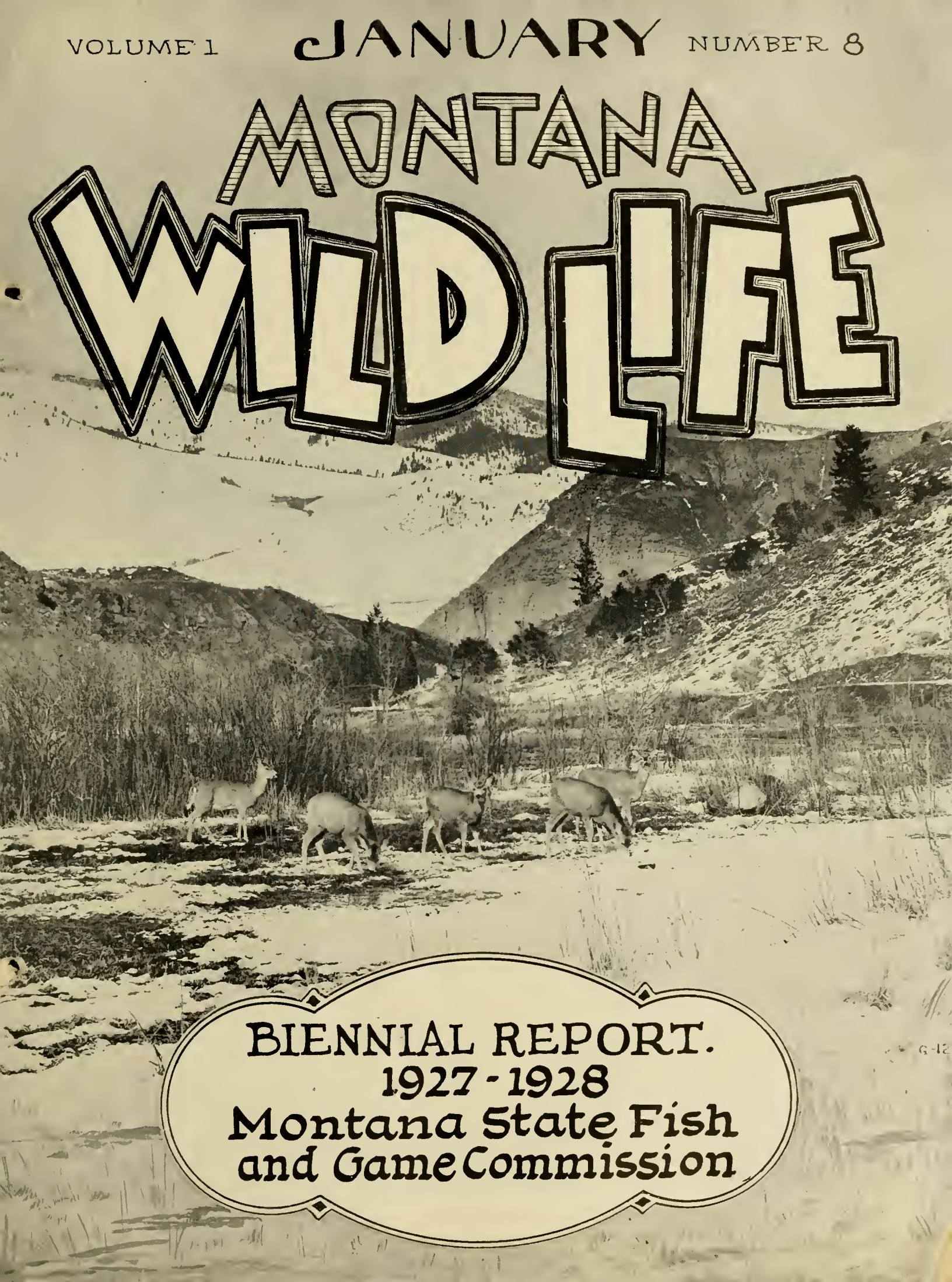
VOLUME 1 JANUARY NUMBER 8

MONTANA WILD LIFE



BIENNIAL REPORT. 1927-1928 Montana State Fish and Game Commission

Our Birthright

HOW long since you stood, bareheaded to the morning breeze, barefooted to the dewy grass, and heard the Bob White whistle in the stubble?

Or searched the scudding clouds above some inland lake, to see the "honkers" drive a mile-high wedge across the dawn?

Or stopped, heart-still, beside a silver birch, as suddenly some dappled patch of sunlight sprang to life and leaped away—a fawn in the spotted coat!

Or flattened yourself to drink deep of some liquid pool, and saw the brook trout dart all ways from the center of your cup?

Or pitched your tent on the bright carpet of a mountain flower field and looked out and up across endless terraces of pine and fir and hemlock, unslashed of woodman's ax, unscarred of fire?

The birds and streams, the lakes and woods, the heights and marshes, and all the lovely, harmless creatures that are native to them: these are Our Birthright.

Ours to see, to hear, to breathe, to explore—to have and to hold for ourselves and our children and our children's children. Our Country.

Is this only some fond rhapsody of fancy? Have these things not gone forever—vanished with the Redskin, the Pilgrim, and the Pioneer? Could this America ever be reality again?

It can be, and thousands of us are resolved it shall be. The ranks are open to all who would conserve all that is left of natural America, who would restore so much of what is gone. To every man who enters, the pledge is given of a new vision of his country: Our Country, of the fair, free beauteous Open, of "Thy woods and templed hills."

His Excellency,

J. E. Erickson,
Governor of Montana,
Helena:

The State Fish and Game Commission herewith submits the biennial report of its activities and achievements for 1927-1928.

MONTANA STATE FISH AND GAME COMMISSION

Thomas N. Marlowe, Chairman
J. L. Kelly W. K. Moore
E. A. Wilson G. T. Boyd
Robert H. Hill, State Fish and Game Warden

When There Was No Bag Limit in Montana

During the formative days of Montana before a State Fish and Game Commission existed, when bag limits were unknown and when wanton slaughter of wild life was the rule rather than the exception, such scenes as that shown above were the result. In this pile of meat are 35 deer, shot down in a small area in 1914—only 15 years ago. Hunting parties such as these, made up of both men and women, killed ruthlessly yet thoughtlessly. Today rigid enforcement of law, constant conservation and protection, have been the necessary result.

Here's another scene in a hunting camp of early Montana. There were no limits. Deer were shot by the wagon load. They threatened to go the way of the buffalo. Antlers for home or club adornment were often the sole prize taken. The coyotes got the rest. Montana's buck law is now being enforced in a gratifying attempt to replenish forests with deer that once roamed the state by thousands.

MONTANA WILD LIFE

The Official Publication of The State Fish and Game Commission

VOL. I. HELENA, MONTANA, JANUARY, 1929 NO. 8

Throwing a Lifeline to the Bass

By THOMAS N. MARLOWE, Missoula, Chairman, Montana State Fish and Game Commission

T. N. Marlowe
Chairman

WHILE conservationists throughout the nation are bending every effort to conserve forest lands in order that timber resources may be assured to posterity, and conducting campaigns to guard against inroads on various national and natural resources, the Montana State Fish and Game Commission, as a part of its vast program of protection and conservation of wild life within the state, is operating a fish reclamation factory in the Flathead country of which but few sportsmen know the workings. Back in 1921 the Department realized the precarious condition of bass and sunfish that had become landlocked and perished following the annual overflow of the Flathead river before reaching Flathead Lake.

Few Montana streams were stocked with these gamey fish. The old mill ponds of the middle west where children delighted to drop a pin hook baited with a bit of dough to lure a sunfish were missing in Montana.

Hence steps were taken that have resulted in reclaiming and saving to fishermen and children of the state nearly half a million bass minnows and more than a million sunfish during the last eight years in which the factory has been operating.

It's an interesting process—this business of rescuing fish lives.

Each spring the waters of the Flathead spread out over a large area near the mouth near Big Fork, above Kalispell.

The waters back up and fill pockets and marsh land potholes. During the spring the adult bass and sunfish go up the river from the lake and deposit their spawn in this backwater. In the warm waters of the little pools the spawn develops. Then the water recedes, leaving the bass and sunfish minnows landlocked. When the summer sun causes these pockets to dry up, the little fish had been left to perish.

Hence, the State Fish and Game Department devised ways and means of saving them. The adult bass remain in the ponds just long enough for the eggs to hatch, after which they return to the river.

In these pockets is a heavy growth of moss and weeds. Fish experts in the employ of the Commission don hip boots and, armed with scythes, wade into the ponds and cut down the grass and weeds. The grass is then piled with forks. This step is taken to prevent young bass and sunfish from hiding when the reclamation process starts.

Gasoline pumps with long extension pipes are used in the entire process. The pumps first reduce the water to enable cutting the weeds. Two ditches are then dug through each pond, crossing at angles with the cross at the lowest point. The pumping process continues until all the minnows are in the ditches.

The night before state fish experts prepare to take out the minnows the pond is pumped as low as possible and in the early morning the little fish have congregated in the deepest holes in the ditches.

The neck of one of the ditches extends to a trough about 30 feet long to the pump. A screen at the end is placed close to the pump to avoid possibility of any minnows being drawn into it. About four feet back of the head screen is a V-shaped screen forming a trap. While the pump continues in action a current is created drawing the little fish through the V-trap where the minnows are removed to cans with the aid of a dip net.

The cans are then burried to the hatcheries where the minnows are retained a short length of time and then transferred to streams and lakes throughout the Treasure State.

Hence, thousands of fish that in former years were allowed to perish in landlocked ponds are now being reclaimed and saved through activities of employees of the State Department. This work is now in charge of M. L. Matzick, foreman at the Somers hatchery.

The bass and sunfish rescue work was started in 1921. The records of eight years ago show that 178 adult sunfish were rescued and 4,500 bass saved that year.

In 1922 the total of 56,000 bass and 8,000 sunfish were planted in Lake Helena.

In 1923 the fish experts rescued 16,000 bass and 22,000 sunfish.

In 1924 a total of 5,200 sunfish and 48,000 bass minnows were rescued and distributed as follows

	Sunfish
Rosebud county	2,000
Lincoln county	3,200
	Bass
Lake county	10,000
Fallon county	10,000
Pondera county	5,000
Flathead county	5,000
Lincoln county	18,000

1925

	Sunfish
Chouteau county	12,000
Lincoln county	153,250
Lewis and Clark county	4,000
Flathead county	60,000
Big Horn county	30,000
Lake county	3,000
	262,250
	Bass
Lincoln county	17,000
Lewis and Clark county	3,000
Lake county	6,000
Flathead county	2,000
Pondera county	4,000
Glacier county	8,000
	40,000

1926

	Sunfish
Blaine county	60,000
Hill county	60,000
Lewis and Clark county	60,000

BASS AND SUNFISH RECORD

DURING the last eight years conservation activities sponsored by the Montana State Fish and Game Department have resulted in the reclaiming of 406,800 bass minnows and 1,133,628 sunfish from the landlocked pools created by the overflow of the Flathead river and transplanting them in streams and lakes throughout the state. Here's the record of achievements:

	Bass	Sunfish
1921	4,500	178
1922	56,000	8,000
1923	16,000	22,000
1924	48,000	5,200
1925	40,000	262,250
1926	200	370,000
1927	53,000	315,000
1928	189,100	151,000
Totals	406,800	1,133,628

Flathead county	90,000
Chouteau county	60,000
Fallon county	30,000

Bass

Fallon county	200

1927

Sunfish

Teton county	20,000
Lewis and Clark county	30,000
Lake county	75,000
Lincoln county	40,000
Blaine county	30,000
Flathead county	120,000
	315,000

Bass

Teton county	10,000
Flathead county	6,200
Lake county	1,000
Lewis and Clark county	30,000
Toole county	3,000
	53,000

1928

Sunfish

Flathead county	150,000
Lincoln county	1,000
	151,000

Bass

Missoula county	135,000
Granite county	30,000
Jefferson county	2,500
Lake county	10,000
Lincoln county	5,000
Teton county	1,000
Lewis and Clark county	3,000
Flathead county	2,500
	189,000

STRANGER THAN FICTION

Jane: Do you mean to say that you flirted with your wife all evening at the masked ball and didn't know her?

Paul: That's right. But she was so agreeable—how was I to know her?

Four Hands Full of Nails

Baby mountain lion snapped by a venturesome hunter in Lincoln county, Montana.

CLOSE QUARTERS

Slim: I was shipwrecked once and lived for a week on a can of sardines.

Jim: You didn't have much room to move about, did you?

FISH AND GAME LAW VIOLATIONS—1927-1928

	1927	1928
Alien in possession of firearms without a license	14	11
Catching over the limit of game fish	3	2
Catching more than 5 fish under 7 inches in length	9	2
Destroying evidence of sex of deer	1	.....
Dumping refuse in stream	1	1
Destroying wild duck nests	2	1
Fishing without a license	48	68
Fishing through the ice	.....	5
Fishing in closed streams	24	20
Fishing during closed season	9	12
Fishing with more than 1 pole, line and hook and set line	6	5
Having over the limit of grouse	.....	1
Hunting without a license	19	16
Hunting on game preserve	2	3
Illegal possession of beaver hides	11	11
Hunting deer with dogs	.....	1
Killing a moose	4	.....
Killing elk out of season	8	4
Killing deer out of season	19	20
Killing grouse out of season, prairie chickens, etc.	6	11
Killing Hungarian partridges	.....	7
Killing ducks out of season	1	6
Killing doe deer	6	2
Killing deer with horns less than 4 inches in length	2	1
Killing more than one deer	.....	4
Killing mountain goats and sheep	.....	3
Killing antelope	6	2
Killing wild geese out of season	.....	1
Killing swan	3	3
Killing Chinese pheasants	.....	10
Killing elk before legal hour in Park Co.	15	.....
Killing grebe	.....	1
Killing golden plover	.....	1
Making false statement in application for a license	23	29
Opening muskrat houses	2	1
Possession of a seine without a license	7	1
Seining fish without a license	6	.....
Salmon eggs, fishing with same	4	5
Snagging fish	3	.....
Selling game fish	.....	2
Shipping furs from state without a permit	14	43
Shooting ducks after sunset	25	9
Shooting ducks out of season	2	.....
Shooting ducks and geese before half hour before sunrise	.....	3
Selling elk meat	1	.....
Selling bear meat	3	.....
Shooting sea gulls	1	.....
Trapping fur-bearing animals out of season	8	6
Trapping fur-bearing animals without a license	8	36
Trapping beaver without a permit	15	28
Trapping bear	1	.....
Trapping marten	1	1
Unlawfully shooting from automobiles	.....	1
Unlawful possession of mountain sheep head	1	.....
Unlawful possession and transportation of moose	.....	1
Using explosives to kill fish	.....	1
Refusing to show license on demand	1	.....
Using artificial light for hunting	.....	2
Total law violations	345	407

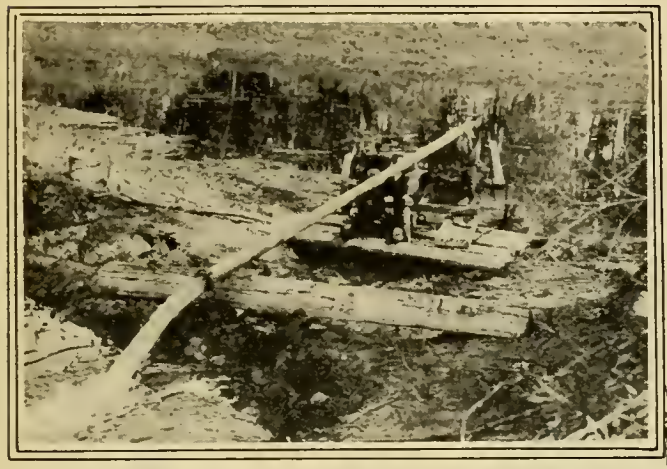
VIOLATIONS BY COUNTIES

	1927	1928
Beaverhead	22	28
Big Horn	9	14
Blaine	3	2
Broadwater	1	3
Carbon	9	9
Carter	.....	2
Cascade	2	3
Chouteau	.....	3
Custer	3	2
Daniels	1	.....
Dawson	.....	.....
Deer Lodge	29	10
Fallon	1	1
Fergus	10	12
Flathead	19	25
Gallatin	19	18
Glacier	4	3
Golden Valley	7	2
Granite	3	5
Hill	2	4
Jefferson	5	1
Judith Basin	10	6
Lake	13	27
Lewis and Clark	16	8
Liberty	1	.....
Lincoln	20	33
Madison	8	16
Meagher	1	3
Mineral	5	5
Missoula	19	27
Musselshell	5	1
Park	22	12
Phillips	.....	6
Pondera	2	5
Powell	8	4
Petroleum	.....	3
Ravalli	8	10
Richland	1	2
Rosebud	.....	2
Roosevelt	4	5
Sanders	3	17
Sheridan	4	12
Silver Bow	6	13
Stillwater	6	10
Sweet Grass	1	1
Teton	4	1
Toole	.....	2
Valley	2	9
Yellowstone	27	20
Total	345	407
Total amount of fines imposed	$9,929.00	$12,422.70
Total number fines assessed	304	352

During 1927, in the 345 violations of the fish and game laws there were 304 fines assessed, 2 jail sentences were given, 6 were found not guilty, 24 were dismissed, 2 were committed to the asylum and 7 were dismissed because defendants were under age.

