATION SCHOOL.

The New York legislature has appropriated $15,000 for a game farm to be conducted as a part of the New York State College of Agriculture at Ithaca, New York. The administration of the farm is in the hands of the trustees of Cornell University, who will cooperate with the New York Conservation Commission. Instruction will be along educational and experimental lines.

BIRD PRESERVES IN RUSSIA.

Although birds receive little legal protection in Russia, there have been established a few sanctuaries. One of these has been established in Caucasia for the protection of the francolin and several for zibelines have been created in Siberia by the Russian Department of Agriculture, the largest of these comprising an area of 50 by 45 miles, or 2,250 square miles. The protection of birds in the parks of Kharkow is planned by a newly formed "Commission for the Protection of Birds" of that town.—*Current Items of Interest*, June 25, 1917.

GOULD LEAGUE OR BIRD LOVERS IN AUSTRALIA.

The Gould League of Bird Lovers, the bird-protection organization of Australia, continues to grow, having a membership of 60,000 (mostly school children) in Victoria alone. It is taking up the plan of supplying state school grounds, parks, and public gardens with nesting boxes, food-tables, and bathing pools for the birds.—*Current Items of Interest*, June 25, 1917.

ARKANSAS REFORMS.

In the recent game bill enacted by the Arkansas legislature, all seines and nets are eliminated from use by market fishermen except stationed hoop nets with limited wings, the meshes of which must not be less than three inches square. The seasons on migratory birds were made to conform with the federal regulations, so there is to be no more spring shooting in Arkansas. Only rabbits and squirrels may be sold. It is illegal to sell other game in the state or to ship it out to a market. Market hunting is dead in Arkansas. Bag limits in the state are twenty-five ducks and fifteen quail in a day, two deer, four turkeys and one bear in a season.—*Wild Life*, September, 1917.

LOUISIANA OPPOSES SUSPENSION OF GAME LAWS.

Conservationists have had to fight the move to suspend all laws protecting game birds "as a war measure." Commissioner Pratt of New York was the first one to set right misguided enthusiasts on the subject. Commissioner Alexander of Louisiana has also opposed any move to allow a greater amount of hunting. He shows that the proposed action would undo the work of years and would not lower the price of meat a single cent. The point is also made that Louisiana is host to almost 75 per cent of the migratory waterfowl during the winter season and hence there is thrust upon her an obligation of guardianship which can not be ignored.

LIFE HISTORY NOTES.

COYOTE KILLS QUAIL.

During the early part of October, 1917, Deputy T. K. Duncan and myself were going down Marsh Creek, in Contra Costa County. Near the oil pumping station, just at break of day, we flushed some quail from a creek bottom. These birds flew across the road as if greatly frightened. In a moment a large coyote appeared, but a few feet from us, carrying in his mouth a valley quail. Evidently the coyote is an enemy of quail, as well as an enemy of other game.—M. S. Clark.

HUNGARIAN PARTRIDGES SEEN IN INYO COUNTY IN 1913.

In July, 1913, I saw about a dozen Hungarian partridges on the Walter's ranch, near Independence, Inyo County, evidently part of the birds planted in the vicinity. The following spring two old ones were seen, but since that time the birds have absolutely disappeared.—J. J. Singlau.

"VARMINT" DOGS CLEAN OUT BOBCATS.

Last winter, with the use of "varmint" dogs "Tennessee Coon Hounds," we treed and shot out twenty wildcats, and all of these up to the time of spring lambing had deer meat in their stomachs, and as lambing came on some had lambs' meat and wool in their intestines. This winter we have caught five already and all full of venison but one, and this one had a fill of rats and mice. It seems only just and fair to all concerned that a bounty, say

of $2.50, be placed on them. This would give trappers more inducement to rid the country of this pest. I keep the dogs for my own protection and at no small expense, but feel this the best insurance my stock can have. It is sure some sport to follow the dogs and at the end of from thirty minutes, sometimes only ten, up to two and a half hours, to find yourself looking up at a very nervous cat in a tree.—C. H. Cooley.

