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BULLETIN

OF THE

CALIFORNIA FISH AND GAME COMMISSION

No. 1

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STATEMENT BY COMMISSIONERS.

In issuing this, the first of a series of bulletins which we, as members of the State Board of Fish and Game Commissioners, propose to publish from time to time, that the people and the press of the State may be informed of the scope and character of our work, we believe it fitting and proper that we should here outline the policies we have adopted.

We recognize that we are administering a public trust, that to us has been assigned the duty of protecting and conserving the fish and game interests of the State for the benefit of all the people, and that to be successful we must have their active coöperation. We believe we can gain their confidence and support by keeping the people fully informed of the nature and scope of our work. We will give publicity to what we are doing and trying to do to foster and conserve the fish and game which nature has so lavishly bestowed upon the State, while disclosing the source and amount of our revenues and the nature of our expenditures, so segregated as to show the cost of each branch of our work and the bookkeeping methods employed. We shall attempt to do this by issuing bulletins from time to time, as well as by complying with that provision of the law which specifically requires this Board to biennially submit to the Governor a full report.

We aim to work on broad, practical and economical lines, and to make the Commission something more than a police force. We shall endeavor to enforce the laws for the preservation of fish and game, and to stock the public waters of the State with food and game fishes best suited to them. By economic and scientific investigations we hope to disclose the life, habits, and abundance of our fish and game, and the conditions most favorable to conserve and, if possible, increase the supply.

We appreciate to the fullest extent the necessity of enforcing all the laws of the State; that we are an executive branch of the state government and not the legislative branch. We recognize, also, as the Legisla-

ture has recognized, that in order to give effectiveness to the laws for the preservation and restoration of fish and game, there must be a specially constituted service designed to enforce them. In consequence, we aim to maintain throughout the State a patrol force of honest, alert, active and intelligent men, who shall devote their entire time to the service. In selecting these assistants, we shall be guided by their apparent qualifications and fitness for the work and not because of their political affiliations or support.

We shall maintain the State Game-Farm in an effort to introduce non-indigenous game-birds of known value, and to promote the domestication of pheasants to supply the markets of the State, in accordance with the act passed at the last session of the Legislature.

We shall continue to operate the fish hatcheries to their full capacity, and to distribute the output in suitable public waters in every section of the State. We will not stock private waters. We shall give to the distribution of the fish produced in the fish hatcheries the greatest care, endeavoring not only to see that the young fish are intelligently liberated where they may best thrive, but by close observation to ascertain the success of such methods, and to ascertain further if additional and more effective measures can be found. It should, we think, be generally understood that the success of hatchery propagation depends largely upon the care given to the planting of the fish produced; that it is not so much a question of liberating excessive numbers in our streams, as it is to insure each individual fish finding suitable waters and food. As much care should be exercised to prevent waters being excessively stocked with young fry as to insure that they are adequately stocked. By giving careful attention to this branch of the work, we believe that we can produce great results.

It has already been demonstrated that the operations of the hatcheries and the stocking of streams in the State with native and non-indigenous fish have produced great results. No other state has reaped as great reward from the moneys so expended.

We believe that, notwithstanding the notable success that has already followed the introduction and the acclimatization of new food and game fishes in the waters of this State, as well as the propagation of our native fishes, much can yet be accomplished; that our waters may be made to produce even more abundantly; for, notwithstanding that this Commission has been in existence for forty years and has accomplished greater results than any similar commission in the United States, very little attention has been directed to a study of the life and habits of any of our food-fishes. To intelligently conserve and increase our aquatic food supply it is essential to be conversant with the life, habits, food, abundance and the principal enemies. Until we know the time and place where our food-fishes propagate, the waters frequented by their young, and the conditions essential for successful development, we can not proceed intelligently. And, we regret to say that at the present time, the Commission is not in possession of positive information of this character. To obtain such knowledge, we have during the past six months begun a systematic and scientific investigation of the life of our salmon, trout, crabs and clams. For this work we have been enabled to enlist the services of some of the well known scientific men from our two great universities.

Dr. Charles H. Gilbert, head of the Zoölogical Department of Stanford University, the highest authority on salmon and trout on the Pacific coast, has been engaged to conduct an inquiry into the life-history of our salmon and trout. Under a separate heading we give a brief review of Dr. Gilbert's notes on the work already accomplished.

The study of the life, abundance and the conditions most favorable to the maintenance of our edible crab (*Cancer magister*) was begun under the auspices of the Board last October. The work is in the hands of F. W. Weymouth of Stanford University, who is a recognized authority. At this time nothing is known as to where or when these crabs propagate, or the life of their young. Investigation has proven to us that vast numbers of young crabs have, for the last thirty years, been regularly destroyed in San Francisco Bay, through the agency of Chinese shrimp- or bag-nets. Immature edible crabs in almost incredible numbers were always to be found in the nets and upon the drying beds of the Chinese shrimp fishermen. We believe, however, that the passage by the late Legislature of the law prohibiting the use of such nets has made the ultimate crab supply reasonably secure.

Professor Harold Heath, of Stanford University, at our direction, began in December last a research intended to disclose the life and range of our edible clams. Very little or nothing is known of the life of these valuable mollusks. There appears, however, to be a limited area in this State which affords opportunity for their existence, and, in consequence, we believe that there is great danger that, with the increasing demand and the present unrestricted methods of digging them, the clam beds in the State may be speedily exhausted. We hope, through the efforts and studies of Professor Heath and his assistants, to be able to lay sufficient facts before the Legislature to warrant the adoption of measures that will insure the future supply.

Arrangements have been made with Dr. William E. Ritter, of the Marine Biological Station at San Diego, to undertake an inquiry into the life, propagation and range of our spiny lobster. Dr. Ritter will, we hope, be induced to undertake a study of the abalone in connection with the work upon the lobster.

In addition to the investigation that we have begun into the life history of our principal food and game fishes, we have also instituted an investigation of the relations of certain birds to the agricultural interests of the State. Harold C. Bryant, of the State University at Berkeley, has been engaged to conduct the inquiry. We hope to show in what manner each doubtful species of bird affects the farmer and the fruit grower, and what measures are to be taken to encourage the beneficial birds and to exterminate the injurious ones. We have engaged in this work because we receive many complaints and many commendations of such birds as the meadow-lark, robin and blackbird. To assist Mr. Bryant in his efforts to ascertain the food and habits throughout the year of these and other birds in the State, we have one assistant in each county who regularly, every two weeks, collects six specimens of each bird. Each specimen is carefully tagged with a label giving the locality, date, hour of day, and place where taken, *i. e.*, in orchard, vineyard, grainfield or garden; they are then placed in formalin, and are regularly forwarded to the laboratory at East Hall, University of California. On being examined, the contents of the

stomach and of the intestines of each bird is carefully noted, showing the kind and character of the seeds and insects upon which the bird lives. This information will be carefully compiled and tabulated, in order that the exact nature and amount of food taken by each of these species shall be plainly disclosed month by month throughout the year.

We submit for the information of the bird lovers of the State, that the work of collecting specimens for the scientific inquiry as to the food of the doubtful species of birds has the hearty approval of the scientific authorities of our two great universities and of the Audubon Society. Dr. David Starr Jordan, who is the president of that society, as well as an ex-member of this Commission, endorses the methods adopted in collecting the birds.

Believing that great good will come from the proper education of our children as to the value of the wild birds and animals to the farming interests of the State, and not alone to the sportsmen and the lovers of nature, we have engaged the services of Gretchen L. Libby, late secretary and lecturer for the Audubon Society of California, to conduct a campaign throughout the public schools of the State.