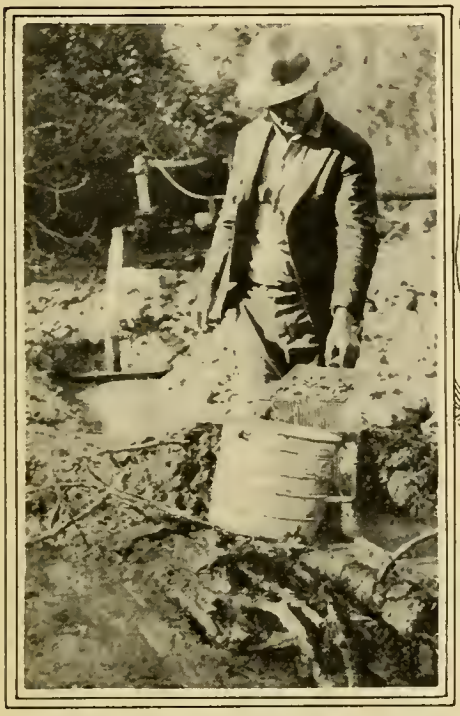
During 1928, in the 407 violations of the fish and game laws there were 352 fines assessed, 4 jail sentences were given, 17 were found not guilty, 23 were dismissed, 10 cases are pending and 1 case was dismissed because defendant was under age.

SAVING THE BASS

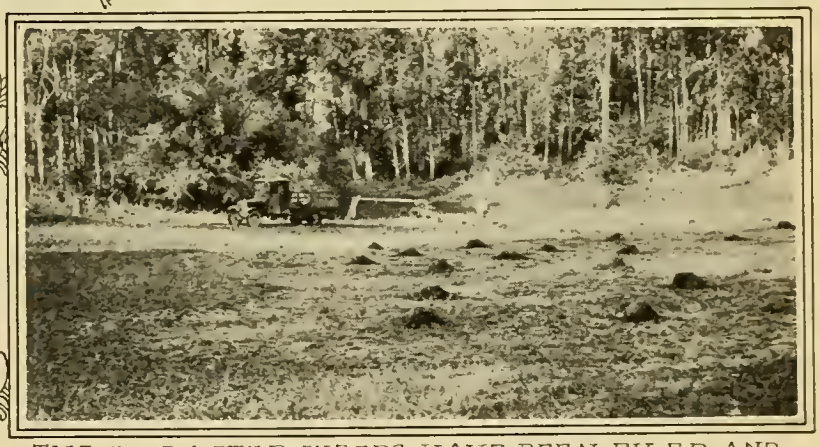


THE PUMP IN OPERATION.

FISH ARE ALL IN THE TROUGH AND ARE DRAWN INTO TRAP BY SUCTION OF PUMP 100,000 BASS TAKEN FROM POND IN 1928

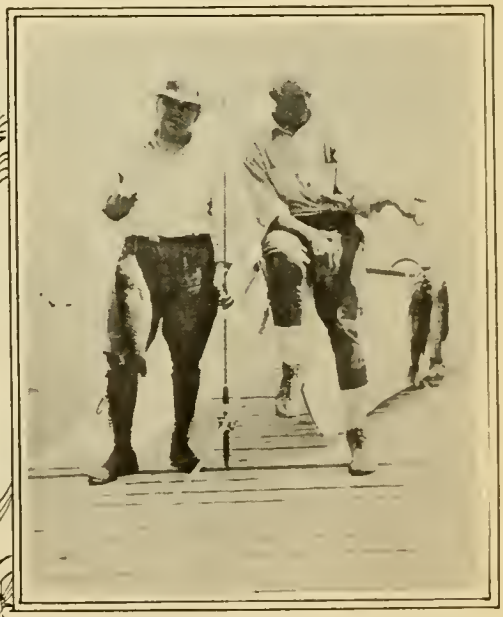


DIPPING OUT FISH AFTER MOST OF WATER HASBEEN PUMPED OUT.



THE POND AFTER WEEDS HAVE BEEN PILED AND MOST OF THE WATER PUMPED OUT.

DIPPING BASS OUT OF THE POND.



T. N. MARLOWE AND DR. L. H. TRECE WITH CATCH OF FLATHEAD RIVER BASS.

Saving Montana Fish and Game

By ROBERT H. HILL, State Fish and Game Warden

R. H. Hill

IN THIS progressive age of constructive endeavor, when the nation is enjoying its greatest era of prosperity, when millions are being expended in the construction of better highways and when all about us we see the march of commercial progress, it is well that we give a thought to the future. Montana, the Treasure State of the nation, with its area of 90,000,000 acres, only half of which is classed as agricultural land, has gained recognition among sportsmen of the nation for its fish and game.

Critics have been free to assert that the man who expounds the cause of conservation, whether of the wilderness or of the forest, is a reactionary. Short-sighted wielders of vitriolic pens have persisted in declaring conservationists as stumbling blocks in the path of progress. Yet thinking men of the nation, with especial regard to sportsmen who have devoted years to a study of game conditions of the future, realize all too well the looming destruction and devastation impending in the west.

In referring to the wilderness, please do not understand that only the deserts and mountainous rockpiles are concerned. I mean to include all that portion of our commonwealth which has not yet been claimed by man, whether it be forest reserves, game preserves, the open plains where once the antelope and buffalo roamed by the thousands, and brooks and streams that have as yet to be divested of their original wildness.

Montana and the entire west has enjoyed its greatest season of motor tourists during the last summer. Thousands have driven through and camped in our playgrounds. Wherever a road wends its way along a babbling brook or a trout stream, there the treadmarks of automobile tires may be found. There the charred embers of campfires tell the story of vacation days well spent. We have opened our hospitable arms to these tourists. We have shared our best with them on the theory that they have all been sportsmen at heart and that the creed that binds us together would be obeyed. It is gratifying to note that the majority of these motorists have been true to the commandments of the sportsman. The forest ranger and the game warden can best report on those who have been derellet in their duty and unmindful of their trust.

America recognizes the Northwest as the playground of the nation. If we wish to retain this identity we must take steps to conserve the wilderness for future generations. Conservation under proper regulations is absolutely mandatory.

Montana is in the midst of a federal aid highway construction program that means the expenditure of millions of dollars. We need the roads. Yet, sportsmen who are watching these highways cutting through formerly impenetrable areas, opening them up to indiscriminate hunting and fishing, are beginning to lean back in their chairs and wonder just how to cope with the problem. It does not particularly affect their own welfare as sportsmen, but it is a vital subject for the sons growing up in the coming generation.

I have in mind our own Madison river, the stream that has gained fame throughout the nation as the fisherman's paradise. It is one of the three streams, the Madison, Jefferson and Gallatin, that go to make up the mighty Missouri. Today it is reached by dyed-in-the-wool fishermen who are willing to pound their cars over roads that wrack machines, tire out drivers and make the going tough. The angler who calls it a good time to sit in the front seat of his limousine and cast into a brook, shuns the Madison because of the rough roads. Yet, because of the highway leading into the Madison country, farsighted sportsmen are beginning to realize the necessity of protecting that wonderful stream for future generations. It has been well said that the small cars have ruined fishing in the Northwest. Proper conservation and faithful stocking can yet save it by stringent regulations.

The same statement may be made of the Forest Service. Let me say right here that it has been my experience as head of the State Fish and Game Department of Montana that men who wear the insignia of the United States Forest Service are true friends of the men who are enforcing the fish and game laws. They are stalwart defenders of the cause and their cooperation is one of the finest elements entering into game law enforcement. Yet, despite the fact that I may be called a reactionary in making the statement, it is a fact that foresighted sportsmen of Montana and other Northwestern states wherein are forest reserves rightfully complain when virgin areas of timber which are the haunts of game are opened to indiscriminate hunting and fishing and grazing by cutting of new trails. It is a thought that should be paramount in our minds that these areas be kept untrammeled. It is a duty we owe to our sons and grandchildren.

Big game quickly learn to recognize areas in which they are protected. One has only to watch proceedings around the border lines of our national parks at Yellowstone and Glacier. It is seldom that deer and elk stray from these sanctified areas except during the severe winter when the elk are forced out for feed. Sportsmen who view this problem through unselfish eyes agree that the creation of more of these preserves are a necessity.

It has been comparatively few years since the forest reserve idea was a national issue. Lumbermen declared the creation of these industrial reservoirs would destroy their business and their institutions. Yet the industry was making such inroads on national timber resources that consumption threatened to pass production. Today these same critics of a few years ago are earnest devotees of the cause of forest conservation. And so it must be with the wilderness that is left. We must adopt methods that will preserve wild life that is left.

One of the first things impressed on the minds of our sons when we teach them the elements of sportsmanship is the conception of a forest as a community of living things. The conception is not only that of living trees, shrubs, toadstools, mosses, flowers and vines, but birds and animals as well. There is something artificial and dead in a bit of woods or plain that does not have the sound of whirring wings, the movement, color and atmosphere of wild animal life. Yet critics tell us that conservation movements are viewed through the window of the cash reg-

LICENSES HIT RECORD

DEMANDS being made upon Montana's fish and game resources are reflected in convincing manner in the increased demand for hunting and fishing licenses among residents and particularly among tourists. Resident licenses for 1928 have established the new high mark of 75,063, the greatest number ever purchased by sportsmen of the state in any year since the department was created. Increased demands for licenses means that additional courageous vigilance must be maintained in law enforcement and in restocking the streams and forests. Last year was likewise the heaviest tourist travel year, there being 4,335 non-resident fishing licenses sold. The total is not yet complete, many stubs being in the hands of dealers. Total figures gleaned from official reports follow:

	Resident Licenses	Non-resident Fishing
1916	69,466	1,082
1917	72,113	1,012
1918	42,744	741
1919	70,429	252
1920	52,751	1,305
1921	59,348	1,879
1922	50,508	1,620
1923	64,202	2,193
1924	56,113	2,064
1925	73,042	3,369
1926	71,249	3,133
1927	67,083	3,320
1928	75,063	4,335

ister. They may call us theorists or idealists if they like, yet it will require only a few years more to find them heartily and enthusiastically aligned with our cause.

Joseph Grinnel, professor of zoology of the University of California, one of the most eminent naturalists of the nation, has well said, in reference to the groups of factors necessary to the successful existence of game animals: "Presence of safe breeding places, adapted to the special needs of animals, presence of places of temporary refuge during day and night or while foraging, when hard pressed by predatory enemies or correlated with the inherent powers of defense and concealment"—and these are the spots in the wilderness that demand conservation.

Wild animal life must have breeding places, shelter and food. The forest in many of its forms provides this. An overlooked opportunity in improving these conditions through setting aside the wilderness is the appeal to the average man's love of sport and instinct.

Private duck clubs are taking up so much of the shore lines in Montana that our State Fish and Game Commission has established a precedent in buying up areas whenever available to be later used for public shooting grounds.

We owe it to future generations to take immediate steps to conserve the wilderness, the unsullied places, the fish and game havens, in order that one of our greatest state and national assets may not dwindle and perish through lack of concentrated endeavor.

Bozeman Has Game Refuge

By H. B. FOOTE, Sanitary Engineer, State Board of Health

H. B. Foote

DURING the fall I had occasion to make a two day inspection trip by horse over the watershed of Bozeman (Sourdough) creek, from which the city of Bozeman secures a part of its water supply.

This catchment area is probably 35 square miles in extent, of typical Montana forest covering, well watered. It is unique in Montana in that it is "closed" to all visitors, human habitations, and stock grazing for the prevention of pollution of the waters.

I have been into this area on several occasions and for various reasons since 1915, and have observed conditions during the period before the closing and afterward, and am thus in position to compare them "before' 'and "after."

While the road has never in my experience been passable for autos, it has been for teams, but now all the bridges are gone and it would be a very arduous and clever task to drive a team with wagon as far as Mystic Lake, seven miles from the mouth of the canyon.

The vegetation is heavy, wild fruits are abundant, and there is ample evidence of wild life along the stream and in the forest. We of the inspection party saw several deer, and in small lakes hidden away among the trees are countless fish. Beaver also are at work.

While I am not an especial student of wild life, my observations lead me to suspect that this area, under the "closed" administration, is becoming a real refnge for wild game and in effect a reservoir for wild life, from which bordering areas may derive benefit as fish, deer and birds find their way ont of it.

There is a distinct benefit derived from the exclusion of people from Bozeman creek in that pollution of the waters is avoided and I believe that lovers of wild game and those interested in their protection can be assured of a distinct benefit in that respect also. While there has been in the past, and may yet be, some feeling of injury on the part of a few residents of Bozeman because they are deprived of this area for recreation, it seems to be that the exclusion of all visitors and stock produces conditions which far offset their loss.

At the World's Largest Spawn-Taking Station

MONTANA'S fish culturists are aiding nature in providing spawn for the restocking of depleted streams. This picture was taken at the Flint creek spawn-taking station on Georgetown Lake, near Anaconda, Montana, which is recognized as the largest station of its kind in the world. Here millions of eggs are artificially taken from the thousands of trout that are caught in the traps at the mouth of the creek in their attempts to reach the headwaters to spawn. Fish experts in the water up to their waists are here shown transferring "green" trout to an adjoining pond to await the "ripening" period when the eggs are removed by artificial means, sorted, graded, placed carefully in cans, rushed to the hatchery at Anaconda at a cool temperature and then immediately distributed to the 14 hatcheries operated by the State Fish and Game Commission. The female trout, after the spawn is removed, are returned to the waters of the lake, free from injury, while the eggs are artificially hatched after being fertilized by like artificial means.

The Buck Law and Its Benefits

By WILLIAM K. MOORE of Billings, Member Montana State Fish and Game Commission

W. K. Moore

SPORTSMEN throughout Montana who have watched the operation of the law that forbids killing of female deer, with the exception of a few localities, and allows but one buck deer with horns more than four inches in length to to be killed by each hunter, generally favor the continuance of its operation. Enforcement of the law has produced deer where they have been practically exterminated. While many hunters who failed to kill a buck during the last season when snow was scarce tell of seeing many does, they are quick to acknowledge the fact that men who hunt for sport's sake appreciate the cunning of the buck and the difficulty of bagging him when natural conditions are in his favor.

The buck law and activity of predatory animal hunters have been principally responsible for the increased number of deer in Montana forests. In localities where deer are so plentiful that they may not have enough winter feed it might be advisable to open the season on the females, but this situation is rare in Montana.

Aside from its benefits to the deer herds, the buck law has been of value in educating hunters. When a man must stop to scrutinize the head of a deer for visible horns, he is not liable to pot shoot another hunter by mistake. Many sportsmen have asked that the season on deer be set at a later date in order to take advantage of the snow. They complain that many deer have been wounded and lost during the last season because of the inability to track them.

Deer are growing so numerous in some of the forests that there is danger of starvation, according to officials of the Forest Service of the United States Department of Agriculture.

The annual game census of the service indicates that the number of deer on the forests is increasing in spite of the fact that except on certain areas set aside as game refuges the only restrictions upon hunting are those imposed by state game laws.

The Forest Service holds that the logical remedy is the development of game management plans. The basic principle of these plans is to establish and maintain a balance between the number of animals and their food supply.

In a state of nature such a balance is automatically maintained, say the forest officers, largely through the check imposed by wolves, mountain lions, lynx, and other animals that prey on the game. Man has greatly reduced the number of such killers. This leaves as the chief natural check the factors of famine and disease.

A given land area under given conditions, it is pointed out, can grow only a certain quantity of game feed. The quantity available varies with the season. Thus when an excessive number of animals are seeking sustenance a short forage crop or an extra hard winter results in undernutrition, increased susceptibility to disease, and a struggle for life under which the weaker animals often succumb in large numbers.

The most acute situation on any national forest is on the Kaibab, in northern Arizona. The deer herd on this forest, containing more than 28,000 head, has outrun the food supply so far that fawns born the previous year have died, and many of the other animals as well.

Under a game management plan the aim would be to prevent overcrowding by finding out how many deer or elk the available land will carry permanently, and varying the amount of hunting permitted so that the herds of game will be kept at this number. Stable in place of fluctuating herds would mean a constant stock of breeding animals, would permit of utilizing the increase for food, and would prevent the decline in the productive capacity of the land which overgrazing—whether by domestic livestock or game herds—inevitably produces.

Twenty years ago the deer in Pennsylvania forests were so reduced in numbers that stock was imported from other states and planted in various sections where these animals had entirely disappeared. There were probably not over 1,000 deer in the entire state. Now they number many thousand and Pennsylvania has not had a closed season on deer at any time during that period.

Innocence Abroad

This astonishing result has been brought about by protecting the brood stock. After much preaching, many discouragements and bitter opposition, John M. Phillips and his devoted associates secured the enactment of a buck law in 1907, which has been on the statute books ever since. This protection has been supplemented by the establishment of many of the famous Pennsylvania game sanctuaries surrounded by public shooting grounds.

That the Pennsylvania Game Commission should have found it necessary this year to make a regulation protecting bucks and permitting the killing of adult does only is a most astonishing fact but it appears to have been necessary for the reason that female deer have increased to such numbers that the food supply for them in their accustomed ranges has become exhausted and serious losses by starvation have occurred.

The surplus stock of deer, it appears, does not occur in all parts of the state by any means but is apparent in several counties. It has been suggested that deer might be captured and distributed more widely but any one familiar with the difficulty of capturing wild deer will appreciate the impracticability of such a remedy. It is also an unfortunate fact that deer do not range widely from their accustomed habitat and will not scatter enough to really relieve the congestion. Another troublesome factor is that as the does and young deer have become more abundant and their food scarcer they have invaded the orchards and fields of farmers and have become a menace to the agricultural interests of certain localities. Beginning in 1923 the Game Commission of Pennsylvania, realizing that over-population of deer was threatening, began to consider plans for controlling the supply. It is possible that had occasional killing of female deer in the more congested areas been permitted from that time on the present situation might not have developed.

After the Morning Flight

Bud Fischer, his dog pal and a beautiful limit bag of geese killed near Polson. Photo by Deputy Game Warden J. F. Goldsby.