Fig. 55. Freak antlers of black-tailed deer killed near Mount Hamilton, September 10, 1918. According to law this deer was unlawful game in that it lacked branched antlers. Photograph by W. N. Dirks.

ADULT DEER WITH UNBRANCHED HORNS.

A freak deer was killed near Mount Hamilton, September 10, 1917. This deer was apparently an old stag and weighed close to 150 pounds. The antlers, however, were unbranched in spite of the fact that they were much longer than any normal pair (see fig. 55). The law definitely states that the killing of such deer is a violation. Deer of this sort are so rare that the hunter loses nothing, the supply of deer is augmented, and the law more easily enforced when such animals are not killed.—W. N. Dirks.

SWANS RARE THIS YEAR.

Proof of the oft-quoted statement that swans are driven south during severe weather is to be found in the lack of birds of this species during the past winter, which has been an unusually open one. Last season a mile or two of water northwest of the Marysville Buttes was covered with swans. This year in the same place not over twenty birds have been seen on this body of water. As swans nearly always loaf in the same situation, these birds could be expected in this locality had they come south into California. —Geo. Neale.

UNITED STATES FOREST SERVICE CO-OPERATION.

FOREST FIRE KILLS FISH.

Ranger Robert Finley, who is in charge of the trail crew, reports that in places at the head of Arroyo Seco in the Monterey National Forest where fires occurred last summer the rains have washed so much hardwood ashes into the creeks that the fish have been killed.—H. G. Merrill.

ANTELOPE IN MODOC COUNTY.

A small bunch of antelope range on the plateau country north of Alturas and although local opinion is much divided as to their number, I have heard of but one man who had seen over a dozen head. This man claimed to have counted seventeen.—Wm. S. Brown.

MOUNTAIN QUAIL SCARCE IN TRINITY COUNTY.

A general scarcity of mountain quail is reported in the Trinity National Forest, except at the lower elevations along the Trinity River. This condition is attributed mainly to the heavy snows of the past season, which prevented them from securing the usual amount of food. After the storm numbers of dead birds were found along the trails and roads in our region. The coyote is also responsible for a heavy annual loss, as it is a well-established fact that great destruction, especially to the young, is due to these animals.—E. V. Jotter.

BURLINGAME PUBLIC

REPORTS.

CALIFORNIA FISHERY PRODUCTS, OCTOBER, NOVEMBER AND DECEMBER, 1917.

Species of fish	Del Norte, Humboldt	Mendocino, Sonoma, Lake	Marin	Solano, Yolo	Sacramento, San Joaquin	Alameda, Contra Costa	San Francisco	Santa Cruz	Monterey	San Luis Obispo, Santa Barbara, Ventura	Los Angeles	Orange	San Diego	Imperial	Mexico	Total
Albacore										5,691	1,409,021	202	397,382			1,812,296
Anchovy							8,612		47,925		45					56,582
Barracuda										27,102	221,466		245,435		54,065	548,068
Bonito								249		1,580	373,385		383,643			758,857
Bocaccio							11,264	67,981	341,043							420,228
Bluefish							26,017	271	8,182							34,470
Chilipepper							40,109	136,957	108,405							285,471
Carp		317		1,801	12,311	9,406	2,392									26,227
Catfish		24,765		6,689	6,750	734										38,938
Coalfish							2,039	1,437	1,397		2,664					7,537
Cultus cod	81						161,203	14,933	210,900							387,117
Dogfish						225	168,972	318	242		4,163		6,379			180,299
Flounder	693		63	453			79,045	67,675			617					148,546
Halibut	634						4,451	1,197	526	45,786	173,976		361,560		223,160	811,320
Hake							51,822	18,000			3,863		695			74,383
Hardhead					13,526	2,957										16,483
Herring	2,300		161,330				80,349				425					244,404
Kingfish							4,641	4,800	6,798		104,851		9,704			130,794
Mackerel							305		353,926		798,982	746	123,124		8,775	1,287,060
Mullet														17,832		17,832
Pike				12	841	1,420	22									2,295
Pompano							28				3,718					3,746
Perch	956	130	11,438			8	28,597	225	2,634		12,858	148	124			57,118
Rock bass											149,664		23,521			173,185
Rockfish	3,182						467,212	155,121	374,257	17,059	399,237	2,750	197,713		1,665	1,618,196
Sole						58	2,195,609	447,747	2,840		10,896		5,360			2,661,910
Salmon	1,274,973	109	479	5,553	759	4,707	149		225		492					1,287,446
Smelt	2,315	50	10,070				8,183	8,832	9,143	31,974	83,241	169,368	36,545		778	360,499