Miss Libby began lecturing in the public schools last April. Her talks to the children are carefully prepared and consume about thirty minutes in each classroom. From reports made to us by the superintendents and teachers in the public schools, she has interested the scholars greatly. In addition to her work in the schools, whenever opportunity offers, Miss Libby gives evening lectures upon bird protection, before school and lyceum societies, illustrating with lantern slides. From April 11th to June 10th, she delivered 149 addresses in schools, to 10,480 pupils, and spoke six times in the evening, to 779 persons.

Through her efforts we hope to interest all the children in the public schools. Miss Libby will resume her work at the beginning of the fall term of school and in time will speak in every public school of the State.

Respectfully submitted.

STATE BOARD OF FISH AND GAME COMMISSIONERS.

F. G. SANBORN, *President.*

M. J. CONNELL.

F. M. NEWBERT.

JOHN P. BABCOCK, *Chief Deputy.*

Office of the Board,

Balboa Building, San Francisco, August 15, 1911.

SALMON INVESTIGATION.

Notwithstanding it has been fully demonstrated that, owing to hatchery propagation, the quantities of salmon annually taken from the waters of the State have been largely increased during the past twelve years, it appears from a comparison of the record of the number of fish caught in the Sacramento River, with that of the annual output of young salmon from the hatcheries, that the number of adult salmon taken annually from that river is averaging less than one per cent of the hatchery output. Not being satisfied with such a showing as this, and in the hope of uncovering much that would prove of value in this great work, the Commission, in January last, determined upon an investigation that would disclose, as far as possible, the conditions confronting the young salmon during the seaward migration. The work already

gives promise of gratifying results. Briefly stated, it has been shown that, in the headwaters of the Sacramento River and its tributaries, where the greatest number of the young salmon have been liberated, the trout prey upon them during February, March, and April, entailing great loss; that the loss through trout was very light during the last of April, and amounted to little in May and June, notwithstanding that the streams were still full of young salmon and that large numbers were still being planted. It has also been found that in passing down-stream there is, during high water, a pronounced movement from the main channels of the Sacramento into the Sutter and Yolo basins, and that the young fish passing into these basins find there rich feeding grounds, and grow rapidly, and that they appear to make little or no effort to pass from the basin back into the main channel; so that, as the waters recede and become warmer, they perish. The loss from this source appears to be enormous.

By the use of small mesh nets, it has been demonstrated that there were young salmon in Suisun Bay, Carquinez Straits, San Pablo and San Francisco bays during the months of April and May, and that young salmon less than one and three-quarters inches in length were taken near Lime Point, at the entrance to San Francisco Bay.

In order to demonstrate, if possible, the effect of the river trip upon the seaward migration of the young salmon, fifty thousand salmon fry were marked by removing the dorsal fin, and after having fully recovered from the effects of being marked, they were liberated in the head tributaries of the Sacramento River. An additional fifty thousand were marked by removing both the dorsal and adipose fins; after recovery, these were transported to Benicia and liberated in Carquinez Straits.

In a report upon this work Dr. Gilbert wrote on May 24th as follows:

"On the morning of May 20th, the Commission car delivered at Benicia 50,000 Chinook salmon fry, which had been marked at Sisson for the purposes of the experiment, and also 3 cans containing other fry of different ages, for a second experiment which will be presently described.

The marking experiments which we have undertaken are planned to serve more than one purpose. (1) They should make it possible to secure valuable data containing the movements of fish of *known age*, in the river, the bay and the ocean. (2) They should give a much needed opportunity to check up the work of the Commission in salmon propagation, and furnish a basis for computing what proportion of the salmon run is dependent on artificial and what proportion on natural spawning. (3) They may furnish also evidence as to the relative advantage of liberating salmon fry at the headwaters of the Sacramento, near Sisson, and on the lower river, in the vicinity of San Francisco Bay.

In all, 100,000 fry have been marked, the first 50,000 by completely removing the dorsal fin, the second 50,000 by removing the dorsal fin and in addition the adipose dorsal. The first 50,000 were planted about April 1st, in Cold Creek, about half a mile below the hatchery, at the same point and under the same conditions characterizing the majority of the other plants from the Sisson Hatchery this year. They should, therefore, share the same fate of the common run of planted fish, exposed to such dangers as accompany the long river trip and with equal chances of surviving and returning from the sea at maturity.

The second lot of 50,000, with both dorsal fins removed, was the one handled by us at Benicia on May 20th. All possible precautions had been taken to equalize the conditions of the two lots in all respects, save method of marking and place where planted. Both had developed from eggs secured from the Baird Hatchery, and were of equal age. Further, the up-river planting was at such a date as would permit the fish (on the basis of our present knowledge) to reach the lower river at the time the second lot was planted. If the two lots develop differently and return to the river in strikingly different proportions, it would seem fair to conclude that the river trip was responsible for the difference. It is a pleasure to report that the planting on May 20th was an entire success. The cans were promptly loaded on a tug kindly furnished for the purpose by Mr. F. E. Booth, taken to the middle of the river and the plant made where conditions were most favorable. While most of the young fish promptly disappeared in the turbid water, a small proportion remained for a time at the surface and were very conspicuous because of their dark coloration. Careful observation failed to indicate the presence of any enemy.

On the completion of this work at 11:30 a. m., the Commission party, consisting of Deputies F. A. Shebley, A. D. Ferguson and myself, boarded the Commission launch, which was in charge of Mr. Nidever, and proceeded with the second experiment. This was to test the effect, on Chinook fry, of fairly rapid transference from the fresh river water through the brackish water of varying salinity found in the bay and thence outside in the open sea. It was planned to reproduce, as nearly as was feasible, the natural conditions encountered by salmon fry when passing out to sea. But it is to be noted that in the experiment the transition was much more rapid and abrupt than it would be in nature, where the young fish could drift back and forth on the tides for an unknown period. If, therefore, the experiment should fail, it would not necessarily demonstrate that the young fish could not pass out safely when employing the more gradual natural method. But should it succeed, it would seem to indicate that even with young fry there need be no fear of fatal results in effecting the transition from fresh to salt water. Wherefore, it would be entirely safe, if for any reason it were desirable, to plant young fry in the vicinity of the bay.

Fry of three different ages were used in the experiment; the youngest, just beginning to feed after the absorption of the yolk-sac; the oldest, fish of the Baird lot, like those used in the marking experiment, and some Mill Creek fish of intermediate age. While passing down the river, the water in the cans was constantly changed by dipping from the river, and remained—as we ascertained by testing—similar to the river water in temperature and density. No trace of salt was detected until we reached the vicinity of San Pablo Point, as the tide was changing to flood. The salinity then increased so rapidly that we tied up for two hours at the San Pablo wharf, in order not unduly to hasten the process. In a little over an hour, the water became as salt as we afterwards found it on the bar outside the heads, but the fry showed no distress or uneasiness, and fed voraciously when given a meal of ground meat. The success of the experiment here, as elsewhere, was greatly furthered by the presence of Superintendent Shebley, whose care for the young fish was incessant, and whose experience with salmon fry would have enabled

him to detect at once any abnormal behavior, should the salt water occasion distress or discomfort.

From San Pablo Point, we proceeded to Sausalito, where we spent the night. We found the water varying in density with the stage of the tide. The salinity increased until it registered 10° on a saturation scale, but even the youngest fry were not disturbed, and possessed sharp appetites in the morning.