Test Net Brings Up a Million

This unusua. snapshot. taken by Deputy Game Warden J. F. Goldsby, shows the result of a single dip of a test net lowered in the Nine Pipes reservoir. The State Commission has been planting warm water fish in this reservoir. In an effort to ascertain the result of experiments the nets were used in various spots in the reservoir. In this lift were bass, sunfish, catfish, native trout, squawfish and suckers. The 75-foot net revealed gratifying results.

Autobiography of a Worm

I AM of German descent. Worm history records the migration of our race to these grounds in the year 1521, when men assembled for the Diet of Worms in Germany, writes H. P. Dowler of the angleworm in Outdoor America.

My early education was not neglected; I was well grounded in many subjects for I always went to the root of things. I soon advanced to the position of cashier in a clay bank which adjoined a school of fish. One day I stuck my head out of the bank and each fish in the school wanted me to enter their anatomy course, saying I would pass through and come out into the world with a fertile mind, and body. They knew for they had digested similar subjects. I never took any worm medicine for it would not cure my ailment, which is curvature of the spine. I completed a course in vocal training and often sang my favorite so-low, "Massa's in the cold, cold ground."

I am not in sympathy with the Rockefeller method of abolishing the hook worm. They should begin at the source and abolish only the hook, it would be more to the point and could be straightened out, provided they could get a line on it. Just seems to go right through me when I see a fish hook. Eaters of fish should catch them on the fly.

We do not hold measuring worms in high esteem for they double up and give us short measure. We prefer to have our measuring done with a tapeworm. Had a deal on one time with another worm and I intended to pull his leg, but discovered it was a 100-legged worm and I didn't have enough pull.

In my youth I was fond of the sport called "tug of war." We always played against birds; they would try to pull us out of a hole and we would try to pull them in. The birds never won unless we were all in, with over-exertion. Worms like birds and often feed them.

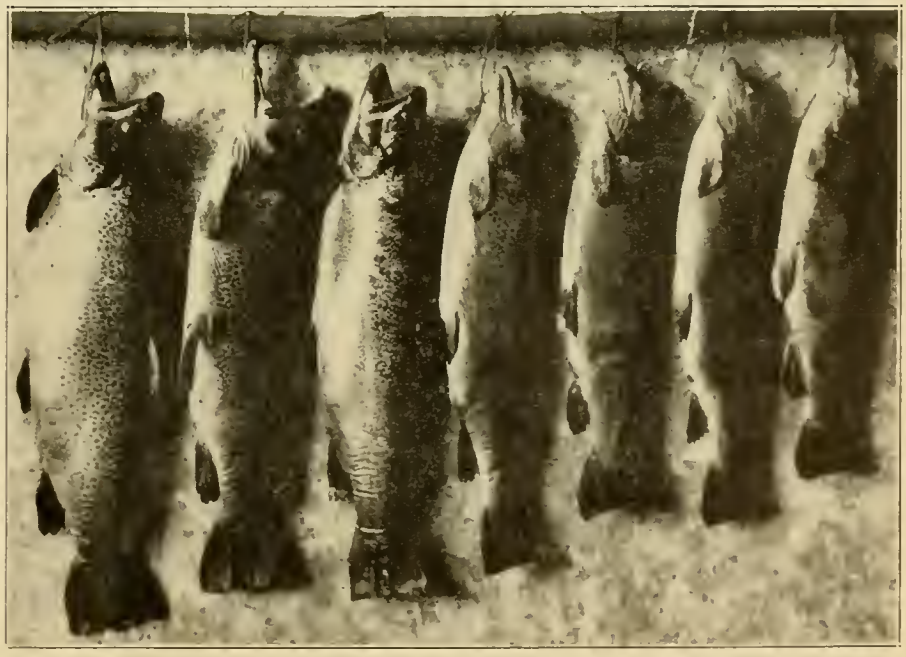
Early in life I took to drinking and when I got canned it seemed I always went fishing with some man, but fortunately for me, the man usually got canned up, too, when fishing, and when he, nervously, tried to bait me on so he could throw his hooks into me, I fell from grace to the ground as he uttered a cuss word. Drink never went to my head, too far to go. Once I got caught with a hook that passed through my appendix, then I flew through the air, landed on the water, sank down to the bottom, came up in a sucker, felt like a Jonah and escaped when the man cleaned the fish. Some experience for an innocent young worm.

I was not what you would call a good worm; spent too much time in the bright light districts where the glow worm maidens would dance the crawl with me.

In my mature years I have followed but one course in life; not the straight and narrow path, only the narrow. I could never hold any position for any length of time, possibly because I always laid down on the job. I never prospered, but was always in the hole. Seemed that whenever I could see daylight ahead, a bird would present its bill and I would go in the hole again. Could never get on my feet.

HUMANITY massed is a hateful thing,
Despoiling the fair green earth;
And God sends His rain to wash it clean
And give it a fresh new birth.

Beauties from the Boulder River



This string of speckled Montana beauties was hooked on flies in the Boulder river, five miles south of Big Timber, Mont. The photograph was taken by P. W. Nelson, veteran deputy game warden of the staff of the State Fish and Game Department.

Have You Hooked Your 370 Fish?

G. T. Boyd
Commissioner

ONE of the outstanding achievements of the Montana State Fish and Game Commission during the last five years has been the extensive program of hatchery operation which has made posible the liberation of a total of 207,800,843 game fish or approximately 370 fish for every man and woman enumerated in the census of the State of Montana. Figures of the Department of Agriculture show that Montana's population at the start of 1928 was estimated at 546,000. Have you hooked the 370 planted for your personal benefit in the campaign of restocking in which the Commission is engaged? During the last biennium alone the Department has made possible the planting of 85,834,026 game fish in lakes and streams of the Treasure State, with the assistance of cooperating hatcheries at McAllister, Columbia Gardens and Divide. Of this total plant, the 14 state hatcheries produced 52,285,185 fingerlings.

These figures have been compiled in no haphazard manner. They are taken from the actual count made daily by hatchery superintendents and compiled at headquarters at Helena where a constant check is made of the work of each fish factory operated in the state. The fingerlings, of course, are not counted separately. They are measured so many to a container and then the containers counted. Experience has shown that fish may be counted in this manner with comparative accuracy.

During the 1927 season a total of 22,678,418 native trout were planted in Montana streams, while in 1928 the total dropped to 18,666,908 because of causes outside the control of man. The spring was cold and late and trout failed to start to spawn until after the opening of the fishing season. This, of course, necessitated a small egg-take. To enable attaches of the Department to secure sufficient eggs by artificial means to keep the 14 hatcheries operating, the Commission closed Georgetown Lake for a period of 30 days after the start of the fishing season.

The spawn-taking station at the mouth of Flint creek at Georgetown is conceded to be the largest plant of its kind in the nation. It is under the supervision of Dr. I. H. Treece and his hatchery staff.

During the 1927 season the plant of rainbow trout eggs reached 5,617,477, while in 1928 the total was 4,801,002.

Eastern brook trout planted in 1927 totaled 2,843,326 and in 1928 the plant was 1,734,500. Some Montana sportsmen have declared war on this gamey trout because of his habits and the manner in which he lords it over all other trout in the neighborhood.

Salmon planted in 1927 totaled 466,897 and in 1928 the figure reached 326,775. The Commission was able to secure a supply of these eggs from eastern hatcheries in exchange for Montana eggs.

The plant of loch leven trout reached 1,533,200 in 1927 and in 1928 it was 2,167,191.

The plant of grayling, the pride of Montana's game fish to many sportsmen, was heavy during the last biennium. In 1927 a total of 12,495,000 was planted while in 1928 the plant reached 9,950,000. These eggs are hatched in a series of battery jars where a stream of flowing water keeps them constantly agitated.

The plant of Lake Superior whitefish such as are making Flathead Lake popular for commercial fishing reached 2,791,400 in 1927 and in 1928 totaled 1,022,480.

The planting of bass and sunfish concluded the total.

Modern equipment perfected by the State Department has made the planting and transfer of fingerlings more efficient during the last biennium. Speedy motor trucks hurry the cans of fish to the headwaters of tiny streams and rivulets. The fingerlings are kept at a normal temperature while being

THE FIVE-YEAR RECORD

DURING the last five-year fish-planting program, the 14 hatcheries operated by the State Fish and Game Department, working with the three cooperating hatcheries, has liberated a total of 207,800,843 game fish for the maintenance of the sport for anglers of Montana and the nation. Here's the record:

1924	24,471,098
1925	38,985,517
1926	58,510,202
1927	46,823,070
1928	39,010,956
Total	207,800,843

Because of the unsatisfactory weather conditions, bringing about late spawning, the egg-take at the Flint creek station and other spawning grounds was light in 1928.

Distribution Report of All Hatcheries for the Year 1927

Hatcheries	Natives	Rainbow	Eastern Brook	Salmon	Loch Leven	Grayling	L. Superior Whitefish	Bass	Sunfish	Total
Big Timber	3,626,424	470,315	275,000	22,800	624,000					5,018,539
Emigrant	2,035,650	209,533	288,026	43,750	327,200					2,904,159
Great Falls	1,198,750	491,000	175,100	35,567	582,000					2,482,417
Lewistown	1,172,820	80,000								1,252,820
Red Lodge	942,000									942,000
Total										12,599,935
Anaconda	2,560,000	206,801	1,130,000	83,800		8,535,000				12,975,601
Somers	1,799,650	811,260	471,200	27,440		1,960,000	2,791,400	53,200	315,000	8,229,150
Hamilton	1,920,000		504,000	53,500						2,477,500
Missoula	2,147,000	228,500								2,375,500
Libby	788,800									788,800
Rock Creek	795,220									795,220
Station Creek	888,868									888,868
Ovando	1,125,640									1,125,640
Ronan	1,142,596	689,220		200,040						2,031,856
Total										31,688,135
*McAllister	535,000					2,000,000				2,535,000
*Columbia Gardens										
Grand Totals	22,678,418	5,617,477	2,843,326	466,897	1,533,200	12,495,000	2,791,400	53,200	315,000	46,823,070

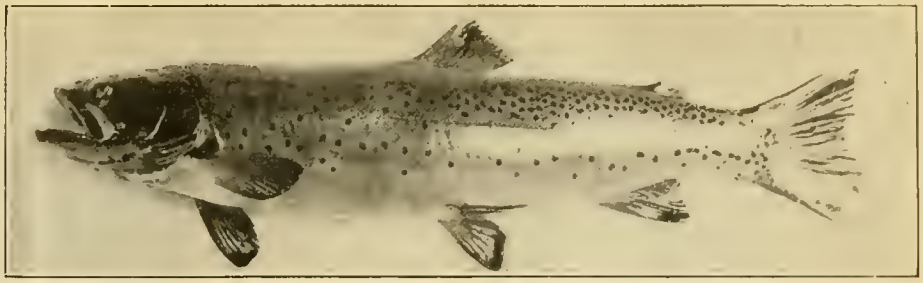
*Cooperative Hatcheries.

carted over the road, they are planted in water of the same temperature after tests have been made by state experts and only a few in a million are lost between the hatcheries and the planting grounds.

After entering the runways at the Georgetown spawning station, which provides the greatest number of eggs, the trout are seined carefully and placed in handling traps. The cool waters of Flint creek flow through these traps and the milling thousands of trout are kept in their natural conditon. Two to four men experienced in the work are stationed at each handling trap and thousands of visitors are annually attracted to the spot to watch the interesting operations.

The workers don waders and slickers, wear a woolen glove on their left hand to hold the trout and walk right out among them. The trout are placed in a handling box with the big dip nets. The expert reaches into the box, grabs a female with the gloved hand, holds the fish by the head, swings the tail under his arm, gently bends the head backward toward the tail and, if the trout is in proper condition for spawning, the eggs are brought forth by stripping and caught in a prepared pan.

When a quart of eggs has been collected a male of the same species is caught and milt for fertilizing the eggs is stripped into the pan. Experts stir the eggs thoroughly with their fingers, mixing them with the milt. The eggs are then washed and placed in cans.



Another Montana Beauty

Dr. Treece estimates that under natural spawning conditions only about 10 per cent of the eggs hatch, while under artificial or hatchery methods more than 80 per cent hatch and are later developed for planting in Montana streams.

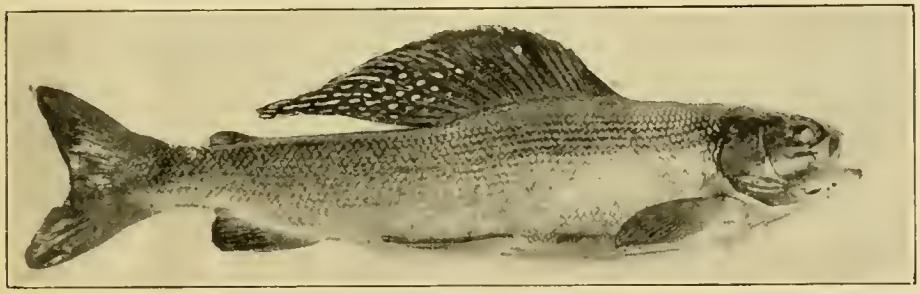
Immediately after each take is completed and the traps are emptied, with the trout being returned to the lake and their native haunts, the eggs are placed in cooled, specially constructed trucks built for the State Commission and rushed to the hatcheries by express.

Upon receiving eggs at a hatchery the first step taken after unpacking is to ascertain the temperature. Then follows the slow raising of the temperature. After the eggs are tempered they are put in baskets or stacks of trays to eye or hatch.

There are two stages of eggs, green and eyed. Green eggs are those which have been fertilized, but in which the incubation period has not started. Eyed eggs are those which have been incubated to a point where the embryo is well defined and the eye spots are plainly visible. If the eggs are green and in water of an average temperature of 50 degrees, it will take from 14 to 18 days for them to become eyed.

They are then syphoned out of baskets into a tub or bucket for the purpose of giving them a shock. This shock is necessary to kill the blank or unfertile eggs. The blank or unfertile eggs are then picked out and the eyed eggs are put back in the baskets to hatch, which will take about 10 or 14 days. When the eggs hatch they are called fry; after they begin to take food they become advanced fry. They remain advanced fry until they become an inch long, when they reach the fingerling age, which is fingerling No. 1, meaning they are an inch long. They remain in the fingerling class until a year old, when they are called yearlings.

The tables of official State Department figures accompanying this article tell the story of achievements of the Department in attempting to restock streams and guard against depletion.



The Montana Grayling

Distribution Report of All Hatcheries for the Year 1928

Hatcheries	Natives	Rainbow	Eastern Brook	Salmon	Loch Leven	Perch	Grayling	L. Superior Whitefish	Bass	Sunfish	Total
Big Timber	2,125,370	878,800	289,000		1,155,000						4,448,170
Emigrant	1,701,850	342,236	730,000								2,774,086
Great Falls	1,197,815	585,000	396,300	61,675	1,012,191						3,252,981
Lewistown	958,569	144,400									1,102,969
Red Lodge	934,500										934,500
Total	6,918,104	1,950,436	1,415,300	61,675	2,167,191						12,512,706
Anaconda	2,082,450	775,000	185,000	69,400			5,200,000				8,311,850
Somers	1,842,878	179,960	134,200	146,700			1,600,000	1,022,480	189,100	151,000	5,266,318
Hamilton	997,000	393,000		49,000							1,439,000
Missoula	854,500	569,000				2,000					1,425,500
Libby	867,500										867,500
Rock Creek	953,776										953,776
Station Creek	874,500	284,500									1,159,000
Ovando	961,000										961,000
Ronan		213,106									213,106
Total	9,433,604	2,414,566	319,200	265,100		2,000	6,800,000	1,022,480	189,100	151,000	20,597,050
*McAllister	603,000	341,000					1,750,000				2,353,000
*Columbia Gardens	708,000	95,000									1,049,000
*Divide	1,004,200						1,400,000				2,499,200
Total	2,315,200	436,000					3,150,000				5,901,200
Grand Totals	18,666,908	4,801,002	1,734,500	326,775	2,167,191	2,000	9,950,000	1,022,480	189,100	151,000	39,010,956

*Cooperative Hatcheries.

Montana Plans State Game Farm

MONTANA'S State Fish and Game Commission, meeting in joint session with the 15 members of the committee on fish and game from the house of representatives, of which Ben Nelson of Phillips county is chairman and Steve C. Arnold of Stillwater county is vice-chairman, conferred regarding proposed changes in game legislation at the regular meeting of the Commission January 11 and it was the sense of the meeting that all concerned are content with existing laws. The Commission will meet again Friday, January 25, while the meeting of the Montana State Sportsmen's Association will be held the following day. Glen A. Smith of Missoula is president of the association. Plans are being made for a banquet Saturday night, January 26, with committees on fish and game of the legislature as honor guests.

Montana may establish and operate its own game farm at the state prison at Deer Lodge or the state hospital at Warm Springs, if an investigation now being conducted by the Commission develops facts that assure a saving in producing game birds rather than purchasing them from distant states.

The Commission authorized Game Warden Robert H. Hill to continue the investigation, looking toward acceptance of the offer of heads of these state institutions, the cost of constructing pens and buildings and the expense incurred in establishing the bird factory. It is planned that an expert on game birds be placed in charge, with inmates of the institution employed to aid in the work. The Commission has expended funds for the importation of Hungarian partridges, Chinese pheasants and quail and it is believed these birds can be more profitably propagated at an enormous saving of funds of Montana sportsmen.

Since the three-day open season was declared for the first time on Chinese pheasant cocks last November, requests for hundreds of these gamey birds have been reaching the Department from many clubs of sportsmen in the state. Plans were made to purchase a consignment for spring planting.