Sea bass (white)			260				459			5,114	19,843		7,998		6,110	39,884
Sea bass (black)										284	39,675		28,426		5,230	73,615
Sand dab							379,080	239,973	22		4,305					623,380
Striped bass			192		70,910	94,312	16,492									181,906
Shad				2,658	24	6,544	1,538									10,764
Sardine			2,072				117,172	1,150	16,867,822		13,120,252		4,637,268			34,775,736
Skate							79,525		203							79,728
Sculpin							50		100		10,224					10,374
Sea trout											36					36
Tom cod							5,370									5,370
Trout (lake)								237								237
Trout (steelhead)	18,611															18,611
Turbot			40													40
Whitebait			2,014				2,237									4,281
Yellowtail								165,761	18,157	1,078	564,463		310,907		9,089	1,014,455
Miscellaneous			4,649		344		78,119		2,556	2,832	14,783		4,333			107,616
Totals	1,303,775	25,371	192,707	17,166	105,465	120,371	4,020,433	1,272,864	18,357,303	151,056	17,530,948	173,214	6,810,117	17,882	308,872	50,407,494
Crustaceans—																
Crab (dozen)	727						34,362	290	108							35,487
Spiny lobster										26,259	42,243	3,524	131,558		62,746	266,330
Shrimp							162,301									162,301
Turtle													170		520	690
Total																464,808
Mollusks—																
Squid									12,040							12,040
Cuttlefish							4,945	2,715	5,243		5					13,006
Clam (Pismo)										230,080						230,080
Clam (cockle)			5,501								5,747					11,248
Clam (softshell)		1,335	37,295				3,900									42,530
Clam (mixed)	11,990	270	317,631					1,374		57		1,400				32,752
Oyster (shell) No.							621,835									621,835
Abalones		1,183							148,014	21,058						170,255
Mussels	169						2,707			2,405	5,809	590				11,671
Total																1,145,417

VIOLATIONS OF FISH AND GAME LAWS.

November 1, 1917, to February 1, 1918.

Offense	Number of arrests	Fines imposed
Game.		
Hunting without license	54	$825 00
Failure to produce license on demand	1	
Deer, close season, killing or possession	4	100 00
Female deer and fawns, killing or possession	3	100 00
Deer meat, close season, possession	7	100 00
Deer horns and skins, failure to produce	1	50 00
Quail, close season, killing or possession	3	75 00
Ducks, possession or shipping excess bag limit	6	50 00
Geese, possession or shipping excess bag limit	2	
Brant, possession or shipping excess bag limit	2	
Doves, close season, killing or possession	1	50 00
Grouse, close season, killing or possession	1	25 00
Wild pigeon, close season, killing or possession	5	100 00
Tree squirrels, close season, killing or possession	2	50 00
Nongame birds, close season, killing or possession	22	281 00
Shore-birds, close season, killing or possession	4	100 00
Taking song-birds with net	5	200 00
Night hunting	37	575 00
Shooting from power boat while in motion	5	60 00
Shooting at pheasants	2	25 00
Selling wild game without a license	3	20 00
Offering Bird of Paradise for sale	1	15 00
Possession mountain sheep heads and hides	2	100 00
Using an animal blind	1	25 00
Trapping fur-bearing mammals without a license	2	20 00
Total game violations	176	$2,946 00
Fish.		
Angling without license	10	$190 00
Fishing for profit without license	14	60 00
Trout, close season, taking or possession	7	160 00
Trout, taking other than by hook and line	1	
Trout, excess bag limit	2	50 00
Salmon, Saturday and Sunday fishing, taking other than by hook and line	8	650 00
Spot-fin croaker, offering for sale, close season	1	10 00
Catfish, offering for sale, undersize	1	20 00
Halibut, offering for sale, underweight	2	30 00
Abalones, close season, taking or possession, undersize, drying	40	900 00
Crabs, female, undersize	5	30 00
Clams, undersize, excess bag limit	11	350 00
Lobsters, undersize	5	90 00
Illegal fishing apparatus	11	300 00
Dynamiting fish	2	
Dried shrimps, possession	1	
Total fish violations	121	$2,840 00
Grand total fish and game violations	297	$5,786 00