Making use of the early morning ebb, we passed out of the harbor and across the bar to the buoy marking the entrance to the middle channel. As the salinity had not at all increased while running out, it was evident the water of the bay and the river was spread, fan-like, over a wide area, in which the fry could continue indefinitely. About one mile outside the buoy, the salmon were planted. They were in excellent condition and disappeared promptly from the surface, seemingly more vigorous and active than when taken from the car the preceding day.

We failed to encounter pure sea-water and did not succeed, therefore, in carrying the fish throughout the series of densities. This will be attempted at a later time, and, meanwhile, important information may be expected from the Papermill Creek experiment, in which the fish are to be watched as they naturally pass out into Tomales Bay.

I have already mentioned the indispensable assistance rendered by Superintendent Shebley of the Brookdale hatchery. It is also a pleasure to record the volunteer services rendered by Deputy Ferguson. Without the aid of these gentlemen, the experiment could not have succeeded."

Referring to his experiments in marking and liberating steelhead trout at the Scott Creek egg collecting station, Dr. Gilbert writes:

"It has been worth the work of wiring the steelheads merely to ascertain that after a certain time in the spring, practically all yearlings remain in the stream, and during the summer months grow very little. Now if we can succeed in ascertaining when they do go to sea, one long step forward will have been taken in working out the life-history of the steelhead. My original task—to discriminate between steelhead and rainbow—has resolved itself for the present into an exhaustive investigation of the life-history of the steelhead. We need to demonstrate—

1. Do the fry seek salt water shortly after attaining the free-swimming stage, and if so, in what proportion of the total hatch? Also, do they survive, and what proportion of adult fish consist of developed fry which have immediately sought salt water?

2. Do the young which remain in the streams for longer periods, pass out at different ages?

3. Do any which have entered the sea return to fresh water before maturity? If so, when and for how long?

4. Do any, which are free to pass out, remain in the streams permanently? If so, when do they mature and what age do they finally attain?

5. The ages at which sea-run fish mature? Do they spawn during successive years? What age do they attain?"

Under date of February 13, 1911, Dr. Gilbert writes:

"Saturday at Scott Creek proved interesting and valuable. One specimen bearing tag No. 36 was marked last February when it returned

from the sea as a small 'grilse' 15 inches long and weighed but one-half pound; it now weighs 6 pounds and is $24\frac{3}{4}$ inches long. The scales from this specimen exhibit a very beautiful spawning mark or scar, and a broad growth outside that mark formed after the return of the fish to salt water. The station at Scott Creek offers the best opportunity for experimental work in marking and liberating fish that could be devised. I sincerely hope the Commission will be able to increase the facilities with hatching troughs and a supply of water, as soon as the Board can acquire all the legal rights to the station."

Under date of February 21, 1911, and referring to the marking of salmon at Sisson hatchery, Dr. Gilbert reports:

"I found the little salmon not difficult to mark and believe it can be done with some rapidity as soon as the men have had a chance to become adept. Superintendent Hunt will keep me informed of the progress of the work, and has arranged to send me a few marked fish picked up at random, so I can examine the results. Then, when 50,000 are marked, it will be advisable to make a trip to examine and witness the planting. When this is done I wish to haul a net in the pools below the planting and examine the stomachs of any large fish that we may capture. The importance of this is obvious. It will be a great relief if this experiment brings negative results."

Under date of June 14th, Dr. Gilbert wrote:

"In my recent trip in the Commission's launch 'Shad,' with Deputy Nidever, up the Sacramento River, I inspected the various 'breaks' through which the river overflows into the Yolo basin; also the Cache Slough, through which a portion of the overflow waters find their way back into the Sacramento, in the vicinity of Rio Vista. We also visited the Tisdale Weir, or Easement, and Butte Slough, both of which divert surplus flood waters into the extensive Sutter Basin. As had been found by deputies Seofield and Nidever on previous examinations, wherever waters were pouring into these basins, they were carrying with them numbers of salmon fingerlings of the year, now making their downward migration to the sea. While at this date the crest of the wave of migration is long past, some of the results secured were sufficiently impressive. Thus, at Wood's Break, which has an opening of about 175 feet into the Yolo Basin, a short distance below Knights Landing, a trap with a small opening set in the overflow current for three hours intercepted 79 young salmon, and in the succeeding three hours 106, while during the night 168 entered the trap. When it is considered that the trap strains but a small part of the water entering the basin through Wood's Break, that this is but one of several breaks into the Yolo Basin, and that the height of migration is well past, the importance of an exhaustive study of these overflow basins from the standpoint of their effect on the salmon industry of the State becomes sufficiently obvious. Fingerlings in the river at this time average about three inches long. They are a picked lot, representing the favored remnant which have survived the early dangers in the egg, as alevins, and when beginning to feed. To rear salmon under protection in artificial surroundings to a length of three inches, is an expensive process. So much the greater is the need of observing solicitously the fate of those which are diverted into the overflow basins, and of devising means of avoiding the loss, should such be proven to occur.

Now is the critical time to determine the extent of this loss. Water has ceased to flow over the Tisdale Weir and over the Easement into the Yolo Basin, and is beginning to recede from the upper portions of the overflowed districts. Such smaller bodies of water as are left in depressions should be promptly examined before the evidence is lost. As soon as the water becomes stagnant and overheated, the young salmon will perish, and even before that time many will fall a prey to the predatory birds which are already congregating in great numbers throughout the overflowed districts. Terns, gulls, herons and shags abound everywhere and can be observed feeding in every favorable pool. They catch the living fish and also quickly remove all trace of those which perish because of unfavorable surroundings.

Under these conditions, it is imperative that the work proceed vigorously and without interruption. I recommend that the field party return in the Tisdale Weir, and examine in great detail all the ponds available. It will not suffice to examine a few and assume that all the rest agree with these. The evidence should be specific and detailed, and should be presented in such mass as to convince everyone of the soundness of the conclusions. Liberal sets of photographs should be taken, approximate measurements of the ponds should be made and attempts to estimate the number of impounded fish. Special attention should be paid to temperature and other conditions which eventually prove fatal to the young salmon. Such knowledge will prove highly useful later in the season, at the period when the overflow waters are most concentrated.

As soon as the field party has completed its examination of the Tisdale Weir district, it is probable the Wood's Break will have ceased to flow, and will leave for investigation a most important series of holes and ponds. And, in succession, other overflow regions will become available and should be at once investigated. Finally, the residual lakes in all the basins will remain for a most thorough study."

Under date of June 20, 1911, Dr. Gilbert states:

"I am leaving to-morrow for Pacific Grove, where I expect to make some observations on the food of the salmon and the character of the run, if indeed enough are being captured to admit of observation. I wish also to inspect the catch of the sardine fishermen, to ascertain a possible relation with the salmon industry. This is in pursuance of our general plan to determine all the causes which prevent a greater return of mature salmon to the Sacramento River, in proportion to the number of fry there liberated. Losses by predatory fish in the streams and by stranding in the overflow basins are now determined, though the seriousness of the loss thus effected is still to be fixed. The loss in the sea we believe to be very great, but have no knowledge as yet what are the effective causes, or whether any part of it can be prevented. We anticipate, however, the possibility of ascertaining what forms prey upon salmon during their entire residence in the sea, and also whether current methods of fishing are unduly destructive."

THE SALMON PROPAGATION OF 1910.