Sam Woodring, chief ranger of Yellowstone National Park, presented figures on the elk kill in the Gallatin country near the park for 1923-1928 and asserted that if the open season on elk is extended the herd will be exterminated in three years.

Wilsie M. Cramer, who has been a visitor at a series of legislative sessions attempting to get more state funds, again appeared before the Commission, asserting that he was not satisfied with the $1,000 paid him after inspection by the State Board of Examiners for a hatchery site at Somers and that, in case the Commission declined to pay him more money, he would again appeal to the legislature. The Commission denied his request, asserting that it has nothing further to do in the matter in that a bill was passed by the state legislature submitting the matter to the State Board of Examiners, that examination by the state board had shown Cramer entitled to $1,000, that the board paid Cramer the amount and that the incident is closed.

Thirty tons of carp and suckers have been removed from Lake Helena since last June through activities of the Commission, according to the report of Thomas Medanich, in charge. He reported that the traps were set in June and that since that time 60,000 pounds of these fish have been removed, sold, buried or sold for hog feed or fertilizer. He asserted that many of the carp are too small for marketing but that during Lent he expects to market many in the vicinity of Los Angeles. Trapping operations have disclosed the presence of a few trout and sunfish in the lake. The carp and suckers have, however, destroyed most of the plant and aquatic life and the Commission instructed that the work proceed until next spring, when traps will be set in feeder streams during the spawning season.

Game Warden Hill made a report on the work of the wild life legislative committee at the national conference at New York and Washington and asserted that action on the Norbeck bill is expected at this session of congress.

The petition of residents of Sweet Grass county for the closing of Sweet Grass creek and all its tributaries was denied after an investigation was made by John W. Schofield, field assistant in charge of hatcheries.

The petition of Carter county residents asking an open season the first 10 days in October on buck antelope was denied.

The report of Jacob W. Forbes, as-

Montana's State Fish and Game Commission

Left to right—Robert H. Hill, state game warden; William K. Moore, Billings; G. T. Boyd, Great Falls; Thomas N. Marlowe, chairman, Missoula; E. A. Wilson, Livingston; J. L. Kelly, Anaconda.

sistant in the sewage and water division of the Board of Health regarding the contamination of waters of Milk river by beet pulp from the sugar factory at Chinook was read.

Several claims for alleged damage to crops caused by elk and ducks were denied because the Commission has no legal right to recognize such documents. Ducks are said to be destroying grain near the Nine Pipes reservoir while feeding at night. The farmer who made complaint, according to the report to the Commission, has his land posted against hunting.

McNeil Brothers, who have been seining carp from Lake Bowdoin, were given permission to extend their operations in Medicine Lake in Sheridan county and in the backwaters of Nelson reservoir, with expense to be paid by the fishermen.

An order was issued that hereafter no seines shall be permitted in less than 30 feet of water in Flathead Lake where commercial fishing for whitefish is in progress.

Senator Pearl I. Smith of Beaverhead county asked that the ling be seined out of Red Rock Lakes, and an investigation was ordered.

The game department of Massachusetts has requested that the Montana Commission ship them a consignment of western prairie chickens to be crossed with the pintailed grouse of that region to strengthen the stock.

Kenneth McDonald of Anaconda was appointed temporarily to take the place of Dr. I. H. Treece, field assistant in charge of hatcheries, while Dr. Treece is spending the winter at Osteen, Fla.

Word was received that a shipment from federal hatcheries of 199 cans of black bass, sunfish and crappie has been received at the Miles City pond cultural station. People of Miles City ask that the territory surrounding the pond at old Fort Keogh be made a fish and game preserve.

Frank Rose, superintendent of the federal bison range at Moiese, has offered the State Commission 300 head of elk for distribution. The first shipment will go to the Libby Rod and Gun Club with the understanding that the Libby club pay half the costs of loading and transporting a carload. The Commission is willing to make similar arrangements with other state clubs.

The Commission ordered the purchase of 1,000 metal signs to designate boundaries of game preserves, and another 1,000 metal signs to be placed on streams closed to fishing throughout the state.

LESS DUCK MORTALITY

DAVID H. MADSEN, superintendent of the Bear River Migratory Bird Refuge, reports that very few sick ducks were observed in that region last summer. The past season was one of the driest in recent years and the consequent recession of the water from much of the flat alkaline country ordinarily resorted to by ducks limited waterfowl to comparatively small areas of fresh water and drove them also into the grain fields. The work of building dikes by means of which large alkali flats will be flooded with fresh water and thus remove the danger of duck poisoning hereafter is going forward rapidly.

The Kid in the Crags

The Kid

DEPUTY State Game Warden William J. Dorrington has positive proof that Montana's mountain goats are not as wary as pictured by many naturalists. While on a hunting expedition in the crags they came across the mountain goat kid pictured herewith. The little rambler was only a few days old. A short distance away the herd watched the sportsmen and the cliff-dwelling youngster. Its horns were just poked through the skin and it was as playful as a domesticated lamb. The deputy writes that the little fellow attempted to follow them after they had caressed it and parked it alongside a perpendicular rock wall to take the accompanying photograph. The rams and ewes of the band kept watch from a careful distance while all this monkey business was going on. After taking the picture the sportsmen went on their way, leaving the kid to join his elders.

SO MY gypsy camp will my temple be
As well as a home to me—
Where I may learn of the ways of God
From flower and bird and tree.

TROUBLES OF A TICKET AGENT

GIVE me a Pullman berth," said the man. "Upper or lower?" asked the agent. "What's the difference?" "A difference of 50 cents in this case," said the polite agent. "The lower is higher than the upper. The higher price is for the lower. If you want to go lower you will have to go higher. We sell the upper lower than the lower, although it is lower on account of being higher. When you occupy an upper you have to get up to go to bed and get down when you get up. You have the lower if you pay the higher. The upper is lower than the lower because it is higher. If you are willing to go higher, it will be lower. That is the only difference there is."

"DON'TS" FOR HUNTERS

Don't neglect the simple precaution of a red cap while hunting for upland game.

Don't carry a loaded gun while hunting so that the barrel points other than toward the sky or ground.

Don't lay a loaded and cocked gun on the ground or lean it against fence or tree where it can be dislodged.

Don't fail to remove the load the instant you stop hunting.

Don't draw a gun toward you by the barrel-end.

Don't use your gun for a leaning post.

Don't pull the trigger until you positively identify your game and have a clear vision of everything within range in the direction in which you aim.

Don't shoot at moving brush, which may merely screen a fellow hunter.

Don't carry a loaded gun in your automobile.

When the Fightin' Fool Breaks Water

Here's an unusual photograph, taken at a thrilling moment when a Montana scrapper makes his leap in the turbulent water below riffles in the Gallatin. It's another of those thrills that make things scamper up and down the spine of the angler.

Scientists Study Montana's Fish

M. A. Brannon
Chancellor

MONTANA has the only biological research station devoted to the study of fish and game in the United States. This statement covers considerable territory, yet is unchallenged. Through cooperation of the Montana State Fish and Game Department with enterprising leaders of the greater University of Montana, the biological station at Yellow Bay on Flathead Lake has been operated throughout the summer season. Its achievements have just been embodied in a series of exhaustive reports received by the State Fish and Game Commission. They are interesting documents of scientific fact. Trained scientists in research specialties have been detailed to make a thorough investigation of water and fish life of the lake, to ascertain corrective measures and to recommend steps to be taken to make the lake an angler's paradise.

It is the plan of the Commission to have these gratifying, informative reports arranged and published in booklet form for the information of all true sportsmen interested in that scenic body of water. The scientists have given strict attention to each minute detail. They have made thousands of tests of water, of plant life, of the individual fish, examined their stomachs, their makeup, favorite foods, and have embodied their findings in their reports. These booklets will soon be ready for distribution.

The State Fish and Game Commission has for some time realized that adequate and desirable plant life did not exist in many of Montana's lakes and streams for the best propagation of game fish. Hence these scientists associated with the educational institutions of Montana, under the leadership of Chancellor Melvin A. Brannon, were secured to make a survey. They will continue their work in other lakes when the Flathead task has been completed.

Included in the sweeping reports made by each member of the staff of specialists are the summary of the zoology of the lake by Prof. R. T. Young, the summary of the botany of the lake by the late Prof. J. E. Kirkwood, the physics of the lake as determined by Prof. G. D. Shallenberger, the chemistry of the lake by Prof. J. W. Howard, the history of the lake and an exhaustive report on each of the fishes, the food of each species, and notes on their number and distribution by Prof. M. J. Elrod.

In submitting the report of activities of the biological research station to the Commission, Professor Elrod writes in part:

Following the announcement that the State Fish and Game Commission had made a grant for the purpose of making investigations relative to the animal and vegetable life of Flathead Lake, especially with regard to the problem of developing more fish, a committee was appointed, to be called the Biological Station Research Committee, to have general charge of the investigations. The committee consists of M. A. Brannon, chancellor of the University of Montana; C. H. Clapp, president of the State University; Thomas N. Marlowe, chairman of the Montana State Fish and Game Commission; I. H. Treece, member of the State Commission especially interested in fish culture; R. T. Young, professor of biology of the State University; and M. J. Elrod, head of the department of biology of the State University.

M. J. Elrod was chosen as the responsible head of the investigations. As he had previously agreed to serve as park naturalist for Glacier National Park during the summer, he was unable to take a direct part in the work that was undertaken.

R. T. Young, professor of biology, was placed in charge of the investigations. His part of the study dealt with the animal plankton (microscopic animals), the number and distribution of the fish of the lake, and the general problem of the animal life of the lake.

J. E. Kirkwood, professor of botany, was to undertake investigations relative to the minute plant life, which is the ultimate source of fish food.

J. W. Howard, professor of chemistry, was to make chemical analyses of the water and its absorbed gases, and all other studies dealing with chemistry.

G. D. Shallenberger, professor of physics, was to make investigations dealing with light and other rays, their penetration and effect; and with the temperature of the water at different depths and to determine its relation to the plant and animal life of the lake.

The primary question is the food supply and the breeding grounds for fish. The food supply is the plankton (microscopic plants and animals), which is dependent upon such physical and chemical factors as the flow of water, light penetration, temperature, and the gases dissolved in the water. Other factors likely to affect the fish life are: the chemical composition of the water, the depth, the character of the bottom, the turbidity, and the presence or absence of suitable feeding grounds.

Intimately associated with the preceding are detrimental factors such as water contamination, cannibalistic fish, fish parasites, birds which prey upon fish, and shallow areas either devoid of suitable food or too shallow for fish.

The immediate problem seemed to be the determination of the number, kinds, distribution, migration, and habits of the fish, the interrelations of fish of different species, and the interrelations of the microscopic life in the lake with the fish living in the lake. Some phases of this study are recognized as exceedingly difficult.

Following the adoption of the general plan the members of the working staff secured the necessary apparatus and material. Much of the apparatus was loaned by the state university. Some special pieces were borrowed from the United States Fish Commission. Most of the chemical analyses were made in the chemical laboratories of the university. The university placed the biological station buildings in repair, and made suitable provision for living quarters for the staff. Chancellor Brannon and President Clapp were greatly interested in the investigations, and gave as freely as funds were available to aid in their prosecution.

The State Game and Fish Commission loaned their 30-foot boat for use during the summer, without which studies on

Make a Pal of the Lad

G. G. (Dode) Cottier, at left, and his big brother, Melvin, at right, of the Murphy McClay Hardware Company of Great Falls, casting a mean fly in the Gallatin.

MODERN men equipped with the fundamentals of sportsmanship realize the joy that comes of making pals of their sons. Here's a snapshot that's a rich possession of the sons of John Cottier of Great Falls, long associated with the Murphy McClay Hardware Company. The snapshot was taken of his three sons while he was teaching them the rudiments of Izaak Walton's pastime. The lad in the center has passed beyond. Dode and Melvin are now prominent business men of Great Falls. They cherish the memory of the Dad who was their one best pal.

the lake far from shore were impossible.

The work was conducted from the biological station at Yellow Bay, about midway on the east side of the lake. The station is 25 miles from Polson and 40 miles from Kalispell. An automobile road passes through the grounds, so access was easy.

The studies were conducted during late June, July and August. Dr. Young's studies have been carried on regularly during the fall, and are still being conducted at this writing.

During the period of study President Clapp visited the station frequently and assisted in discussion of the problem. Chancellor Brannon left his work at Helena to visit the station. Chairman Marlowe of the Commission traveled from Missoula to see how the work was conducted, and M. J. Elrod came from Glacier Park for a similar purpose. The staff entered upon their problems with eagerness and energy, accomplished a large amount of work and accumulated much data.

This is only a report of progress. Much of the material collected is still to be counted and tabulated. Also, it will be necessary to conduct the experiments through more than one season before definite conclusions may be drawn.

Just at the close of the season's work the sudden death of Mr. Kirkwood occurred at the laboratory at the close of a day's work. Although he seemed rugged and looked healthy, organic bodily trouble, embolism, snapped the thread of life almost instantly. The eye, brain, hand, and pencil that so acurately and beautifully sketched almost a hundred and fifty minute organisms were suddenly stilled. His sudden and tragic passing was unexpected, and is very unfortunate for the work undertaken. He had a fine grasp of the problem, and the large number of specimens he identified and made permanent in sketches, done in an extremely short time for such exacting work, is a fine testimonial of his ability. His generalizations would be of prime importance, but these he had not yet made. It will fall to others to draw conclusions from his work.

Dr. Howard made the first chemical analyses on record of the water of Flathead Lake from different places, and at depths from the surface down to 300 feet. The report shows sufficient oxygen for the support of fish life to a depth of 300 feet, an absence of injurious gases, but also an absence of some of the elements of plant food.

Dr. Shallenberger's report on light penetration, made with special apparatus, is very interesting, and shows that, even at the depth of 140 feet, the light reaching that depth is 170 times that which the earth's surface receives on a clear night at full moon. At this depth, and even lower, to 200 feet, Dr. Kirkwood found three species of diatoms, plants, and one of protozoa, animals. At 300 feet he found seven species of micro-organisms.

Dr. Shallenberger finds the bottom layer of the lake at about 300 feet to be of rather uniform temperature, 4.5° C. (40.1° F.) to 4.2° C. (39.6° F.). In determining the lake depth about 125 soundings were made, which are increased by some 25 soundings made by the writer. A map of the lake, with approximate locations of the soundings, is appended to the report, and will correct much misinformation relative to the lake's depth.

Moose in Montana

Yearling Moose

MONTANA'S game laws protect the moose. There is no open season. It's a sincere pleasure to spy these mountains of wild meat along Montana's mountain highways, near the water holes, in spots where the moss grows green and in the nooks where the cows care for their moose calves. Along the Madison river, close to Yellowstone Park, sportsmen many times catch an eyefull of moose. The same conditions prevail in other portions of the state on the range. The photo of this yearling moose was taken by William Rush on Hellroaring creek in Park county during the winter when the big calf ventured down to the water hole in the snow. He paid little attention to the photographer except to lift his head and register silent contempt for the rude interruption.

IF YOU WANT GAME, CONTROL VERMIN

THE crow and the blackbird do more destruction than is generally believed. They not only kill the young birds but the eggs of all birds are the natural food for crows and blackbirds. The toll of the blackbird and crow exceeds the number of game birds killed by all the sportsmen combined. Campaigns for killing crows and blackbirds are encouraged by the Montana Department at all times, and every effort should be made by sportsmen, and farmers as well, to rid the country of these greatest enemies of game, song and insectivorous birds. The ordinary house cat is also one of the great destroyers of bird life. When allowed to run, the house cat will meander over a territory of ten to fifteen miles during the night in search of young quail, pheasants and other young birds, and the loss of these birds by cats in every part of the state is enormous. Campaigns are on in many states to exterminate the meandering cat.

Biological and Research Station on the shore of Flathead Lake operated by the State Fish and Game Commission in cooperation with leaders of the University of Montana in solving problems of disease and propagation of wild life. It is the only station of its kind in the United States.

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THE BIENNIAL REPORT

MONTANA'S State Fish and Game Department herewith presents the biennial report of its achievements and ambitions for the years 1927-1928. Conservation activities of the Commission are so widespread and numerous that but brief mention has been possible in this review. In this program of propagation and conservation of Montana's wild life sportsmen of the state have taken an active part. They have provided the funds in the purchase of licenses which make the Department self-sustaining. The Commission can go no farther than permitted by its receipts. Figures and statistics are herewith presented showing disposition of these funds. Fignres in greater detail are available at headquarters at the state capitol for those who desire to go over them. Montana has taken the lead in the nation in this work of sane conservation. It maintains the largest pond cultural station for warm water fish in the United States at Fort Keogh. It has the greatest spawn-taking station in the nation at Georgetown Lake. The biological research station on Flathead Lake is the only one of its kind in the world. Fourteen fish hatcheries are being operated to keep pace with inroads being made on streams. The State Commission is making an honest, courageous effort to maintain this natural heritage for posterity and keep Montana in the forefront in the estimation of lovers of the out-of-doors.

GAME EXHIBITS AT FAIRS

EFFORTS of the Montana State Fish and Game Commission to bring its program to the people of the state through its series of displays at larger Montana fairs has attained amazing results. It has been one of the outstanding features of the biennium. These displays of Montana's game and fish have been taken to the larger expositions in the state, concluding with the state fair at Helena, and have constantly been surrounded by crowds that reflect popular interest.

Live animals always create interest. You never saw the window of a pet shop which did not have more or less of a crowd around it—and the window may have contained only puppies or chickens—alive and therefore interesting.

Much more interest is taken in exhibits of live game and this natural tendency has been made the most of in some states. It should be employed still more than it is now and used to awaken the average sportsman to a lively cooperation with his own state game officials and a sympathetic understanding of their problems and aims.