SEIZURES—FISH, GAME AND ILLEGALLY USED FISHING APPARATUS.

November 1, 1917, to February 1, 1918.

Game.

Ducks	2,242	
Geese	815	
Brant	222	
Quail	89	
Doves	2	
Pheasants	100	
Wild pigeon	3	
Rabbits	51	
Sparrows	779	
Nongame birds	27	
Song-birds	344	
Deer meat	216	pounds
Bird nets	2	

Fish.

Striped bass	5,644	pounds
Salmon	3,967	pounds
Trout	100½	pounds
Black bass	9	pounds
Catfish	27¾	pounds
Halibut	270	pounds
Spot-fin croaker	30	pounds
Crabs	187	
Clams	1,972	
Abalones	1,454	
Abalones (dried)	197	
Lobsters	30	
Lobsters	37	pounds
Dried shrimp shells	500	pounds
Miscellaneous fish	21	pounds
Nets, traps and fishing outfits	27	

Searches.

Illegal fish and game	27

STATEMENT OF EXPENDITURES FOR THE MONTHS OF OCTOBER, NOVEMBER AND DECEMBER, 1917.

	October	November	December
General Administration.			
General administration	$1,827 46	$1,580 12	$1,697 49
Research, publicity and education	205 23	215 20	193 34
Printing	----------	1,172 91	82 23
Fish exhibits	42 93	23 50	----------
Game exhibits	7 75	----------	----------
Game farm	263 01	310 40	242 30
Mountain lion bounties	290 00	300 00	320 00
Lithographing hunting licenses	----------	----------	----------
Lithographing angler's licenses	----------	----------	895 00
Hunting licenses, commission and refunds	2,273 70	954 25	1,752 40
Angler's licenses, commission and refunds	742 70	1,214 15	1,463 20
Market fishing licenses, commission and refunds	48 50	82 00	93 50
Paper Mill Creek Dam	236 37	----------	----------
Totals	$5,940 65	$5,852 53	$6,739 46
Patrol.			
San Francisco district	$5,740 54	$5,626 31	$5,296 37
Sacramento district	4,015 22	3,719 19	3,694 09
Los Angeles district	2,518 90	2,528 99	2,902 33
Launch patrol	599 73	836 80	1,523 70
Prosecutions—fish and game	182 25	213 40	174 55
Crawfish inspection	296 78	----------	----------
Winter game feeding	----------	----------	----------
Accident and death claims	250 80	200 64	200 64
Tota's	$13,604 22	$13,125 33	$13,791 68
Department of Fish Culture.			
Hatchery administration	$808 64	$813 94	$799 98
Mount Shasta Hatchery	1,315 54	1,302 73	1,774 38
Klamath Station	----------	8 40	125 00
Mount Whitney Hatchery	1,302 58	766 24	670 65
Rae Lakes Station	34 00	----------	----------
Cottonwood Lakes Station	----------	----------	----------
Tahoe Hatchery	208 05	45 49	5 00
Tallac Hatchery	5 00	5 00	5 00
Marlett Lake-Carson Hatchery	----------	----------	----------
Fort Seward Hatchery	820 63	632 34	565 38
Ukiah Hatchery	----------	----------	----------
Snow Mountain Station	----------	----------	6 75
Brookdale Hatchery	77 35	71 53	161 90
Scott Creek Station	31 00	30 00	31 00
Almanor Station	16 35	5 00	5 00
Domingo Springs Station	52 14	17 20	9 00
Bear Lake Hatchery	421 14	555 98	246 50
Wawona Hatchery	----------	----------	----------
Yuba City Station	----------	----------	----------
Fish distribution	1,316 70	372 03	78 89
Fish transplanting	281 41	408 71	----------
Screen, fishway and water pollution	347 75	587 80	507 62
Special field patrol	222 82	275 78	64 10
Totals	$7,261 10	$5,898 17	$5,056 15
Commercial Fisheries Research and Patrol.			
Fishery research and patrol	$1,123 82	$1,379 89	$1,116 42
Grand totals	$27,929 79	$26,255 92	$26,763 71
Department Engineering Launch "Albacore"	----------	1,483 04	----------