In 1910, during the months of October, November, and December, the Fish and Game Commission received as usual from the U. S. Bureau of Fisheries, a grant of 24,126,000 salmon eggs which had been spawned at the Federal hatcheries at Baird, Battle Creek, and Mill Creek. These

eggs were received and cared for at the State hatcheries at Sisson, Eel River, and Brookdale.

Those hatched at Sisson were liberated in the tributaries of the Sacramento, near the hatchery, with the exception of 2,215,000 which were taken down to Redding and liberated in the Sacramento. Those hatched at the Eel River Hatchery were liberated in that stream within a few miles of the sea, and those hatched at Brookdale were planted in Scott Creek and the San Lorenzo River.

In addition to the above grant, 2,109,000 of silver salmon eggs were obtained through the joint operations of the Commission and the Bureau of Fisheries, on Klamath River, near Klamathon. The eggs of the silver salmon were shipped to Sisson and hatched there, with the result that 700,000 young silver salmon were planted in Klamath River and 719,000 in the Sacramento River. This is the first effort made in this State to increase the runs of the silver salmon; heretofore, hatchery propagation has been confined to the Quinнат, or Sacramento salmon.

The silver salmon, commonly called "Oho" in the north, apparently does not enter either the Sacramento or the San Joaquin rivers. There is no known reason why the fish should not enter these streams; they run abundantly in the Klamath and the Smith rivers, in Del Norte County; they are taken in considerable numbers in Eel River, in the fall; and they frequent many other of the coast streams, as far south as Monterey Bay. Strange as it may appear, the presence of the silver salmon in the waters of this State remained unnoticed, until Dr. Gilbert, Professor of Zoölogy, at Stanford University, a few seasons ago called attention to them. Heretofore, all the salmon taken in our rivers have been commercially classed as Quinнат. The silver salmon—though a true Pacific salmon—is not considered as valuable a fish as the Quinнат; they are smaller, run late in the fall, and are lacking in color and in oil. Nevertheless they are an excellent food fish when taken as they enter the rivers from the sea. Though the silver salmon run neither into the Sacramento nor the San Joaquin rivers, as an experiment the Commission planted 719,000 in the Sacramento, at Redding, with the hope of establishing a run in that river of these desirable fish. The outcome of the experiment will be watched with interest.

TROUT EGG COLLECTION AND DISTRIBUTION.

During the last few months the Commission has taken from the stock fish in the breeding ponds at the Sisson Hatchery, the following numbers of trout eggs:

Loch Leven trout-----	1,200,000
Rainbow trout-----	1,100,000
Eastern Brook trout-----	750,000
	<hr/>
	3,050,000

In addition to the eggs collected from the stock ponds at Sisson, two spawning stations were operated on the Klamath River, for the collection of wild rainbow trout eggs; these stations obtained 2,500,000 eggs, which were eyed and shipped to the Sisson Hatchery. A station for the collecting of steelhead trout spawn was also operated at the Snow Mountain Power Company's dam, in Eel River, and 1,900,000 eggs were collected there, 300,000 of which were paid to the California Trout Farm Com-

pany, who holds the leases for operating at that dam. 300,000 of the eggs taken at the latter place were shipped to the State hatchery at Grizzly Bluff, on Eel River, in Humboldt County, where they were hatched. The fry from this lot will be distributed in that county. 700,000 of the eggs were shipped to the Ukiah Hatchery, which the Commission holds under lease. This lot will supply fish for Mendocino, Sonoma, Marin, and Lake counties. The balance of the eggs was shipped to Sisson, where they were hatched and are awaiting shipment to public waters. The Commission also operated the Scott Creek spawning station, owned by the county of Santa Cruz, upon a lease, under the terms of which the County hatchery at Brookdale was furnished 500,000 eyed steelhead trout eggs, from a total of 1,300,000 steelhead eggs taken at this station, 600,000 of them being shipped to Sisson, to be used in stocking public streams.

Owing to unfavorable weather conditions, only 130,000 steelhead trout eggs were collected at Grizzly Bluff, Humboldt County, but the output of that hatchery was increased by the shipment already mentioned. In all, 5,800,000 steelhead trout eggs were collected during the season.

The season at Tahoe was much later than usual, owing to the excessive snow fall of last winter. Operations were begun there in May and 3,000,000 Tahoe trout eggs were collected, which will be hatched at the Tahoe and Tallac hatcheries and planted in the lakes in the immediate vicinity.

The hatchery at Wawona, Yosemite National Park, is being operated as usual, with eggs shipped from Lake Tahoe.

The total number of trout eggs collected this year amounts to 11,980,000.

TROUT DISTRIBUTION.

In June the distribution of trout from the Sisson hatcheries began, and the Commission will endeavor to make plants in public waters in every section of the State.

Many applications have been received from all over the State, and interested persons desiring the streams of their section stocked should file applications without delay.

The fish distribution car of the State was thoroughly overhauled in May, at the Southern Pacific railway shops at Sacramento. Its carrying capacity has been increased by the installation of an additional line of air-pipes. Every endeavor will be made and the greatest care given to the proper distribution of the fish from the hatcheries.

CRAB INVESTIGATION.

Excerpt from a report made to the Fish and Game Commission by F. W. Weymouth, in charge of the Crab Investigation.

"The edible crab of the Pacific coast, known to scientists as *Cancer magister*, is not only an animal of considerable commercial value, forming a respectable item in the three million dollar yearly yield of California's fishing industry, but one quite as interesting as the salmon or any of our game birds.

Though both valuable and interesting, there exists hardly a reference to its habits or life-history, either in scientific or popular literature, although other crustaceans, notably the lobster of our eastern coast and

the edible crab of Europe, have been the subjects of careful studies, undertaken to determine efficient means of protection and feasible methods of propagation. The present Commissioners plan to remedy this state of affairs, and the purpose of this account is to give some idea of the little we do know and more of the lot we do not know, but might easily find out, about this interesting animal. In as brief a treatment as this, many points must necessarily be omitted, but perhaps some conception may be given of the scope and methods of the present investigation, if we state our present knowledge of the life-history of the young crab.

By a wise law the taking of female crabs is prohibited at all times; but if one were to examine some of those which the fishermen return to the ocean during the fall or winter, many would be found with great masses of eggs, often equalling in bulk a fourth or fifth of the body, securely attached to the abdominal legs. The individual eggs are very small. If the fact is grasped that a single egg measures only about one-sixtieth of an inch in diameter and that about fifty thousand may be held in an ordinary teaspoon, it will not be thought surprising that a single, rather small female was found to be carrying 750,000 eggs.

Just how long the eggs are carried in this fashion and what is the usual date of egg-laying we do not yet know, but this may easily be found out when a complete series of specimens collected at all seasons of the year is available for study.

Such a production of eggs would seem a sufficient provision for the maintenance of the supply of crabs. An illustration may perhaps make this clearer. If there were present in the waters about Eureka, alone, a number of females equal to the number of males taken at that port during 1910, and half of these were to produce eggs—both of these assumptions err on the side of caution—the total weight of the offspring produced in a single year, if all were to reach maturity, would amount to over 59,000,000 tons, or about eight and a half times the combined weights of the Pyramid of Cheops and the Washington Monument.