As an example we quote from the San Francisco Chronicle:

"One of the outstanding exhibits at the Pacific Southwest Exposition, which recently closed at Long Beach, was that of the devision of fish and game of the Department of Natural Resources. It is estimated that more than a million visitors took advantage of this display during its showing there.

"The working of the state game farm at Yountville, where Chinese pheasants and Hungarian partridges and California quail are being raised by August Bade, superintendent of the farm, was graphically displayed. The fish exhibits, depicting the Shasta hatchery in miniature, attracted considerable attention and many words of praise for the work of the division in aiding the canse of the angler.

"Fish and game division attendants carefully explained to the thousands of visitors the work of that department and drove home the message of conservation and protection. This work is one of the most valnable being undertaken by the fish and game body, and one which should receive the support of all sportsmen."

HUNTERS' MONEY MAINTAINS GAME

MANY STATES are going through the throes of recently awakened conservation. On one side is the hunter and fisherman; on the other, the sentimentalist and the ordinary citizen who neither hunts nor fishes. Both sides want fish and game and insectivorous birds protected, propagated and distributed. The hunter and fisherman want to shoot and catch as many birds and fish as the supply will permit, paying for the privilege by protecting the seed stock. There is an ever-present agitation coming from the non-shooters and non-fishermen in favor of cutting out most of the hunting and a big share of the fishing.

"Suppose the sentimentalists had their way and, as one of the most prominent advocates, not a gun was fired for a year," says J. B. Doze, former Kansas state fish and game warden.

"How many fishermen would buy licenses after the fishing season was cut down to a few days and the trespass law extended? What is more important than that qnestion is who would pay for keeping the violator from taking his fill of fish and game?

"When the time comes that a game bird must be given perpetual protection the time also has arrived when the general public should pay for the protection and not the hunters. If America keeps on eliminating the shooting of certain game birds and maintains its increased restrictions against fishermen the burden of enforcing these restrictions should be lifted from the hunter and fisherman and imposed on the general public. Every orchardist and agriculturist is helped because hunters pay for protection of the insect and noxious weed seed eating birds.

"Consequently the dollars the hunters pay for the privilege of killing replenish the earth with the things he kills. Kansas quail killers have been shooting several consecutive seasons. This is the first time consecutive shooting has occurred in many years. There are more quail in Kansas today than at any time during the last 15 or 20 years. The reason lies in the fact that these quail shooters have imported 15,000 birds to increase the seed stock."

WILD LIFE conservation means protection, maintenance of right biological conditions for breeding and living and artificial propagation. It is not a sentiment but a business and should be administered as such.

WHY GO FISHING?

AS a contemplative fisherman with positive ideas on piscatorial subjects, some of which he had well expressed in print and otherwise, Herbert Hoover was prepared to say some interesting things of that ancient pursuit when questioned by newspaper men in his retreat on the Klamath river. In view of the striking fact, which particularly impresses Mr. Hoover, that 10,000,000 persons annually purchase fishing licenses in the United States, it is worth trying to discover why people go fishing who might easily buy all the fish they could eat.

"All men are equal before the fishes," Mr. Hoover told an inquisitor. "There is peace and relaxation in going fishing. It is something that commands silence." And he said also: "In wading the streams and trying to hook trout a man finds solitude. He gets away from the jazz of our present civilization." To an insistent photographer he remarked: "There are two things that are sacred. One is prayer and the other is fishing. Neither can be done before a camera."

Since he holds such views, Izaak Walton and his brothers of the angle to whom fishing was a rite would have accepted this man as a kindred spirit worthy of their wish that "the east wind may never blow when he goes fishing." For manifestly he subscribes to the Waltonian tenet that fishing is "an art worthy the knowledge and practice of the wise man." In view of the record as a fish conservationist made by him in his seven years as secretary of commerce and his comments on fishing as he cast his hook, doubtless he accepts also the verdict of old Izaak that "God never did make a more calm, quiet, innocent recreation than angling." On this subject the testimony of the trout is not admissible.

FARMERS ARE GREATEST HUNTERS

THE FARMER more, perhaps, than the city man, is a hunter, for the man on a farm has more opportunities to hunt. Frequently all he need do is pick up a gun and walk a few hundred yards from the farm house to find game. Because of that fact, it is likely that most of the shotguns owned in the United States are in the hands of rural dwellers.

It is on farms that most of the game birds and game animals are to be found. State-owned lands provide for the enjoyment of shooting by thousands of gunners. Usually, shooting is better on public lands than on the average farm. However, the farm can and should be as good a place for small game, especially birds, as a state-owned tract. Still, the official and unofficial reports disclose that the mortality rate of game on farms is excessively high, owing to lack of control of "vermin"—as the natural enemies of game are called. Absence of necessary cover is also a factor both in mortality of game and in failure to attract wild life to farms. This condition is largely due to the destruction of natural cover by farming operations. These observations are based on the composite opinion of sportsmen in various parts of the country.

Many are of the belief that the situation could be greatly improved by educational efforts along the line of instruction as to the kinds of cover required for various species of game. Concerning the subject of cover, the Department of Agriculture Farmers' Bulletin states:

"The favorite resorts of upland game fowl have long been known as coverts, no doubt on account of their being admirably adapted to covering or concealing the birds. Such coverts are usually characterized by an abundance of low but dense and stiff or thorny shrubbery, together with luxuriant growths of grasses and weeds. These plants supply also an important part of the food of the birds."

WISCONSIN BARS POLITICAL WARDENS

WISCONSIN has put into effect an effective system of civil service examination for appointment of conservation wardens, thereby eliminating the political hanger-on. In a recent examination of applicants for certification to the Conservation Commission, 250 applicants presented themselves, 61 of whom succeeded in securing the passing grade. The examination is not, as the results would indicate, merely a perfunctory affair. Knowledge of the essentials for qualification as a competent conservation officer is absolutely necessary to secure a passing mark. The examination given applicants in Wisconsin consists of four parts: first, the application in which the applicant states his general qualifications. Many applicants are eliminated on the showing made in this portion of the examination. Second, a written examination which is conducted in the several county seats of the state and which consists of 250 questions relating to conservation law, enforcement provisions of the law and similar information. Third, testing the applicant's knowledge of natural history by requiring him to classify 30 marked game and song birds, and approximately 20 pelts of animals all native to Wisconsin. Mounted specimens and pelts are used for this purpose. Besides this the applicant must name and classify 35 varieties of fish from colored plates and 65 native birds and animals illustrated in the same way. Each applicant is also subjected to an oral inquisition to determine his personal fitness and general qualifications. Physical fitness is also taken into consideration.

PROTECTION OF DOES

CONSERVATIONISTS generally stand for protection of breeding stock of all species in order to maintain the supply of game. They favor the buck law for the protection of deer and maintenance of a permanent deer herd. Evidences of the effectiveness of limiting deer shooting to antlered bucks, such as prevails in Montana, with the exception of a few counties, are numerous but experience in this respect also shows the fallacy of trying to establish and follow any hard and fast rules in the administration of game. Wherever deer have been seriously depleted they can be increased and restored by the application of the buck law but this dosn't necessarily imply that the buck law should be maintained thereafter indefinitely. The experience of Pennsylvania has shown how deer can be tremendously increased by the protection of does and fawns and it also shows that results may be disastrous if the buck law is maintained so long that the deer range becomes overstocked and the available supply of food becomes insufficient and starvation ensues. This has actually occurred in Pennsylvania and it has been found necessary in that state to limit shooting of deer during the past season to does only.

A thoughtful discussion of this subject is made in an article in the October-November issue of American Game, the bulletin of the American Game Protective Association, by E. A. Sherman and R. R. Hill of the U. S. Forest Service, in which they say:

"In practical game management the percentage of each sex that should be killed each season should vary with the losses from other causes, the rate of increase and the number of bucks and of does which it is desired to maintain. An important consideration from the game standpoint is that when the range unit under management has already all the deer that can be provided for safely it is necessary to dispose of the excess number of animals of both sexes, and that the number to be disposed of should be the net annual increase, proper allowance being made for losses from all causes. However, this does not in any way minimize the desirability of greater protection to does on game refuges which are not fully stocked."

In other words, effective game management requires occasional adjustment of regulations to changing conditions.

THE ELECTRIC FISH SCREEN

PREVENTION of loss of trout in irrigation ditches of the west is a very live and difficult problem. Experiments have been made with all manner of devices and screens to prevent fish going into these ditches with indifferent success. Congress has recently made an appropriation of $25,000 to carry on investigations. Among other devices being investigated by the Bureau of Fisheries under congressional authority is the electric fish screen. This device promises to be an improvement on anything heretofore discovered. A device of this kind recently installed in a stream in Oregon is claimed to work successfully in repelling fish which otherwise would pass into irrigation ditches or the intakes of power plants. These experiments are being watched with very keen interest by the game and fisherles departments of the west and sportsmen generally.

Our Migratory Heritage

By JOE B. HALM, Missoula, Montana

"TWO MORE BANDS." My friend was wading ashore holding up two beautiful greenhead mallards which we had just shot. The place was Nine Pipes Reservoir, the time mid-December, 1928. Six out of the eleven mallards that morning were banded. Forty-nine banded mallards have been bagged this fall by the five members of our club, within 25 miles of the banding station in the National Bison Range at Moiese.

A few years ago a friend was telling me of the wonderful hunting in the Flathead valley. He declared he daily saw thousands of ducks leave Mission creek in the Bison Range.

I had never seen a thousand ducks in one day in my life. I mentally questioned my friend's statement, but aloud asked, "Where do they all come from?" His answer was: "They come from all over because they aren't shot at in the reserve."

Now I had fished Mission creek before the Bison Range was created and recalled the brushy, log-strewn little trout stream, overhung with willow, alder, aspen, cottonwood and an occasional cedar, where a fisherman, even when wading, found it difficult to cast a line. I could only picture it as a most unlikely place for ducks.

This fall I visited the park ranger at his headquarters at Moiese, and we walked along the alder-covered banks of Mission creek.

What a change eighteen years had made in that quiet rippling little stream.

Every available stretch of water as far as one could see was literally alive with mallards, a busy, crowding, noisy, quacking mass, thousands of them.

Upon reaching what would have been easy gun range those nearest took wing and flew to find another place further up the creek.

Some large flocks of several hundred flew south toward the mountains within the preserve; after attaining considerable height they turned and headed north toward the grain fields, or other favorite haunts in the valley. Never once did they fly over the Bison Range enclosure in shooting range. Instinct and experience told them that fence was the danger line.

Upon reaching the banding traps we found a number of mallards had followed the corn bait into the traps, which are chicken wire enclosures with wings extending across the creek. Once in, ducks can not get out until banded and released by the keeper.

It was but the work of a few minutes to band and release the birds; each bird as it was released and took flight carried a little copper or aluminum band, a message to the finder, whether he be an Eskimo in the Land of the Midnight Sun, a trapper in the Canadian north woods, or a sportsman of California or other sunny clime. These bands will, one by one, like the homing pigeon, find their way back to Washington with a message. A small percentage of the ducks are captured and recaptured in these traps.

Of the 350,000 mallards that have frequented the three miles of creek within the refuge this fall, more than 8,000 have been banded. I was told that only a small percentage of these ducks were hatched in the valley. The locals are joined by their feathered brethren from the north who, finding safety within the refuge, stay for weeks and months in ever-increasing numbers, feeding over the fields and ponds of the surrounding country for miles around.

I was invited to witness the ducks' evening flight which, I was told, occurs at precisely the same minute each day, which is approximately twenty minutes after the official sundown. The ducks all leave in the evening and drift back in small flocks at all hours during the following day.

It was nearing flight time. We jumped into a car and drove to the creek. As we alighted I could see the same surging quacking mass I had witnessed earlier in the day. The ranger at that moment, watch in hand, said "They should be starting now."

As if in response to his word there was a mighty roar as a great wave of ducks arose, followed by another and another. In less than ten minutes more than 10,000 ducks had scattered in all directions for their feeding grounds all over the valley.

It seemed strangely deserted and quiet—an occasional feather floated down the placid little creek where a few moments before all had been noise and confusion. Without the refuge, if pursued too persistently by hunters, these ducks would not remain in the valley but would take wing and head for the south. The remarkable increase in the numbers of ducks which return to this unlikely looking little creek within the refuge every year speaks louder than words in favor of other refuges which could be created about the state.

Ruth Halm and her pet mallard

The Grass Valley Bird Refuge, located a few miles west of Missoula, was created about three years ago upon the request of a number of far-sighted sportsmen and citizens, and is, according to reliable census, already harboring some 5,000 mallards this winter.

There has been some agitation by a few individuals to throw this preserve open. There is little likelihood that this will be done since the area is all privately owned and posted; only a chosen few could possibly benefit by this move.

The average sportsman who must look to the rivers, ponds and open fields for his shooting would suffer a great loss. It is fallacy to suppose that the present 5,000 ducks would remain long in the locality after being blasted from behind every bush and tree from daylight till dark. The territory within and adjacent to the refuge would, in a few weeks, be as destitute of ducks as it was before it was created.

In fairness to all concerned, however, I believe a careful study and survey should be made by competent men of this migratory bird refuge. It might be found advisable to exclude some of the less desirable portions from the present boundaries, confining it only to the most desirable areas.

I feel confident that I am voicing the sentiment of the majority of sportsmen in western Montana when I say we do not want the Grass Valley Bird Refuge opened, thereby destroying the only sanctuary of its kind in the western part of the state, a refuge which the Montana State Fish and Game Commission has so wisely set aside for us.

Before me are a number of popular sporting magazines containing articles pertaining to bird and game refuges. These articles, written by eminent men such as Charles G. Dawes, Vice-President of the United States; Paul G. Redington, Chief of the U. S. Biological Survey, and other conservationists and sportsmen, are all strongly in favor of creating more refuges and sanctuaries.

The U. S. Biological Survey, states, counties and thousands of private estates and clubs, are spending millions annually in creating additional refuges. Areas formerly destitute of ducks and geese now abound with migratory fowl in the fall and there is hunting for all.

That bird refuges and public shooting grounds are the salvation of public

shooting is no longer a matter of conjecture, as has been clearly demonstrated in the eastern and most western states.

Montana, by virtue of her small population, has not, as yet, felt the need so keenly, but that need is at hand and we must heed the call. A refuge can not be created in a day or a month; it takes years to change fixed habits of migratory birds; it takes years to build up the complete confidence of geese and ducks, confidence which can be destroyed in a single season. Finding a place that affords safety, ducks and geese on their migratory flight will stop as long as they are not pursued with importunity. These birds do not, as some suppose, stay within these sanctuaries, but daily drift here and there about the adjacent country and waters; when sufficiently harassed they retreat to the refuge for protection and rest.

We sometimes assume the attitude of ownership; we think these ducks are ours, overlooking the fact that by far the greater number are hatched in Canada and raised to maturity there; inclement weather, ice and shortage of food drives them south to more favorable latitudes. There they are again fed all winter until their return flight north. Their stay with us in Montana is momentary and incidental like a transient traveler picking up a quick lunch en route. However, if proper and suitable accommodations are provided, these winged tourists will tarry as long as food and weather are favorable, incidentally affording the local sportsmen some of the most exciting and fascinating sport in the world.

Let us, therefore, as sportsmen of Montana, back up our own Fish and Game Commission of which we are so justly proud and urge their support in the creation of additional sanctuaries for the propagation and protection of fish and game for present and future generations.

We can not continue to draw upon our great heritage of wild life without giving something back. How meager will be the hunting opportunities of our children as compared with our own and what will be the opportunities of their children, unless we attempt to restore a part of that which we and our fathers have destroyed?

Quail Are Immune to Strychnine Poisoning

THE Bureau of Biological Survey, Department of Agriculture, as the result of an investigation of strychnine-poisoned baits to control rodent pests, has concluded that this form of poisoning is not injurious to quail and other game birds. The full text of the department's statement follows:

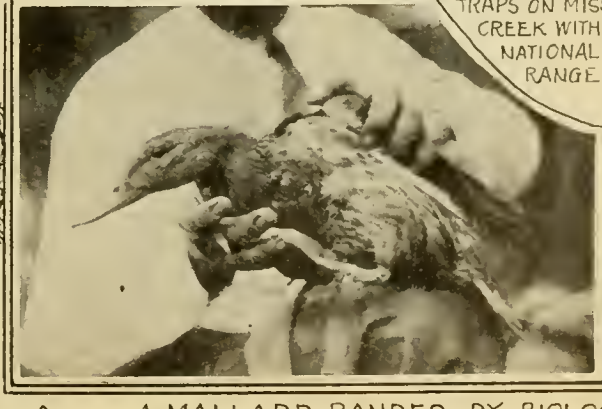
Complaint is frequently made that quail and certain other game birds may be injured by the exposure of baits poisoned with strychnine, which are used in the control of injurious rodents and other mammals. Investigations made by members of the Biological Survey of the United States Department of Agriculture and other interested organizations have shown that such destruction is unlikely to occur. It has been definitely established that gallinaceous birds as a group possess a certain immunity from strychnine poison. This group of birds includes grouse, partridges, quail, ptarmigan, prairie hens, sage hens, pheasants, wild turkeys and domestic poultry.

Quail in California have been observed to feed to a large extent on strychnine-poisoned baits exposed for ground squirrels, and, so far as known, not a single individual has been killed. Prairie chickens have been known to eat without ill effects enough poisoned grain to kill 100 ground squirrels. A sharp-tailed grouse in Montana ate 400 kernels of strychnine-poisoned wheat without any of the strychnine symptoms developing. Experiences such as these indicate that complaints regarding the destruction of gallinaceous game birds by strychnine-poisoned baits are founded upon suspicion rather than upon facts."