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PATROL SERVICE.

SAN FRANCISCO DIVISION.

E. L. Bosqui, Commissioner in Charge. Carl Westerfeld, Executive Officer.

J. S. Hunter, Assistant Executive Officer. E. C. Boucher, Special Agent.

Head Office, New Call Building, San Francisco.

Phone Sutter 6100.

W. H. Armstrong—Vallejo
Earl P. Barnes—Eureka
Theo. M. Benson—Fortuna
O. P. Brownlow—Porterville
F. A. Bullard—Dunlap
J. L. Bundock—Oakland
J. Burke—Colma
M. S. Clark—San Francisco
S. L. N. Ellis—Fresno
J. H. Hellard—Laytonville
J. H. Hill—Watsonville
D. H. Hoen—San Rafael
H. H. Hunt (on furlough)—San Francisco
R. S. Kimball—Merced
I. L. Koppel—San Jose
Henry Lencioni—Santa Rosa
Albert Mack—San Francisco
B. H. Miller—Ukiah
E. V. Moody—Santa Cruz
W. J. Moore—Napa
J. E. Newsome—Newman
Chas. R. Perkins—Fort Bragg
Frank Shook—Salinas City
E. W. Smalley—Hanford
H. E. Foster—Launch "Quinnat," Vallejo
Chas. Bouton—Launch "Quinnat," Vallejo

SACRAMENTO DIVISION.

F. M. Newbert, Commissioner in Charge.

Geo. Neale, Assistant.

Forum Building, Sacramento.

Phone Main 4300.

T. W. Birmingham—Sutter Creek
E. W. Bolt (Enlisted U. S. Navy)—Gridley
Frank P. Cady (on furlough)—Susanville
S. J. Carpenter—Maxwell
Geo. W. Courtright—Canby
J. K. De Young—Stockton
Euell Gray—Placerville
W. J. Green—Sacramento
G. O. Laws—Weaverville
Roy Ludlum—Los Molinos
R. C. O'Connor—Grass Valley
E. D. Ricketts—Live Oak
D. E. Roberts—Murphys
J. Sanders—Truckee
C. A. Scroggs—Loomis
R. L. Sinkey—Woodland
L. J. Warren—Taylorsville
J. S. White—Castella

LOS ANGELES DIVISION.

M. J. Connell, Commissioner in Charge.

E. A. McKee, Assistant. Edwin L. Hedderly, Assistant.

Union League Building, Los Angeles.

Phones: Broadway 1155; Home, F 5705.

H. J. Abels—Santa Maria
J. J. Barnett—Ventura
C. S. Bauder—Los Angeles
H. D. Becker—San Luis Obispo
J. H. Gyger—Elsinore
W. C. Malone—San Bernardino
E. H. Ober—Big Pine
H. I. Pritchard—Los Angeles
W. K. Robinson (on furlough)—El Toro
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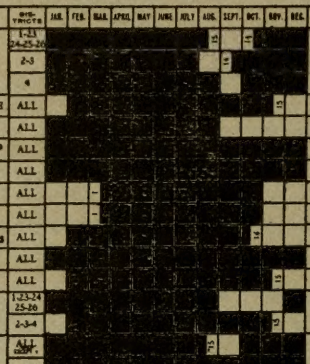
ABSTRACT CALIFORNIA FISH AND GAME LAWS