It is obvious that they do not reach maturity, and here, as in the case of most animals, there must be an enormous mortality among the young. Let us consider some of the conditions that favor this. The egg hatches into a minute larva bearing little resemblance to the adult and called a zoea. The zoea of *Cancer magister*, as far as we have record, had not been obtained before the beginning of the present investigation, and most of our knowledge of this, as well as of the other larval stages, is drawn from the work on the European crab. The little crab comes to the surface of the water, where, in company with an immense variety of microscopic plants and animals, it forms what is known collectively as plankton. Now this plankton, though unnoticed by the casual observer, is the immediate source of food for countless animals of all sizes, from microscopic copepods to whales, and ultimately the source of the food of all marine animals, since those that do not feed upon it directly feed upon those that do.

Thus, with many other tiny organisms the zoea and later larval stages are destroyed in countless numbers. The stomachs of salmon, for instance, have been found crammed with the larvæ of this or closely related species.

The larvæ may be collected by towing a net of fine meshed cloth at

the surface of the water, and a beginning has been made at this work, which, if carried out systematically during all seasons of the year in various localities, will show at what time of year larvæ are present, where they are found, how their distribution is affected by the tides and currents at whose mercy they float, what food is present, and perhaps some hint of the enemies that destroy them.

After a number of weeks or months—we have as yet no exact information on this point—the larvæ assume a form closely resembling the adult, and shortly afterward, to judge from the results of what dredging has been carried out, they seek the bottom, where they continue to live until adult. That they do not frequent the places where the adults are most numerous is indicated by the results of the present work, but more exact information on this point will be necessary in order to determine whether a correspondingly great destruction occurs at this stage and if any of the loss is preventable.

The important question of the time required for the crab to reach a marketable size offers many difficulties, since no large aquaria have been maintained in this State for the continuous study of such forms; but some indirect evidence, based on the rate of growth of the young, is already at hand, and promises valuable results.

Now, before there is any alarming diminution in the supply, is the time to begin conservation, and an accurate knowledge of the life-history of the crab must form the first step in any scheme for its protection."

BIRD INVESTIGATION.

Letter written by H. C. Bryant, Assistant in charge of Bird Investigation, to the editor of the "San Bernardino Sun."

"DEAR SIR: I am in receipt of a clipping entitled 'Protests the Slaughter of Birds,' taken from your paper under date of May 30th. In order that the position of the Fish and Game Commission on this subject may be clearly understood by Mr. Herron and other readers of your paper, I take the liberty of writing you.

The killing of birds at nesting time is certainly to be deplored and, unless a reasonable excuse for so doing can be advanced, the killing is indeed criminal and should be a subject of protest by all humane people. Mr. Herron's description of the suffering young should work on the sympathies of even the most hard-hearted.

Each year the protection and preservation of wild birds becomes more important. In some of the eastern states an especially appointed officer spends his time investigating the value of birds. In California the value of certain birds has been much discussed, as the records of the last two legislatures show. Opinion is divided on the question whether meadow-larks, blackbirds, robins and horned larks pay for the fruit and grain which they eat, by destroying injurious insects. The Fish and Game Commission, believing that a scientific investigation as to the value of these birds would settle the controversy, has begun such an investigation.

The examination of the stomach-contents of the birds concerned being of greatest value in determining the food, it was decided to collect birds for such investigation. In an investigation of this kind it can readily be seen that birds taken only at the time of year when they are feeding on grain and fruit would furnish evidence against them. On the other hand, birds taken at some other time of year might furnish only evidence

in their favor. Therefore, in order to be fair to the bird itself as well as to its friends and enemies, it was decided to take birds in every month of the year, and in sufficient quantity to make the result conclusive. It is a well known fact that many birds which feed almost altogether on vegetable food most of the year feed their young largely on insects. Thus it will be seen that the taking of birds during the nesting season is very important and absolutely necessary, even though it involves the destruction of a limited number of parent birds and their young.

What the Commission desires, and what all interested in the matter in controversy desire, is that the birds under protest shall have a fair and just trial. The only fair test of the value of a bird to the people of California is a knowledge of the bird's feeding habits throughout the whole year. A discontinuance of the collection of birds at any time during the year, therefore, would make the result obtained of doubtful value.

To most people the killing of several hundred birds appears an unjustifiable slaughter, but our best ornithologists tell us that in the economy of nature there is food and protection in each locality for a certain bird population, and that if this number is decreased by epidemic, lack of food, storm, or other means, the number of young, which live as a result of the diminished numbers, soon brings back the balance of nature. An instance in point is the linnet, or house-finch. This bird has been unprotected for a number of years, and the number of birds killed and the nests destroyed by fruit-growers and small boys mounts into the thousands and yet who will dare to say that this species has decreased in numbers. This does not mean that an indiscriminate slaughter of any species of bird would not have any effect on the numbers, for we have only to point to the game-birds for instances of this. It does show, however, that the collection of non-game birds now being carried on is not so serious as might at first appear.

The collection of birds for evidence now being conducted by the Fish and Game Commission has the approval of the Audubon Society of the State and the Agricultural Departments at the State University and at Stanford, and is being conducted strictly on well considered and scientific lines. Every bird taken is carefully preserved and the contents of its crop and intestines determined and tabulated. The birds taken will furnish evidence to establish whether they are friends or enemies of our great agricultural interests. If it be shown by the specimens taken that any one of the doubtful species of birds are friends, the loss of a number of specimens taken to establish the fact becomes of no importance to the species."

GAME FARM NOTES.

The season at the State Game Farm has so far been most satisfactory. Fifty adult wild turkeys were carried over from last season. With few exceptions, all the original stock of wild turkeys brought from Mexico three years ago has been liberated, the present stock at the Farm consisting of birds raised from the original stock, and two gobblers and one hen from Virginia. The hens being young have laid a large number of eggs, from which were hatched 720 young turkeys. The loss up to the present time has been small, the wild turkey chicks appearing to be more hardy than the domestic birds. The young birds will be held until early fall and will then be liberated in the Sequoia and the General

Grant National parks, and in the forest reserves in southern California, in all of which, plants have been made each season of the last two years.

We are indebted to Major James B. Hughes, 1st Cavalry, Acting Superintendent of the Sequoia and the General Grant National parks, in Tulare County, for the following interesting report upon the wild turkeys seen in the parks this season. Walter Fry, the Park Ranger, who collected the information for Major Hughes, is well known to the Commission as a painstaking and thoroughly reliable man. He personally supervised the liberation of the turkeys shipped from the game farm last year.

"In compliance with your request calling for a report on the wild turkey in the Sequoia National Park, I have the honor to submit the following in this connection:—

Birds were seen by the following individuals on the dates and at the places as given below:—

Walter Fry, Feb. 20, 1911—8 adult birds; 1 nest with 14 eggs, at Marble Fork.
 Walter Fry, Mar. 20, 1911—12 adult birds; 9 young birds, at Turkey Flat.
 Walter Fry, June 6, 1911—1 adult bird; 6 young birds, at Salt Spring.
 Walter Fry, July 3, 1911—4 adult birds; 7 young birds, at Barnefee Flat.
 Walter Fry, July 14, 1911—5 adult birds, at Barnefee Flat.
 Walter Fry, July 16, 1911—11 adult birds, at Alder Creek.
 C. W. Blossom, Jan. 11, 1911—2 adult birds, at Salt Spring.
 C. W. Blossom, Feb. 15, 1911—2 adult birds; 1 nest with 7 eggs, at Salt Spring.
 C. W. Blossom, Mar. 4, 1911—3 adult birds, at Turkey Flat.
 C. W. Blossom, June 14, 1911—1 adult bird, at Pigeon Creek.
 H. T. Britten, Jan. 11, 1911—3 adult birds, at Turkey Flat.
 J. G. V. Grunigen, Mar. 4, 1911—2 adult birds, at Turkey Flat.
 E. L. Cass, July 8, 1911—2 adult birds, at Turkey Flat.
 C. W. Fry, July 8, 1911—2 adult birds, at Turkey Flat.
 C. W. Keller, Apr. 15, 1911—6 adult birds, at Salt Spring.
 Chester Wright, Apr. 15, 1911—6 adult birds, at Salt Spring.
 Chester Wright, Apr. 22, 1911—3 adult birds, at Salt Spring.
 Robert Pool, July 8, 1911—4 adult birds; 4 young birds, at Barnefee Flat.
 R. Hubbard, July 11, 1911—2 adult birds, at Barnefee Flat.