Banding Ducks *at* Nine Pipes.

REMOVING MALLARDS FROM ONE OF THE BANDING TRAPS ON MISSION CREEK, NATIONAL BISON RANGE.

ONE OF THE BANDING TRAPS ON MISSION CREEK WITHIN THE NATIONAL BISON RANGE.



FRANK ROSE SHOWING METHOD OF BANDING MALLARDS ON BISON RANGE BIRD REFUGE

A MALLARD BANDED BY BIOLOGICAL SURVEY ON NATIONAL BISON RANGE.

The Waterfowl Situation in Montana

By GEORGE E. MUSHBACH, Billings, United States Game Protector

George Mushbach

SINCE the publication of the last Biennial Report of the Montana State Fish and Game Commission there has been a decided, marked, and gratifying improvement in conditions affecting migratory waterfowl in Montana. In part, at least, this may be attributed to nature's generosity in replenishing the water supply which for several years preceding 1927 was sadly lacking in many sections. The year 1926 witnessed the termination of a drouth period which had extended over an interval of several years, and which had been the cause of wiping out many important waterfowl areas in eastern Montana. The western part of the state was not affected so noticeably by this condition as the water supply is of a more permanent character and not dependent upon seasonal flood waters as is the eastern section.

The heavy rains in the spring of 1927, a generous snowfall the following winter, and another wet spring rejuvenated a majority of the lakes and ponds of the prairie regions, resulting in the migratory waterfowl returning to the former path of migration which had of necessity been abandoned due to the lack of suitable water areas to make it attractive to this character of fowl.

The marked increase in waterfowl during 1927 was more decidedly so in 1928. Reports and personal observations clearly indicate that the supply of these birds was far greater throughout the present year than for any time during the past five or six years preceding. Nor did the increase in eastern Montana appear to be an appreciable drain on the supply from other sections of the state, for waterfowl were abundant in practically all favorable localities.

An unusually large number of ducks nested in Montana the past year and remained throughout the season. A considerable number of ducks are remaining in the state at the close of the season on December 31; of these greenhead mallards and golden-eye ducks predominate, with a sprinkling of pintails and occasionally a few of other species. For the last two years many pairs of cinnamon teal have nested here where formerly they were rarely seen in Montana. This teal is evidently a spring migrant only, leaving before the opening of the hunting season, as it is seldom one is taken by our shooters.

Montana has been most fortunate in that there has been no duck sickness among our waterfowl, such as affected the snow geese in the spring of 1926 and which took large toll at that time. This is attributed, no doubt, to the abundance of fresh water which has kept the lakes and ponds alive.

There has been a noticeable improvement in food conditions since the planting campaign instituted by the Montana State Fish and Game Commission, and which extended over an interval of several years. The wapato or duck potato appears to have done exceptionally well in many localities and seems adapted to Montana. It is to be presumed that the introduction of duck food has had much to do with the excess of wildfowl remaining in the state instead of going farther north to nest.

What appears to be the outstanding need for our migratory waterfowl is a system of refuges or sanctuaries over which some one of our game protective agencies will have control, thus assuring permanent quarters for wildfowl. It is of vital importance at the present time to make provisions and guard against the possibility of all, or most, of our desirable water areas coming under private control. The danger is not an idle dream for it is practically an assured fact that within a very few years all of the water areas best suited for the needs of waterfowl will be owned or controlled by private shooting clubs and fur farms, unless safeguards are provided.

Other sections of the country have awakened to this need only when it was too late. All of Montana's conservation agencies should profit by these grave mistakes and unite in making ample provisions while there is opportunity. That there is opportunity is apparent for there are many tracts throughout the state, either privately or publicly owned, of low acreage value that are chiefly valuable for wild life purposes and which could now be acquired for public uses for a reasonable outlay.

It is quite probable that many of these areas, or parts of them, if acquired for refuge purposes could also be utilized as shooting grounds for the general public without seriously interfering with the refuge features. Public shooting grounds are in a class with the refuge plan and should have serious attention.

Each year witnesses the acquisition of desirable waterfowl areas by private shooting clubs. It is only a matter of time until the duck shooter of moderate means will find himself excluded from his sport for the reason he will have no place to hunt. These sportsmen should be provided for as all are equally assessed by license—the man of little means paying for game preservation an amount as great as the members of the expensive duck club. There is no blame or criticism directed against the club member. He is entirely within his rights and is simply fortunate in being able to provide for himself a place where he may enjoy his sport; however, there is a duty to be performed for those less fortunate but who are equally entitled to consideration.

A refuge matter of vital importance to Montana and the entire northwest is the act of congress last year which authorized an appropriation of $350,000 for the establishment of the Bear River migratory bird refuge in Utah. Of this amount $200,000 was made available for 1929.

This will result in some 10,000 acres being diked so as to impound fresh water in what was formerly a veritable death trap for wildfowl. For a number of years millions of bird life has been annually sacrificed as a result of alkaline poisoning on these marshes. It is now expected to turn this area into a wonderful resting, nesting, and feeding ground which will produce and care for a vast supply of waterfowl from which Montana will draw, in place of a terrible drain on our flocks and the flocks of the adjoining states. Within the next few years we will undoubtedly have a practical demonstration of the worth of this project in the form of a noticeable increase in our waterfowl population.

It now remains to make provisions so that we may profit by the benefits which are sure to accrue from the Utah refuge.

A SPORTSMAN'S CREED

1. I deem it a point of honor never to shoot a sitting bird (except cripples). I will not pot-shot, and I will not stand for it in my party.

2. I will measure the success of my day afield not only by the size of my bag, but by the cripples I leave behind me. I would rather get a mass of game with no lost cripples, than to kill the limit and leave the woods full of lost game. Accordingly, I will shoot to kill, and I WILL NOT SHOOT OUT OF RANGE.

3. I am against "piecing out" the other fellow's limit. I am against the "dummy license." The legal limit applies to the man, not to the party. If I can't kill my own game, I don't want anyone else to kill it for me, and I expect my hunting partners to look at it the same way.

4. I will not clean out a covey. Leaving some for seed is one of the first principles of sportsmanship.

5. I realize the Montana game laws are made for my protection and to insure the future of my sport; therefore I will observe both the letter and the spirit of the law, and I will make it my duty to see that others do also.

6. I want to be a sportsman, not a meat hunter.

A BLACK MALLARD— EXTREMELY RARE IN THE WEST.

A COOT'S NEST IN THE CAT TAILS.

THE END OF A PERFECT DAY ON NINE PIPES.

MALLARDS FEEDING IN A POTHOLE NEAR NINE PIPES.

A PIED BILLED GREBE'S NEST.. THE LITTLE STRIPED FELLOW IS THE FIRST ARRIVAL FROM THE HATCH—

THE LAST OF A HATCH OF MERGENSERS LEAVING ITS EGG HOME FOR THE WATER.

Montana and The Bear River Marshes

By DAVID H. MADSEN, Salt Lake City, Superintendent Bear River Migratory Bird Refuge

THE RECLAMATION of Bear River marsh means much to the migratory waterfowl of Montana and western America. Irrigation and power have materially changed the water courses and the water areas of the west. The Bear River marsh has suffered because of these two essential activities. Where at one time 40,000 or 45,000 acres of marsh furnished feeding and breeding grounds for countless hordes of migratory waterfowl only a remnant or 2,000 or 3,000 acres of natural marsh remains. The state of Utah and private shooting clubs have reclaimed 15,000 or 20,000 acres and at present this constitutes the entire Bear River marsh. Even though this great shrinkage has occurred, the birds seem not to have changed their course of migration but have continued to pour into this small area in great numbers.

Either because of overconcentration of birds or because of the presence of an excess of alkali and salts in the waters, disease has occurred frequently among all varieties of waterfowl in this section for more than 20 years. The result has been the loss of literally millions of birds. This subject has had great publicity throughout the country and for several years attempts have been made to secure money necessary to bring back this marsh to its original condition. Finally success crowned our efforts and the last session of congress appropriated $350,000 for this purpose.

SAVING THE QUACKS

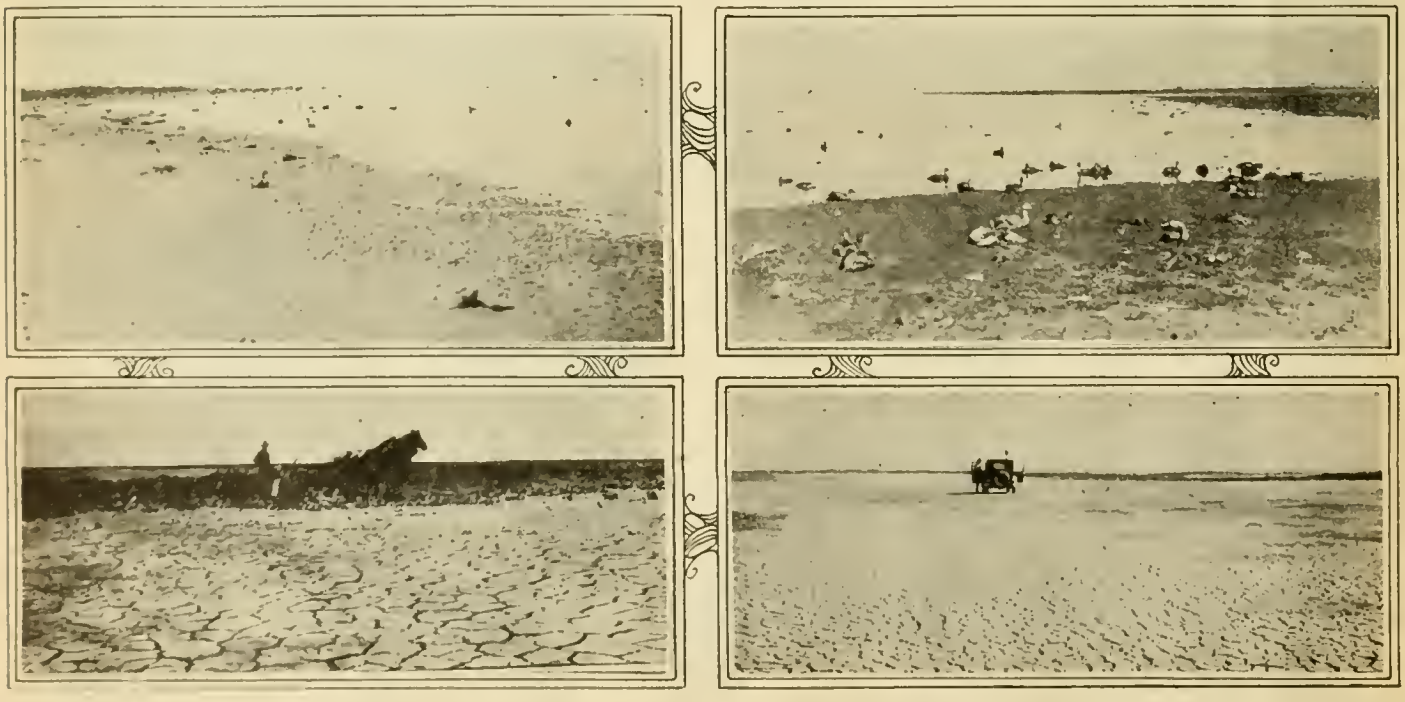
MONTANA sportsmen are vitally interested in steps being taken by the federal government in the reclamation of the Bear River marshes in Utah. It is through these marshes that come the majority of migratory waterfowl that eventually are quartered on Montana lakes, ponds and potholes. When duck sickness afflicted the birds on the Bear River marshes in their migrations north or south, the disease cuts down the flight that reaches Montana. The marshes provide a natural resting and feeding area for these migratory wanderers and have much to do with maintaining the waterfowl supply in the Treasure State.

On July 1, 1928, the program for actual construction was outlined and placed in operation. A corps of competent engineers was employed and a complete survey of the project is now near completion. It is estimated the work will require about three years and that when completed possibly in excess of 40,000 acres of marsh area will be reflooded and brought under control and will be maintained by the federal government in the interests of the waterfowl of this part of the country.

The work will consist of a control works in the Bear River from which will be distributed the water of this stream to desirable points for flooding the large level delta which the river has created during the past. A series of low dikes built from materials at hand will be constructed for the purpose of holding the fresh water back and preventing it from disappearing into the Great Salt Lake and also at times acting as a barrier against the salt water of the lake.

In considering the importance of this construction it is necessary to bear in mind that the waters of Great Salt Lake contain about 25 per cent salt. When the lake attains a comparatively high level and the waters are blown back over the marsh, the result is to destroy every particle of vegetation. Due to the deposit of great quantities of salt as the waters recede this vegetation does not come back for several years. In addition, the fresh waters which flow into the lake from the river have been greatly reduced in volume because of irrigation and power reservoirs above, thus delaying the process of leaching out the salt which has been deposited with each successive rise in the lake.

The fresh water lakes to be created will all be shallow, none of them attaining a depth of over three feet, which means the entire area will be feeding grounds for ducks. It also means that the control of carp in these waters will be possible so that they may not destroy the duck foods.



—Photos by courtesy of the Bureau of Biological Survey.

Above—Sick ducks on the shooting grounds shown strewn along the shore lines where they died from the results of alkaline poisoning in the Bear River marshes.

Below—Looking toward Pintail Neck from Bond's Pond showing the dried up marsh. At left—Constructing dikes across the old river west of South Bay showing the river channel completely dried.

While seeking information leading up to the construction of the project the Biological Survey undertook to band several thousand ducks which were either reared in these marshes or which came there and were affected by disease. This was for the purpose of determining the flight of these birds and also what part of the country was being affected by the great loss of birds in this section.

From returns which were had on banded birds that were taken after leaving the Bear River marsh it was conclusively demonstrated that these birds traverse at least fifteen states, Canada and Mexico. It is probably true that many shore birds and perhaps even some of the ducks travel as far south as South America.

With this picture fully presented it was not difficult to determine that this was a national project and that the loss of a million ducks in Bear River marsh affected adversely the supply in practically every state west of the one hundredth meridian. Not many of the birds seem to migrate in an easterly direction beyond that point.

Occasionally sportsmen of states other than Utah have expressed concern because of the establishment of so large a marsh here on the theory that the birds will be attracted to this place and remain here, thus interfering with the shooting privileges which have been enjoyed in the past in other states. This fear is wholly unwarranted. Utah sportsmen get comparatively little shooting at the birds which nest here. Our season opens October 1 and practically all of the resident birds have left by that time. Our shooting consists chiefly of birds which migrate through here from the north. This migration begins in August when a great many birds, particularly male pintails, come into this marsh to moult. The greater part of these birds also leave before October 1 and the remainder soon thereafter.

A second migration usually occurs about the middle of October and with greatly increasing numbers continues until the 10th or 15th of November when so far as we know most of the birds have arrived on their way south.

The Bear River marsh contains no warm springs, is extremely shallow and as stated is flooded by the waters of Bear River. Because of this condition it freezes with the first cold snap and there is rarely any shooting after November 25. No birds whatever winter in this section.

They return in great numbers in the spring and the marsh is particularly valuable at that season because then the birds are badly in need of food and devour everything that has been left over from the previous season before leaving for their nesting grounds in the north.

I do not believe the Bear River project will affect the shooting in any other part of the country except that with the elimination of disease and the great increase which will result in the number of birds which nest in the region, shooting in the western states will almost immediately show an improvement and will continue to improve if the birds are given adequate protection elsewhere.

However, the Bear River project should not be the only project of its kind in western America. The entire line of flight of these birds should be safeguarded by the establishment of refuges at intervals along the line where the birds can find protection during the open season and a food supply during their return in the spring. Furthermore, the bill provides that not to exceed 40 per cent of the Bear River refuge may be open to public shooting. This matter is in the hands of the Secretary of Agriculture of the United States and will be an administrative problem which will be worked out along the lines that will give the birds adequate protection.

The time is rapidly approaching when the game refuge idea as it applies to resident game will also be applied to the migratory waterfowl situation throughout the country. The sooner sportsmen and conservationists agree upon such a program and put it into effect the better it will be for the birds and sportsmen alike.

HABITAT DESIRED

IF I should build me a gypsy camp
I'd go where the land was clean—
Where the foot of man had never trod
And the air blew fresh and clean.

When Fishin's Best

Fishin' in the springtime,
Finest sport there is;
Keep a feedin' of the fish,
He will sure get his.
Fishin' in the summer,
That's the greatest fun;
Every single trout he lands
Wil beat the other one.
Fishin' in the autumn,
Sport that can't be beat;
Hookin' 'em and landin' 'em
Is the greatest treat.
Fishin' in the winter,
There ain't no better way
To get a dandy mess of fish
And spend a nippy day.

FAYE S. PERRY, Butte.

Lost---A Canoeist

I am Johnathan Reginald Pike of New York
And I know all about a canoe;
And I care not a fig for your asinine guides
Nor a whit for the warning of you.
I shall leap in the stern of my frolicsome craft
And with speed and the grace of a kite;
With a bow riding high to a sun-blazoned sky
I shall paddle with rhythm and might.
And when I have journeyed as far as I choose
I shall splendidly circle about;
And with foam in the teeth of the shattering gale
Shall return in the way I went out.

* * * *

We buried him deep by the cedar-walled shore,
And this is the sign that we raised o'er his grave:
I am Johnathan Reginald Pike of New York
And I know all about a canoe;
But nothing at all of the tricks of the squall
So I'm resting—a warning to you.