WHITE SQUARES INDICATE OPEN SEASON. NUMBERS IN SQUARES ARE OPEN DATES



	DISTRICTS	BAG LIMITS, ETC.
DEER	1-23 24-25-26	No Does, Fawns or Spike Bucks No sale of venison Two Bucks per season See Notes 1-2-8-9-10 on back of this abstract
	2-3	
	4	
RABBITS, COTTONTAIL AND BRUSH	ALL	15 per day. 30 per week
TREE SQUIRRELS	ALL	12 per season
ELK, ANTELOPE, MOUNTAIN SHEEP	ALL	KILLING OF ELK OR POSSESSION OF ELK MEAT A FELONY
SEA OTTER, BEAVER	ALL	$1,000 Fine for Sea Otter
BEAR, BLACK AND BROWN	ALL	SEE NOTE 11 ON BACK OF THIS ABSTRACT
FUR BEARING MAMMALS	ALL	SEE NOTES 11-12 ON BACK OF THIS ABSTRACT
Ducks, Geese, Jack Snipe, Mud Hens	ALL	SEE NOTES 4-14-15-17 ON BACK OF THIS ABSTRACT
RAIL, WOOD DUCK, WILD PIGEON SHORE BIRDS (Except Jack Snipe)	ALL	
QUAIL, VALLEY AND DESERT	ALL	15 per day. 30 per week
MOUNTAIN QUAIL	1-23-24 25-26	10 per day 20 per week
	2-3-4	
SAGE HEN	ALL (EXCEPT 4)	4 per day 8 per week
	4	
DOVE	ALL (EXCEPT 1)	15 per day
	1	
GROUSE	ALL	4 per day. 8 per week
TROUT (Except Golden) WHITEFISH	1	50 Fish or 10 Pounds and one Fish, or one Fish weighing 10 Pounds or over per day. In districts 2 and 3 during the winter season 5 fish per day
	2-3	
	4	
	23-24-25	SEE NOTES 25-26-40 ON BACK OF THIS ABSTRACT
	23	SEE NOTE 27 ON BACK OF THIS ABSTRACT
	Lakes	SEE NOTE 28 ON BACK OF THIS ABSTRACT
GOLDEN TROUT	ALL	20 per day. None under 5 inches
BLACK BASS	ALL	25 per day. None under 7 inches NO SALE Hook and line only
	Clear Lake & Lake Co.	
SACRAMENTO PERCH, SUNFISH AND CRAPPIE	ALL	25 per day. Hook and line only
STRIPED BASS, SHAD	ALL	SEE NOTE 24 ON BACK OF THIS ABSTRACT
SALMON	ALL (EXCEPT 15)	SEE NOTE 23 ON BACK OF THIS ABSTRACT
	15	
CATFISH	ALL	Closed season only for commercial fishing
CRABS	ALL	SEE NOTE 29 ON BACK OF THIS ABSTRACT
ABALONES — RED	ALL	SEE NOTE 34 ON BACK OF THIS ABSTRACT
ABALONES — GREEN, PINK, BLACK	ALL	
PISMO CLAMS	17	SEE NOTE 33 ON BACK OF THIS ABSTRACT

FOR LAWS IN FULL SEE PENAL CODE. FOR COMMERCIAL FISHING LAWS SEE MARKET FISHING ABSTRACT

DISTRICTS 1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i, 1j, 1k, 1l, 2a, 3a, 3b, 3c, 3d, 4a, 4b, 4c, 4d, 4e, 4f, are game refuges. Hunting forbidden. Fishing in accordance with law relating to main district in which refuge is located. (See map.)

Hunting Licenses: Residents, $1.00; Non-residents, $10; Aliens, $25. License year from July 1 to June 30.

Angling Licenses: Residents, $1.00; Non-residents, $3; Aliens, $3. License year from Jan. 1 to Dec. 31.

Trapping Licenses from Fish and Game Commission.

Trapping Licenses: Citizens, $1.00; Aliens, $2.00. License year from July 1 to June 30.

Hunting and Angling Licenses can be secured from Fish and Game Commission, County Clerks and License Agents.

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