In addition to the birds seen by parties herein mentioned, many other parties have seen birds, but as dates were not known, their names have been omitted.

This report was not rendered sooner for the reason that the territory inhabited by the birds is large and but few people pass therein, therefore it was withheld in order that a more extensive and accurate report might be given, and as such the report is submitted."

In addition to the wild turkeys at the Game Farm, there are at present in the neighborhood of 1,145 young pheasants. These birds are mostly of the Mongolian and Ring-neck stock and are doing well, and there is good prospect of making a large distribution in the fall: but while it is well not to count your chickens until they are hatched, it is equally true that the birds for distribution should not be counted until they are grown. Young pheasants are subject to many ills and while the loss at the farm so far this year has been small and there are many hundred more young chicks than in any past season, the danger points are not yet passed for many of the ills so common to them to appear; however, great precaution is being taken to prevent disease.

At the last session of the Legislature, provision was made for the sale, at any time, of domestically reared and imported pheasants. As a result of this action, it is to be expected that there will be a large increase in the number of persons at present engaged in rearing these birds. There is a good market and ready sale for all the pheasants that can be

raised in this State. It is an industry that should attract the attention of the poultry growers of the State. The Commission expects this fall to liberate, in sections well suited to the Ring-neck pheasant, large numbers of birds, and to be able to supply persons throughout the State who will make the necessary provision to care for the birds and agree to make a fair return to the State for the birds granted them. The Commission will be pleased to hear from interested persons.

MOUNTAIN LION BOUNTY.

The Commission concurs in the opinion held by experienced mountaineers and other observers in a position to know, that the California lion is the chief predatory menace to the perpetuation of the wild deer supply of the State. The policy of offering a bounty of \$20.00 for each lion killed within the State has proven very satisfactory and will be continued indefinitely.

The following tabulation displays the numbers of bounties paid for lions each month for the year ending June 30, 1911:

1910—July	14 at \$20 00	\$280 00
August	17 at 20 00	340 00
September	25 at 20 00	500 00
October	26 at 20 00	520 00
November	26 at 20 00	520 00
December	30 at 20 00	600 00
1911—January	24 at 20 00	480 00
February	24 at 20 00	480 00
March	38 at 20 00	760 00
April	23 at 20 00	460 00
May	16 at 20 00	320 00
June	8 at 20 00	160 00
Total	271 at \$20 00	\$5,420 00

Due precaution against possible fraud is taken in every instance where claims for bounty are presented. The following ruling of the Board governs the payment of lion bounties:

Applicants for the bounty of twenty dollars (\$20.00) paid by the Fish and Game Commission on mountain lions killed in the State of California, are hereby notified that no claim will be considered unless the following requirements are complied with:

The *entire skin*, including the scalp of the mountain lion upon which a bounty is claimed, must be sent to the office of the Board, all carriage charges prepaid. The skin should be either dried, tanned, or otherwise cured before shipment, as green skins spoil quickly, becoming very offensive and losing all value. Skins will be returned to claimants at their expense, or destroyed, as may be directed.

It is obligatory, also, that the claim be made upon a form provided by the Fish and Game Commission, upon which shall appear in particular the names and addresses of the claimant and *three* witnesses. This claim must be acknowledged before a notary public or justice of the peace, and shall bear the county clerk's certification to the genuineness of the notary's or justice's signature.

In addition to the claimant's affidavit, there must be an affidavit, upon a form provided, by *one* of the witnesses whose name appears on the claimant's affidavit, which shall also be acknowledged before a notary public or justice of the peace, and bear the county clerk's certification.

The affidavits should be accompanied by an account of the pursuit and killing of the lion, giving in detail the method used, number of deer carcasses left by the animal, and such other facts as may be of assistance in determining the damage done to deer and other game, and in planning the extermination of this member of the cat family.

Before payment of the bounty, it has been the practice of the Commission to write the claimant, requesting him to give, in addition to the affidavit, full particulars of the killing of the lion. From these letters has been gleaned much information, both as to the destruction wrought by lions upon deer and domestic live stock, and the most successful methods of killing this chief predatory pest. Tracking and treeing the lions with the aid of trained dogs is by far the most successful method of bringing these animals within the reach of bounty claimants, although many lions are killed through the agency of traps, and occasionally by the use of poison.

THE WORK OF THE PATROL FORCE.

In its efforts to enforce the fish and game laws of the State, the Board has maintained throughout the State a paid patrol consisting of some sixty officers. The number varies according to the season. These officers have been assisted by upwards of four hundred and fifty duly commissioned men who serve without regular pay, but who are compensated for the work actually performed. Many of these men have been very active and, as a result of the arrests made, have been well paid.

To enable the Board to closely supervise its patrol force, the State has been divided into three districts. The deputies working in the counties in the southern end of the State are controlled from an office which the Board maintains in Los Angeles, directed by Commissioner Connell. The force in the counties in the San Joaquin Valley is directed from an office in Fresno, under charge of Deputy Commissioner A. D. Ferguson. The balance of the force is directed from the head office in San Francisco. As soon as the necessary arrangements can be made, the patrol force operating in the Sacramento Valley and in the Sierra Nevada Mountains, north of the Fresno Division, will be controlled from an office to be established in Sacramento, under the direction of Commissioner Newbert.

The patrol of the commercial fisheries in San Francisco, San Pablo and Suisun bays and the lower Sacramento and the San Joaquin rivers has been thorough. At times all three of the launches owned by the Commission have been in use. That effective work has been done is evidenced by the following tabulation, which discloses the number and character of the arrests made by our patrol force, together with the disposition of the cases in court, for the year ending June 30, 1911. This statement shows that there has been a total of \$5,813.00 imposed for violations of the fish laws and \$10,464.00 for infractions of the game laws. A total for the year of \$16,277.00.

GAME CASES.

SUMMARY OF ARRESTS AND DISPOSITION OF CASES FOR THE YEAR ENDING
JUNE 30, 1911.