OPERATION OF FISH AND GAME FUND

1927

To balance in fund January 1, 1927	$103,216.95
To receipts, January 1, 1927, to January 1, 1928	180,415.27
	$283,632.22
By disbursements, same period	205,552.45
Balance in fund, January 1, 1928	$ 78,079.77

1928

To balance in fund, January 1, 1928	$ 78,079.77
To receipts, January 1, 1928, to January 1, 1929	194,763.18
	$272,842.95
By disbursements, same period	179,810.23
Balance in fund, January 1, 1929	$ 93,032.72

RECONCILEMENT

State treasurer's balance, January 1, 1929	$ 97,084.93
Less auditor's warrants outstanding	4,052.21
Net balance in fund, January 1, 1929	$ 93,032.72

OPERATION OF BIOLOGICAL FUND

1927

To balance in fund, January 1, 1927	$ 8,790.41
To receipts, January 1, 1927, to January 1, 1928	17,722.50
	$ 26,512.91
By disbursements, same period	18,271.75
Balance, January 1, 1928	$ 8,241.16

1928

To balance in fund, January 1, 1928	$ 8,241.16
To receipts, January 1, 1928, to January 1, 1929	19,946.85
	$ 28,188.01
By disbursements, same period	15,102.47
Balance, January 1, 1929	$ 13,085.54

RECONCILEMENT

State treasurer's balance, January 1, 1929	$ 13,611.54
Less state auditor's outstanding warrants	526.00
Net balance in fund, January 1, 1929	$ 13,085.54

Wild and Domestic Animal Life

By DR. W. J. BUTLER, State Veterinarian of Montana

WHICH came first—the duck or the egg? We are still pondering over that question and probably will for all eternity. We might also ask ourselves the question which came first—wild animal life or disease-producing organisms? We do not know because many organisms can lead a saprophytic life. That is, they can live and propagate themselves outside of the animal body but become disease producers when they gain entrance into the living body. That does not hold good for all organisms, or parasites, by any means. There are innumerable bacteria and worms, or what we may call greater parasites, that require the animal body or several animal bodies in order to propagate.

Undoubtedly, evolution has played a very important part in the development and selective adaptability of many of our present known bacteria and greater parasites. In this article, for the sake of brevity and clearness, we shall limit the term "parasites" to include only round and flat worms, although a parasite is any plant or animal which lives upon or within a living organism.

Many flat worms have a remarkable life history. Take for instance the fasciola hepatica, which is the common liver fluke. The mature parasite is found principally in the liver of ruminants. (A ruminant is any animal that chews its end and that means any animal that casts up its food to be chewed a second time.) The eggs of the parasite pass out with the excreta of the infested animal and on getting into water release an embryo. This embryo gets into certain species of snails where it undergoes a further change. It is released from the snail, floats on or in the water and attaches itself to blades of grass or other vegetation. When it is swallowed by a ruminant, the larval fluke escapes into the digestive tract, bores its way through the intestinal walls, wanders around the inside of the body cavity and, as a rule, finally winds up by perforating the capsul of the liver and then the whole cycle starts over again but the parasites never fail to cause considerable damage, if not death, to their host. That is only the history of the life cycle of one parasite. There are other parasites with even a more complicated life cycle, and there are lots of parasites whose life cycle we do not know.

What has all this to do with wild animal life? Lots. We may not know whether the egg or the duck came first but we do know that wild animal life, with their attendant parasites and diseases, came before domestic animal life.

It is a common mistake to believe that disease and parasites are unknown to wild animal life. True it is that disease is more common in domestic animal life than in wild animal life, but that is due principally to the manner in which domestic animals live and are handled and fed, and not to a positive immunity to disease or parasitic infestation on the part of wild animal life.

It probably will be surprising to know that we have found scab in mountain sheep living in their natural habitat. We also have found pneumonia and lung and stomach worms in mountain sheep; scab in elk; stomach worms in beaver; stomach and hook worms in foxes and mink; tuberculosis in antelope; hemorrhagic septicemia in buffalo; and liver flukes galore in deer and elk. Tapeworms in coyotes and rabbits are common and the larval stage of some one of the warble flies are found in practically all species of animal life. In addition to these diseases, there are a number of other diseases found in wild animal life that are transmittable to the human family, some of which are extremely dangerous and fatal. These conditions were not started by, or transmitted from, domestic animal life to wild animal life. Some of them, if not all of them existed long before man had domesticated any animal.

Many of these disease conditions are common but nevertheless they exist, and all that it would take to make them more or less common would be to subject the susceptible host, whether wild or domestic, to a mass of infection or infestation.

The cardinal principal for the proper production and disease prevention of livestock is "Let them live close to

DISBURSEMENTS ANALYZED BY PURPOSE

1927

Game Department		
Operating expense		$ 12,510.17
Game warden and office salaries		10,351.87
Capital expenditures		850.00
Salaries special deputies		7,391.65
Salaries regular deputies		34,657.45
Expense of deputies		18,972.16
Purchase duck food		5,701 48
Purchase birds		2,100.00
Refunds		30.00
Total game department expense		$ 92,564.78
Fish Department		
Operating expense		$ 38,590.20
Capital expenditure		18,930.30
Hatcheries pay roll		44,346.84
Hatcheries employees' expense		5,200.84
Total fish department expense		$107,068.18
Educational Secretary		
Salary	$ 1,800.00	
Expense	1,043.86	
Great Falls Tribune—"Big Horn"	675.53	
State Publishing Co.—printing	328.22	
	$ 3,847.61	
Fish and Game Commission		
Per diem and expense	$ 2,071.88	
Total fish and game disbursement	$205,552.45	
Biological Fund		
Expense	$ 195.59	
Pay roll	18,076.16	
	$18,271.75	$ 18,271.75
TOTAL DISBURSEMENTS		$223,824.20

DISBURSEMENTS ANALYZED BY PURPOSE

1928

Game Department		
Operating expense		$ 11,054.27
Game warden and office salaries		10,281.65
Capital expenditures		4.00
Salaries special deputies		8,520.70
Salaries regular deputies		33,650.00
Expense of deputies		19,947.08
Refunds		40.00
Total game department expense		$ 83,497.70
Fish Department		
Operating expense		$ 31,787.66
Capital expenditures		5,672.71
Repairs and replacements		2,081.27
Hatcheries employees' salaries		41,032.27
Hatcheries employees' expense		4,666.89
Total fish department expense		$ 85,240.80
Educational Secretary		
Salary		$ 750.00
Expense		530.65
Printing and publication		448.46
		$ 1,729.11
Fish and Game Commission		
Per diem and expense		$ 2,297.11
Montana Wild Life		
Salaries, printing and publications		$ 4,014.15
Biological Research		$ 3,031.36
		$179,810.23
Biological Fund		
Salaries	$ 7,419.34	
Expense	183.13	
Transfer to state bounty fund	7,500.00	
	$15,102.47	$ 15,102.47
TOTAL DISBURSEMENTS		$194,912.70

nature". This applies to domestic animals as well as to wild animals. Disturb nature's balance and you have to compensate, or you will pay with animal life.

I do not believe in feeding wild animal life excepting under extraordinary circumstances, or conditions, or when they are in captivity. I believe in game preserves where there exists sufficient forage for the number of animals in the preserve. To me it is just as wrong to have a preserve overstocked as it is to have no preserves at all.

Congregated animals in one place such as a feeding ground and if one is infested with worms, or has some bacterial disease, sooner or later animals that congregate at that feeding ground will be subjected to a mass bacterial infection or parasitic infestation to which they may fall avictim.

Wild animals require protected areas where there is an adequate pure running water supply with natural forage and shelter, and so do domestic animals. In fact, from a strictly economic standpoint, they are entitled to more protection. There is, however, something more in life than money. There is our natural physical and geographic beauty with its attendant wild life. But at that a herd of cattle grazing on a mountain slope never spoiled the natural picture.

The stockman with his herds has helped very materially to build this western country. He has pioneered, he has battled the elements, he has suffered, he has at times prospered and the sunshine of life has been his but always he has helped to develop the natural resources of the country and has supplied our people with a healthful food product.

He is entitled to consideration and no act of congress, or of the state legislature, should deprive the stockgrower of land and range which is essential for the safe and proper production of domestic animals.

Stockmen are advocates of the protection of animal life, be it domestic or wild, and I am confident that I can safely say the majority of them are in favor of game and wild bird preserves. There is, however, a limit to the extent of grazing areas which should be segregated for wild animal life. Some of our eastern friends, zealous of wild animal life protection, which has our utmost support and sympathy, would make large areas in our western states the playground of the east, forgetting that the east is dependent upon the west for raw material both for edible and manufacturing purposes.

There is a common ground of division and that is according to natural geographic boundaries. These areas should not be permitted to become overstocked with wild animal life, but they should be sufficient in area to adequately maintain in a state of nature a reasonable number of wild animals.

When animals are congregated in closely confined feeding areas and are dispossessed of their natural variety of grasses and weeds; or when they are deprived of their natural brush and rough-land shelter and sunshine, and are housed in poorly ventilated sheds, then assuredly disease will make its appearance in a greater number of them no matter whether they are of the wild or domestic variety.

THE BEAR, A SPORTING ANIMAL

COLONEL J. A. McGUIRE, publisher of "Outdoor Life," began years ago to advocate recognition of the bear as a game animal rather than a predatory one. He succeeded in securing such recognition in some states, although there was more or less backsliding from time to time. It has taken a long time to secure this recognition of a fine species of game, a trophy worthy of any sportsman's effort, and there is yet much to be done before the bear is everywhere on a proper footing as a recognized game animal.

The following states now recognize that the bear is entitled to some protection: Arkansas (entirely closed); California (closed in certain districts); Florida; Georgia; Louisiana; Michigan; Mississippi; New Mexico; New York; North Carolina; Oregon (protected in three counties); Pennsylvania; Tennessee; Texas; Utah; Virginia; Washington (subject to regulation by county game commissions).

There is a long list of states, however, that give no protection to bear whatever; although some of them have at certain times in the past. These states include: Arizona; parts of California; Colorado; Idaho; Kentucky; Maine; Minnesota; Montana; New Hampshire; Oklahoma; parts of Oregon; South Carolina; Vermont; West Virginia; Wisconin, and Wyoming. It may be that some of these states do not contain any bear but they all should if the animal had the proper sort of recognition and protection.

Why Mary Had A Little Lamb---Modern Version

The cold winds swept the mountain side
And pathless was the dreary wild.
'Mid this cheerless scene they might have died,
But each father wanders with his child.
For, while through the drifting snow they push
Lambs fare better there than in the bush.
—Apologies to Seba Smith.

GOVERNMENT zoologists, studying the wild life of Montana's mountain valleys of Glacier National Park last spring, not only discovered the earliest arrival of mountain sheep lambs in history, due to the mildness of the winter, but also found that the rams have a "daily walk" program mapped out. The zoologists found that the daddy sheep keep the lambs on the go incessantly rather than allowing them to snuggle down in a snowbank for protection against zero weather. Never before has it been noticed that the old sheep start right in so briskly to get them acquainted with their mountain climbing life. Possibly the light snowfall caused the radical change in the bringing up of their young. The picture at least proves that even the papas of the mountain sheep have home chores to look after. The lamb in the foreground has not eight legs. Behind him is his twin, while father is bringing up the rear in the daily exercising jaunt.

Montana Game Birds and Poison

By DR. EMIL STARZ, Chemist, Montana Livestock Sanitary Board

Dr. Emil Starz

THE conservation of Montana game and useful bird life is of great economic value and anything which assists in increasing the number of game and useful birds is not only an addition to the beauty of our natural scenery, but also to the decimation of destructive insects. The farmer should know his bird friends as well as his bird enemies and protect the former, because the more of these birds that stay around a farm, the less will be the damage to his crops by insects. While birds help considerably in exterminating destructive insects, the farmer in order to keep voracious rodents from destroying his agricultural products has to resort frequently to the employment of chemical substances for that purpose. The latter are generally classed as poisons and comprise, among others, strychnine, cyanide of potassium and calcium, arsenic, and arsenical copper compounds. Strychnine preparations such as wheat and oats poisoned with it are the only ones concerned with the danger of losses among game birds.

The alimentary system of birds differs to a considerable degree from that of other animals. There is no provision made for mastication of food in the mouth because of the absence of teeth. The food is taken up by the beak and is immediately passed by the tongue into the pharynx. From there it enters the esophagus and is carried to the crop, where it is stored, partially softened and passed on to the stomach.

Gallinaceous birds possess a crop, which is simply a dilation of the esophagus. Passage of the contents of the crop to the first stomach is aided by a wide circular muscle surrounding the crop. Ducks, geese and other palmipeds are not provided with a distinct crop. Instead the cervical portion of the esophagus may become greatly distended in such a manner as to form a long fusiform reservoir.

The crop has no secretory glands other than mucous glands. It is connected with the first stomach by a continuation of the esophagus. The walls of the first stomach are thick and contain numerous glands secreting gastric juice. The food is not digested in the first stomach but after becoming saturated with the gastric secretion it is forced into the gizzard where it is triturated by the powerful muscles of this organ, with the aid of sand and pebbles picked up by the bird. The gizzard acts principally in a mechanical way, grinding the food and serving as a substitute for teeth. It is more highly developed in grain-eating birds than in those subsisting principally on fish or animal food.

It is now a known fact, supported by feeding experiments with strychnine poisoned grains to gallinaceous birds, that gallinaceous birds such as quail, prairie hens, grouse, pheasants, partridges and guinea hens, possess a certain immunity from strychnine poisoning.

For instance, in 1918 the Biological Survey of California definitely proved that barley, poisoned with strychnine such as is generally used for killing ground squirrels and gophers, had no effect on the abundance of valley quail. Not a single dead quail was found, nor one which showed any symptoms of strychnine poisoning. Sportsmen, therefore, need not fear the loss of game birds from that source as such cases of poisoning are extremely rare.

Only one case of strychnine poisoning of a male pheasant has come to our observation. About two years ago a woman brought to the chemical laboratory of the Montana Livestock Sanitary Board a dead male pheasant which she had found on the road about three miles north of Helena. Physical examination of the bird did not show any injury and it was suggested that a chemical analysis of the contents of the crop be made, which was gorged with grain. Chemical analysis of this grain showed the presence of considerable strychnine. The bird had evidently been feasting on some poisoned grain put out to kill gophers. But, as stated above, such cases occur very rarely and, therefore, need not provoke the concern of the sportsmen.

Those who are charged with putting out poisonous bait for the destruction of gophers and other rodents are generally men experienced in that work, and know very well the effects of poisons and the care with which they must be distributed.

Besides strychnine there are some other poisons which are used in the pursuit of rodent extermination. However, these very rarely lead to losses of game and useful birds on account of their application and preparation.

To sum up, it can be said from the observation of various investigators that the danger of poisoning gallinaceous game birds, through poison baits distributed for the eradication of rodents, is fortunately very small on account of a certain existing immunity these birds possess for strychnine and its preparations.

THE moon through a forest—a starlit lake
Can preach as no human can—
Of the word of God and His love toward man
Since this earth of ours began.

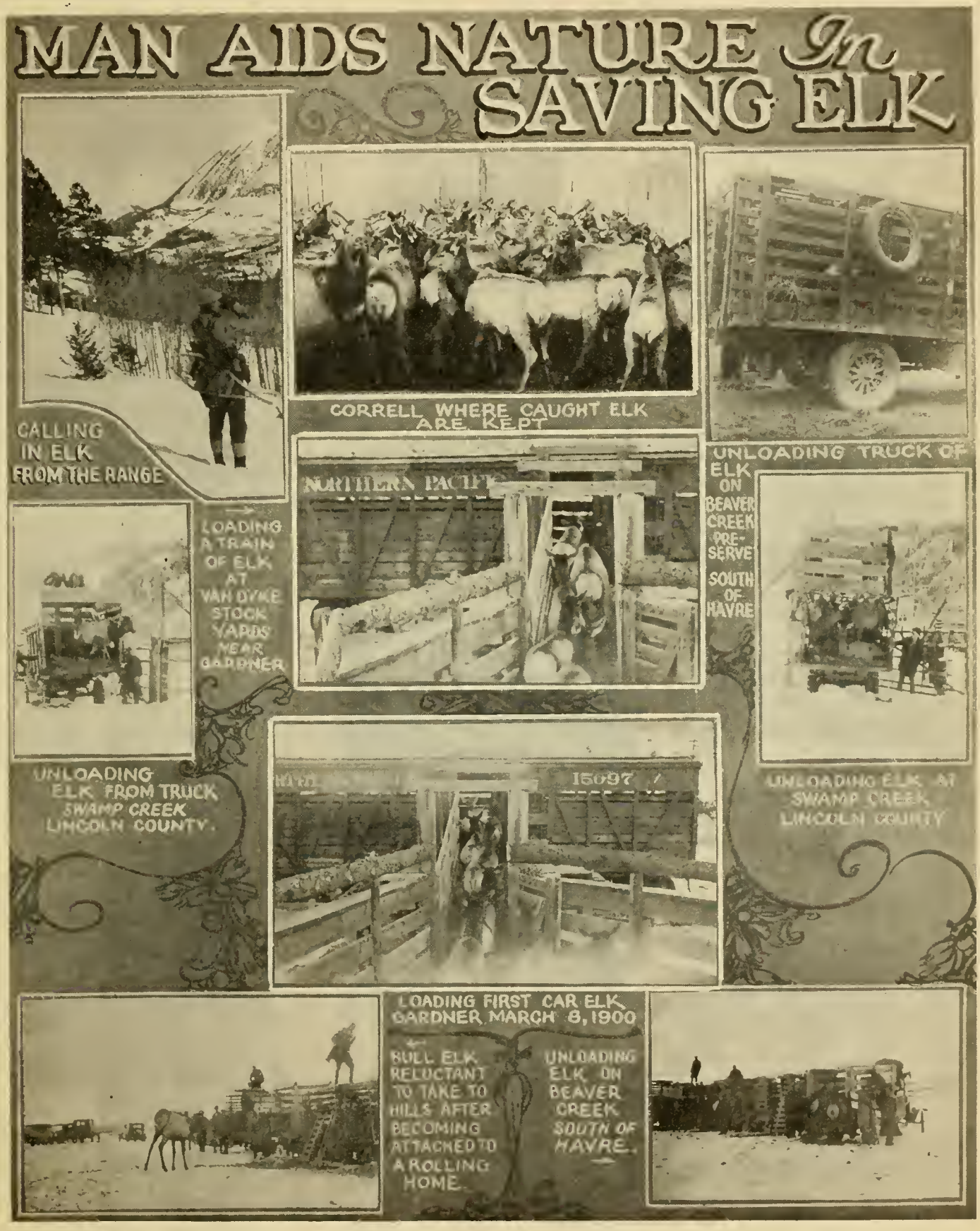
CAUSE AND EFFECT

Rube: What makes your daughter so talkative?