Number of cases.	Violations charged with	Convictions.	Aquittals.	Dismissals.	Fine.	Number of days imprisonment.
263	Violations of the hunting license law.....	242	4	17	\$3,786	59
1	Resisting an officer.....	1			35	
1	Aiding man under arrest to escape.....			1		
1	Perjury (swearing to lion scalp taken by another party)---	1				50
1	Petty larceny (stealing crabs held as evidence).....			1		
2	Shooting on state game preserve (2 pending).....					
1	Shooting on national game preserve.....			1		
8	Shooting on enclosed ground (trespass) (3 pending).....	5			135	
1	Elk, killing.....			1		
39	Deer (female and spotted fawn), killing or possessing (2 pending).....	21	2	14	925	40
44	Deer or deer meat, close season, killing, possessing or sell- ing (2 pending).....	35	3	4	900	
3	Deer, excess bag limit.....	1	2		25	
6	Deer hides in possession, evidence of sex removed.....	4		2	150	
4	Deer, pursuing with dogs (1 pending).....	3			75	
10	Tree-squirrels, close season, killing or possessing.....	10			250	
15	Ducks, close season, killing or possessing.....	14		1	230	
52	Ducks, excess bag limit (2 pending).....	44	3	3	1,220	35
1	Animal blind, used for the purpose of approaching ducks or geese.....	1	2	1	100	
6	Power boat in motion, shooting ducks from.....	4		2	70	
13	Doves, close season, killing or possessing; bag limit.....	11		2	250	
45	Quail, grouse, sage-hens, close season, killing or possessing	37	2	6	940	25
3	Quail, excess bag limit.....	3			80	
4	Quail, buying and selling; keeping in captivity.....	4			100	
5	Plover, snipe and other shore-birds, close season, in possession.....	5			110	
3	Snipe, bag limit.....			3		
6	Protected game-birds (swan, pheasants), killing or trap- ping.....	6			135	
2	Protected non-game birds (sandhill crane), shipping or offering for sale.....	2			10	
1	Game shipped contrary to law (improperly marked).....	1			25	
25	Night shooting.....	16	2	7	425	
4	Nests or eggs, robbing or possessing.....	3		1	50	
44	Non-game birds (blackbirds, yellow-hammers, meadow- larks, sea-gulls, robins), killing, shipping or possessing (1 pending).....	37	1	5	438	
617	Totals.....	511	21	72	\$10,464	209

NOTE.—Fifteen cases pending.

FISH CASES.

STATEMENT OF ARRESTS, CONVICTIONS AND FINES FOR THE YEAR ENDING
JUNE 30, 1911.

Number of arrests.	Violations charged with	Convictions.	Acquittals.	Dismissals.	Fine.	Number of days imprisonment.
41	Fishing without a license (1 pending).....	31	3	6	\$365	-----
90	Chinese shrimp or bag-net, used for the purpose of taking fish (28 pending).....	32	27	3	365	30
29	Set-nets, set-lines, used for taking fish (12 pending).....	11	2	4	1,000	50
2	Nets extending more than one-third across the stream.....	1	-----	1	100	140
2	Small mesh net, used for taking striped bass.....	-----	-----	2	-----	-----
4	Dynamiting fish.....	3	-----	1	500	-----
2	Pollution of state waters (sawdust).....	1	1	-----	250	-----
4	Fishway, fishing within fifty feet of.....	-----	-----	1	-----	-----
15	Salmon, close season, taking, possessing or selling (1 pending).....	10	-----	4	425	-----
9	Saturday and Sunday fishing for salmon (1 pending).....	4	-----	4	400	150
1	Salmon roe used for bait (October, 1910).....	1	-----	-----	10	-----
14	Striped bass, underweight, taking, possessing or shipping.....	13	-----	1	295	-----
1	Striped bass, close season.....	1	-----	-----	20	-----
7	Black bass, close season, taking or possessing.....	4	-----	3	80	-----
8	Trout, close season, taking or possessing.....	7	-----	1	150	-----
4	Trout, excess creel limit.....	4	-----	-----	125	-----
4	Trout, taken other than with hook and line.....	4	-----	-----	90	-----
2	Night fishing for steelhead.....	2	-----	-----	25	-----
61	Crabs, undersized, taking, selling or possessing (6 pending).....	34	-----	21	510	43
5	Crabs, close season, in possession.....	3	-----	2	65	30
4	Abalone, undersized, taking or possessing.....	3	-----	1	65	-----
2	Black abalone, close season, taking, possessing or selling.....	1	-----	1	20	-----
13	Crawfish or lobsters, close season, taking or possessing.....	11	2	-----	233	392
13	Catfish, undersized, offering for sale (1 pending).....	10	-----	2	490	-----
10	Shrimp, in possession.....	5	-----	5	125	-----
5	Shrimp (California), or shrimp-shells, offered for export.....	4	1	-----	105	-----
1	Squid, taken for commercial purposes.....	-----	1	-----	-----	-----
353	Totals.....	200	37	66	\$5,813	745

NOTE.—Fifty cases pending.

SEIZURES OF NETS, FISH, AND GAME FOR THE YEAR ENDING JUNE 30, 1911.

Seizures of fish and game were donated to charities, except where otherwise stated.

- 37 set-nets.
- 3 Chinese shrimp-nets (seized as evidence).
- 1 salmon net used for Saturday and Sunday fishing.
- 6 Chinese sturgeon-lines (53 sections, 12 anchors).
- 500 pounds salmon.
- 800 pounds striped bass.
- 18 black bass (destroyed).
- 311 pounds steelhead trout.
- 418 pounds trout.
- 315 pounds catfish (300 pounds destroyed).
- 420 pounds miscellaneous fish (250 fish returned to water).
- 715 crabs (336 returned to water, 15 destroyed).
- 8 abalones.
- 5,370 pounds dried shrimp or shrimp-shells (about 2,030 pounds used for feeding young fish at Sisson Hatchery).
- 2,961 ducks (75 destroyed; 415 returned to owner).
- 37 geese (5 returned to owner).
- 20 doves.
- 268 quail (17 returned to owner).
- 8 rail.
- 40 plover.
- 252 non-game birds.
- 4 sandhill crane.
- 1 mounted spotted fawn.
- 4 deer hides (returned to owner).
- 251 pounds venison and 3 whole carcasses.
- 2 jack-rabbits.
- 1 bear hide.
- 52 tree-squirrels.

**STATEMENT OF RECEIPTS AND DISBURSEMENTS OF THE STATE
FISH AND GAME COMMISSION FOR YEAR ENDING JUNE 30, 1911.**

The following statements disclose that the total hunting license collections paid into the state treasury for the year amounted to \$132,167.00 and that the total commercial fishery licenses amounted to \$22,640.00. It should be noticed that the fishing license year extends from April 1st to March 31st of the following year and that the hunting license year runs from July 1st to June 30th following.

During the fiscal year ending June 30th, the Board was given an appropriation by the Legislature of \$20,000 for the support and maintenance of the State Hatcheries.

In consequence of the belief that the Commission is now amply provided with means for its work, from the sale of licenses and from fines collected, the Board made no application at the last session of the Legislature for any appropriation, nor was any appropriation made.

In its endeavor to conduct the work of the Commission without the aid of any appropriation, the Board does not contemplate lessening its usefulness in any manner. Owing to the abolishment of the use of the Chinese shrimp nets in San Francisco and San Pablo bays, the expense of patrolling those waters is greatly lessened, and by close attention to expenditure the Board anticipates no difficulty in making its patrol work fully as effective as at any previous period and by its scientific work to add materially to its usefulness.

STATEMENT OF RECEIPTS FOR THE YEAR ENDING JUNE 30, 1911.

1910.	Fish and Game Preservation Fund.	Hatchery Fund.	Total.
July—			
Hunting licenses -----	\$11,106 60		
Fines (game) -----	1,082 88		
Fines (fish) -----	274 75		
By appropriation for year 1910-11-----		\$20,000 00	
Fishing licenses -----		602 50	
	\$12,464 23	\$20,602 50	\$33,066 73
August—			
Hunting licenses -----	\$5,650 80		
Fines (game) -----	907 10		
Fines (fish) -----	30 00		
Game farm earnings-----	30 19		
Fishing licenses -----		\$950 00	
	\$6,618 09	\$950 00	\$7,568 09
September—			
Hunting licenses -----	\$2,237 95		
Fines (game) -----	1,060 03		
Fines (fish) -----	463 30		
Game farm earnings-----	25 00		
Fishing licenses -----		\$1,272 50	
	\$3,786 28	\$1,272 50	\$5,058 78
October—			
Hunting licenses -----	\$56,565 60*		
Fines (game) -----	1,033 85		
Fines (fish) -----	270 00		
Game farm earnings-----	274 21		
Fishing licenses -----		\$1,362 50	
	\$58,143 66	\$1,362 50	\$59,506 16

*County clerks made quarterly returns.

	Fish and Game Preservation Fund.	Hatchery Fund.	Total.
November—			
Hunting licenses -----	\$19,919 30		
Fines (game) -----	807 82		
Fines (fish) -----	674 40		
Game farm earnings -----	33 65		
Fishing licenses -----		\$620 00	
	\$21,435 17	\$620 00	\$22,055 17
December—			
Hunting licenses -----	\$6,885 15		
Interest, bank balance -----	31 17		
Fines (game) -----	1,234 13		
Fines (fish) -----	1,207 65		
Game farm earnings -----	365 40		
Fishing licenses -----		\$3,267 50	
	\$9,825 50	\$3,267 50	\$13,093 00
1911.			
January—			
Hunting licenses -----	\$20,470 30		
Fines (game) -----	1,440 95		
Fines (fish) -----	95 00		
Game farm earnings -----	12 60		
Fishing licenses -----		\$222 50	
	\$22,018 85	\$222 50	\$22,241 35
February—			
Hunting licenses -----	\$1,772 50		
Fines (game) -----	744 83		
Fines (fish) -----	994 50		
Game farm earnings -----	17 70		
Fishing licenses -----		\$307 50	
	\$3,529 53	\$307 50	\$3,837 03
March—			
Hunting licenses -----	\$3,810 85		
Fines (game) -----	917 40		
Fines (fish) -----	159 75		
Game farm earnings -----	8 50		
Inspection of crawfish -----	100 00		
Fishing licenses -----		\$780 00	
	\$4,996 50	\$780 00	\$5,776 50
April—			
Hunting licenses -----	\$5,324 95		
Fines (game) -----	708 82		
Fines (fish) -----	559 15		
Game farm earnings -----	41 95		
Inspection of crawfish -----	100 00		
Fishing licenses -----		\$6,117 50	
Fishing licenses, 1910-11 -----		7 50	
	\$6,734 87	\$6,125 00	\$12,859 87
May—			
Hunting licenses -----	\$2,459 70		
Fines (game) -----	328 68		
Fines (fish) -----	399 55		
Game farm earnings -----	12 15		
Inspection of crawfish -----	100 00		
Overpayment (M. Silva) -----	15 00		
Fishing licenses -----		\$4,177 50	
Fishing licenses, 1910-11 -----		2 50	
	\$3,306 08	\$4,180 00	\$7,486 08
June—			
Hunting licenses -----	\$5,972 75		
Fines (game) -----	74 75		
Fines (fish) -----	349 75		
Inspection of crawfish -----	100 00		
Fishing licenses -----		\$2,950 00	
	\$6,497 25	\$2,950 00	\$9,447 25
			\$201,996 01

The disbursements of the Board for the year ending June 30, 1911, are set forth in the following tables.

Warrants to pay all claims are drawn upon the State Treasurer and are paid from the moneys in either the "Fish and Game Preservation Fund" or the "Support and Maintenance of Hatcheries Fund," after having been approved by the State Board of Control and the State Controller. Duplicate copies of all bills presented are retained in the office of the Board.

The moneys in the "Fish and Game Preservation Fund" are derived from the sale of hunting licenses and the fines collected for violations of the fish and game laws. All the fines collected for violations of the commercial fishing laws are also paid into this fund. The moneys in the "Support and Maintenance of Hatcheries Fund," for the year ending June 30, 1911, consisted of \$20,000 appropriated by the Legislature in 1909, together with all moneys derived from the sale of commercial fishing licenses. As the Board did not ask for nor receive any appropriation from the last Legislature, the moneys in this fund will consist hereafter only of the amount derived from the sale of commercial fishing licenses.

STATEMENT OF DISBURSEMENTS FROM "SUPPORT AND MAINTENANCE OF HATCHERIES FUND," JULY 1, 1910, TO JUNE 30, 1911.

HATCHERIES:

Sisson:

Operating expenses—

Trout	\$5,528 86	
Salmon	12,376 48	
		\$17,905 34
Improvements		8 90

Tahoe and Tallac:

Operating expenses (trout)	1,462 88
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Waivona:

Operating expenses (trout)	204 73
Improvements	105 70

Eel River, Grizzly Bluff:

Operating expenses (salmon)	2,663 92
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San Francisco Office:

Chief Deputy	711 40
Clerks and assistant deputies in office	955 01
Office expenses	2,549 55

Los Angeles Office:

Clerks and assistant deputies in office	75 00
Other office expenses	177 89

Fresno Office:

Clerks and assistant deputies in office	300 00
Other office expenses	127 45

Fish Patrol (field deputies and launches):

San Francisco district	12,517 88
Los Angeles district	787 75
Fresno district	732 00
Cost of prosecutions	17 25
Fish distribution car	499 90

Field investigation relating to fish:

Salmon	1,639 38
Crabs	28 30

SPAWNING STATIONS:

Scott Creek:

Operating expense	244 90
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Snow Mountain Dam:

Operating expense	249 87
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\$43,965 00

STATEMENT OF DISBURSEMENTS FROM "FISH AND GAME PRESERVATION FUND," JULY 1, 1910, TO JUNE 30, 1911.

<i>San Francisco Office:</i>	
Chief Deputy	\$3,176 25
Clerks and assistant deputies in office	6,865 17
Rents, printing,* postage and other office expenses	9,849 65
<i>Los Angeles Office:</i>	
Clerks and assistant deputies in office	1,178 00
Rent, postage, and other office expenses	1,946 24
<i>Fresno Office:</i>	
Clerks and assistant deputies in office	1,817 85
Rent, postage, and other office expenses	395 45
<i>Fish and game patrol (field deputies):</i>	
San Francisco district	61,893 82
Los Angeles district	13,030 27
Fresno district	10,773 10
<i>Game Farm:</i>	
Operating expenses (wild turkeys and pheasants)	6,503 37
Game purchased (Hungarian partridges)	3,653 08
Improvements	649 19
Bounties paid on mountain lions	5,420 00
Commissions on hunting licenses sold by county clerks	12,432 43
Refunds to county clerks for overpayment on hunting licenses	154 00
Cost of fish and game prosecutions	7,475 10
<i>Field investigation relating to fish and game:</i>	
Relation of birds to agriculture	929 05
Salmon	2,178 45
Crabs	245 38
Clams	319 95
Publicity	474 07
SPAWNING STATIONS:	
<i>Sisson:</i>	
Operating expenses (trout work)	5,645 57
<i>Tahoe:</i>	
Operating expenses (trout work)	1,814 47
<i>Scott Creek:</i>	
Operating expenses (trout work)	233 35
<i>Bouldin Island Hatchery:</i>	
Operating expenses (striped bass)	71 69
Fish distribution car	2,688 08
Other distributions (pack trains in Sierra Nevada Mountains)	1,614 63
Launches and fish patrol	293 14
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	\$163,720 80

*Printing for all offices.

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