Boob: I think she and her mother were both vaccinated with a phonograph needle.

Canadian Honkers See America First

Wheat-fed Canadian honkers and their neighboring tourists, Mr. and Mrs. G. H. Mallard, are welcome visitors to Montana when the freeze hits the north country. This splendid bag of geese and mallards was made on Wild Horse Lake, north of Havre, in Hill county. The fortunate shootists in the picture are Lou Lucke of the Lucke Clothing Company of Havre and George Forge. In justice to the sportsmen in the picture it might be well to explain that the remaining members of the party are in the near vicinity.



Through cooperation of the State Fish and Game Department, members of Montana sportsmen's clubs and federal authorities, elk are being transplanted in desired locations throughout the state. The group of photographs above show the manner in which they are corraled, shipped, taken to the mountains in huge motor trucks and released. The Department now has 300 elk from the Bison Range at Moiese available for distribution, each sportsmen's club desiring them to pay half the expense of loading and transporting a carload.

Critical Period for Game

FEED THE BIRDS

GET the bird feeding shelves ready. Winter is unkind to the feathered flocks and existence for the ground feeders is a serious problem. Any old construction of shelf is welcomed by the birds just so that it will hold food. Cereals, small grains, table scraps and raisins will attract practically all of our winter birds.

WHILE it is now midwinter, it is not too late to check up on the condition of game birds and to intensify and extend facilities for feeding and care of game. It very often happens that some of the most destructive snow and sleet storms which cause tremendous mortality of game birds occur late in the winter. Every sportsmen's club which has not already made adequate provision for game birds in its territory would do well to take such steps at once.

Feeding stations should be established wherever game birds can be located. These should be placed in exposed places which the winds will sweep free of snow or in well sheltered places where snow will not cover and hide the food. All such locations should be so selected as to insure the birds opportunity to escape from natural enemies and to this end should be surrounded by openings where ground enemies will not have an opportunity to hide. Bundles of unthreshed grain supply food in ideal form for winter feeding as they can be wired to bushes or placed in sheltered places. Brush heap shelters are readily resorted to by quail but ample openings should be left to permit ready escape in case of necessity.

In the northwest prairie chickens, sharp-tailed grouse, pheasants and Hungarian partridge frequent straw stacks in winter. Grain is readily taken by these birds if placed in such locations.

Ruffed grouse will come near farm buildings for wheat and other grains scattered on the ground. Suitable grains include wheat, barley, millet, hemp and kaffir corn. A mixture is desirable and grit should be furnished when snow is deep. Screenings from grain elevators and mills are cheap and desirable food for birds but should not be used where there is danger of spreading foul seed on farms.

Food for birds should not be placed in large quantities but should be furnished in small quantities at frequent intervals—at least once each week. In some instances automatic feeding devices have been used successfully.

If birds are trained to look for food in certain localities they should not be neglected as in such cases spasmodic feeding will sometimes do more harm than good.

Sportsmen Plant 10,000 Birds

MONTANA'S Fish and Game Commission has purchased and released nearly 10,000 game birds during the last several years, to restock fields and valleys, maintain wild life and introduce approved varieties for the benefit of stockman, farmer and sportsman.

Figures have been compiled under direction of Robert H. Hill, state game warden, covering the purchase of Chinese pheasants, Hungarian partridges and quail for the last 10 years. Since 1918 the department has distributed 2,973 Chinese pheasants throughout the state and the colorful Mongolians have multiplied rapidly and become well acclimated. A three-day open season on male Mongolians was declared in November by the Commission and sportsmen generally voted him a rare game bird.

The figures show that since 1922 the department has purchased from game farms in Czecho-Slovakia, Hungary and other European countries, a total of 6,600 Hungarian partridges—the gamiest little game bird of them all. The Huns have likewise multiplied rapidly and are the friends of farmers and gardeners because of their activities among insect pests. The Hun lays hard for a dog, always flushes where the hunter thinks he ain't and is one of the foxiest of feathered friends of the fields.

One consignment of 360 Gambel valley quail was introduced in the Bitter Root and Flathead. Hundreds of quail were planted by Marcus Daly on his farm in the Bitter Root. The Chinese pheasants were purchased from Oregon game farms.

The purchase of Chinese pheasants by the Commission were as follows: In 1918 the first shipment of 48 was introduced; in 1920 there were 300 released; in 1921 the total reached 500; in 1922 the mark was increased to 1,500; in the same year another shipment of 600 was liberated and the last consignment of 24 was distributed in 1924.

Liberation of Hungarian partridges shows the following figures: The first shipment of 1,000 was released in 1922; the next batch included 2,000 which were freed in 1923; another 2,000 came in 1925; then 1,000 more were released in 1926, and a shipment of 600 was freed. Other small shipments have followed.

The Fool Hen

SPORTSMEN of Montana who delight in attractions of forests near the timber line are intimately acquainted with the fool hen, clown of feathered friends. She's true to her name. She just naturally doesn't know her berries. Forest rangers and hunters tell many a yarn regarding frolics with the goofy girl of the big woods. Many of them toy with the forest jester with a noose of twine hitched to a long pole. The fool hen foolishly continues craning her neck and bobbing her head, wondering what it's all about, until head goes through noose and down comes the dinner. This picture was taken on the Lolo National Forest by H. R. Flint.

DO MOOSE CHARGE?

THIS is a long disputed question and one that has never been answered finally. It all depends on the moose. T. M. Brewer, a resident of New Brunswick, after an experience during the last hunting season, answers the question in the affirmative.

Mr. Brewer, who is now approaching 70, was hunting moose in the Miramichi weeds. He sighted a bull moose, took a shot at him but only slightly wounded the animal, whereupon the moose immediately charged with all speed toward the spot where Mr. Brewer stood. Notwithstanding his advanced age, Mr. Brewer was able to climb a tree with surprising speed, but unfortunately dropped his rifle in doing so. The moose, suffering from the wound inflicted by the bullet, snorted and pawed at the foot of the tree, keeping up the siege for four hours before becoming wearied and departing far enough away so the unfortunate hunter could recover his rifle. After he had done so he succeeded in placing a bullet with more accuracy and secured his prize. The antlers of the moose measured 61 inches, an extraordinary head.

Montana Fish Pond Sets World Mark

By LOUIS F. GRILL, Managing Editor Daily Star, Miles City, Montana

MONTANA has the largest warm water fish cultural pond in the nation, located on the site of old Fort Keogh near Miles City. As the result of close cooperation between sportsmen of the Custer Rod and Gun Club and members of the Montana State Fish and Game Commission, this enterprise has been established and is operating satisfactorily. Funds for completion of the project were provided by the State Commission.

The removal of 5,000 young bass in October, the result of the planting of 375 adult bass in May, constitutes the first major result that accrues from the building and establishment of the fish cultural pond on the grounds of the United States range livestock experiment station, formerly Fort Keogh. The purpose of the movement is to rear in eastern Montana waters warm water game fish and plant them in accessible places for the benefit of future generations of sportsmen. The original consignment of adult black bass was received from LaCrosse, Wisconsin. The achievement justifies the time expended, the labor involved and the expense incurred in the conception and completion of the project.

When in the early history of eastern Montana the plains were made bare by the extermination of the buffalo, the practical extermination of the deer and the antelope followed. Upland birds were threatened with extinction. Lack of legal restrictions resulted in the ruthless slaughter of wild life of eastern Montana.

Within the memory of ardent sportsmen now living the problem of conservation became perplexing. The buffalo were gone forever. Barriers were erected to protect the remaining deer and antelope. Restrictions were placed on the killing of upland birds. The latter were augmented by the planting of the Chinese pheasant and Hungarian partridge. Under the protection afforded herds on the plains and forests and coveys in the fields increased and multiplied. The adoption and the carrying out of the policy of conservation has brought results that are at once gratifying and encouraging.

Out of the problem of conservation so satisfactorily solved came the opportunity to do something of a constructive nature. Sportsmen of vision saw the rivers of eastern Montana barren of game fish. The saugus, the bullhead and kindred varieties of fish, besides the occasional catfish, offered no contests worthy of the angler. Early experiments in importing perch and sunfish produced no appreciable results. Out of the careful study of the conditions there was brought to fruition the idea of establishing a fish cultural pond.

With the inauguration of the movement, the cooperation of the State of Montana through the instrumentality of the State Fish and Game Commission and the federal government, the Custer Rod and Gun Club, after a physical survey was made, selected a site, a natural depression on the west side of the old Fort Keogh reservation.

Under the leadership of the State Commission, Dr. J. H. Garberson, Deputy Game Warden Captain J. H. Chartrand, George Stockhill, president of the Custer Rod and Gun Club; Alva Simpson, supervisor of the Custer national forest reserve, and others, the work of construction was begun.

It was started in July, 1927, and completed in March, 1928. The total cost was approximately $15,000. On the north end of the pond a dam 590 feet long, 10 feet high and 10 feet across the top was erected. One spillway 30 feet wide is provided with a drain box built in the dam. It impounds the waters that are provided by an artesian well flowing at the rate of 12 gallons per minute, the operation of the pumping plant and the irrigation ditches that carry the waters of the Yellowstone river.

The surface area of the pond covers about 78 acres. It extends in devious channels for a distance of more than a mile. The depth of the water at the dam is nine feet, and the average depth for the pond in its entirety is around four or five feet.

In this pond in May, 1928, were planted 375 adult black bass from Wisconsin. It was thought at the time that the black bass were planted too late in the spring to bring any considerable increase. It was surprising, therefore, to the local sportsmen, C. F. Culler, district supervisor of the United States fisheries at LaCrosse, and Captain Hugh Crosser of the same city, who were present at the draining of the pond in October, to discover that 5,000 young bass were removed.

The young fish were planted in the upper reaches of the Tongue river, in available waters in the vicinity of Rosebud and Terry, and in the Mike Pestka storage waters in the Little Dry in the Cohagen region in southern Garfield county.

It required six days to drain the big pond to the point where it was possible for the workers to go down with kettles and remove the young fish, which were from four to six inches long and in excellent condition.

It was also observed that the fungi contents of the water are such as affording a feed that causes the rapid growth and development of the minnows. Ten days were required to refill the pond which was accomplished at a cost of approximately $500.

The results of the first propagation test were considered eminently satisfactory. Arrangements were immediately made to import another and larger consignment of adult fish. Fisheries authorities at LaCrosse were advised of the circumstances and arrangements were made to forward at the earliest opportunity a consignment not only of black bass but also other varieties that include crappies and bream. Arrangements were also made with W. T. Thompson of the Montana State College of Bozeman to come and supervise the planting of the fish.

George Stockhill, president of the Custer Rod and Gun Club, has furnished the details with reference to the number and variety of the adult fish that were received by the local sportsmen. His report shows the following:

His Majesty-King Goat

On Montana's crags, high above the timber line, roam the Rocky Mountain goats. Seldom it is that a manipulator of a camera gets within shooting distance. The king of the crags is protected all the year around by Montana's game laws and his keen sense of smell telegraphs to him the presence of the man. The unusual photo was taken by Hileman of Kalispell in Glacier Park.

51	pails of adult black bass, 2 to 3 per pail	130
21	pails of 2-year-old black bass, 11 per pail	231
97	pails of adult crappies, 6 per pail	582
44	pails of adult breams, 6 per pail	264
213	Total	1207

Calculating the increase of the future upon the results achieved in the initial experiment, it is anticipated that approximately 30,000 young fish will be taken from the pond when it is drained again in the fall of 1929. An additional shipment of adult fish will be sent during the winter to augment the number already planted. This will increase the number that will be removed for replanting in the streams and ponds of eastern Montana in 1929.

The results achieved justify the foresight of sportsmen who have no thought other than building for the future. What was once a hunter's paradise has been restored with the exception of the buffalo. What is considered will be an angler's Eden is in the process of making.

An element of romance enters. The fish cultural pond, located on federal government property, is adequately protected. It is not intended that the pond shall be a place for fishing. The primary purpose of the pond is to allow propagation of warm water game fish that will be planted in streams and other ponds where, within the course of a few years, the opportunity for fishing will be provided. Under the protection afforded the fish cultural pond has become an asylum for waterfowl. Here they are not molested and here they will build their nests in the spring and from the abundance of natural food will rear their young. The potentialities of the pond have not as yet been fathomed, but the promise is vouchsafed that the builders have builded greater than they know.

Baled Hay Kills Antelope

HOT LUNCHES served by a Montana goat have saved the life of a baby antelope. And the presence of a pair of coyote pups failed to cause the young antelope to shy away from the lunch counter, according to the accompanying picture taken by J. H. Chartrand, deputy state game warden at Miles City.

The Mixed Family

"The mother antelope had apparently been killed when we found the little fellow," writes Warden Chartrand. "We first tried cow's milk fed from a bottle but found that the antelope did not do well. Then we found a mother goat. The antelope helped itself to hot lunches and began to grow rapidly. It was necessary for us to hold the goat by the ears when the little stranger was served meals to avoid malicious butting. Some time later several Indian dogs came to town and gave chase. The antelope ran into its shed, hopped up on a pile of coal to look out the window, fell and snapped its leg between chunks of coal. Dr. Baldwin set the leg and after several weeks it was romping around again. Later it grew mischievous and ventured into neighborhood gardens. We shut it up. One day we received a bale of hay filled with foxtail grass. The grass worked into the mouth of the antelope and it could not eat. We did everything possible to relieve the suffering but the pet died. There's only one place for wild life and that's the great open spaces of Montana."

WARDENS SUBJECT TO INTELLIGENCE TESTS

THE FIRST state to exact an intelligence test of its game wardens is the State of Virginia, who are given the same test as that applied to incoming freshmen of Washington and Lee university. It is announced that these tests are given largely for experimental purposes and will not materially affect the wardens' standing with the State Game and Fish Commission.

The idea of rating game wardens psychologically originated with Major A. Willis Robertson, State Game and Fish Commissioner, who had observed how useful these tests were to the government during the late war and at the university.

CASH RECEIPTS

January 1, 1927, to December 31, 1927

67,083	Resident hunting and fishing licenses	$134,166.00
3,320	Non-resident hunting and fishing licenses	11,620.50
151	General non-resident hunting and fishing licenses	4,530.00
90	Limited non-resident hunting and fishing licenses	900.00
18	General alien hunting and fishing licenses	900.00
302	Alien fishing licenses	3,020.00
		$155,136.50
	Less agents' commission	6,998.80
		$148,137.70
1,027	Trappers' licenses	$ 10,270.00
2,601	Shipping permits	1,300.50
63	Guides' licenses	630.00
	Seining permits	50.00
	Flathead seining permits	375.00
99	Game farm licenses	495.00
13	Taxidermists' licenses	195.00
641	Beaver permits	6,410.00
9,227	Beaver tags	1,613.50
		$ 21,339.00
	Refunds	$ 1,040.81
	Fur sales	8,196.18
	Fines	8,859.20
	Confiscations	6,388.64
	Fish royalties	785.09
	Revolving fund	346.15
	Capital expenditures	45.00
		$ 25,661.07
	Total	$198,137.77
	Less biological income	17,722.50
	Net fish and game income	$180,415.27

CASH RECEIPTS

January 1, 1928– to December 31, 1928

75,063	Resident hunting and fishing licenses	$150,126.00
4,335	Non-resident fishing licenses	15,172.50
132	General non-resident hunting and fishing licenses	3,960.00
120	Limited non-resident hunting and fishing licenses	1,200.00
9	General alien hunting and fishing licenses	450.00
311	Alien fishing licenses	3,110.00
		$174,018.50
	Less agents' commission	7,808.70
		$166,209.80
1,773	Trappers' licenses	$ 17,730.00
2,260	Shipping permits	1,130.00
69	Guides' licenses	690.00
	Seining public waters permits	55.00
	Flathead seining permits	100.00
143	Game farm licenses	715.00
10	Taxidermists' licenses	150.00
613	Beaver permits	6,130.00
5,749	Beaver tags	2,874.50
		$ 29,574.50
	Refunds	$ 321.77
	Fur sales	4,758.73
	Fines	9,439.80
	Confiscations	3,686.71
	Fish royalties	93.22
	Capital expenditures	27.75
	Montana Wild Life subscriptions	497.50
	Montana Wild Life advertising	100.25
		$ 18,925.73
	Total	$214,710.03
	Less biological income	19,947.85
	Net fish and game income	$194,763.18

The Elk Herds of Montana

By GLEN A. SMITH, United States Forest Service, Missoula

IF YOU were to ask the average citizen of Montana who is and who is not interested in game matters, where are the big herds of elk, the reply would, in all probability, be "Yellowstone, near Gardiner, Montana," or "the Sun River herd." This would be true in part. There are, however, a considerable number scattered over other portions of the state from the Yellowstone on the east and the state line on the west and along either side of the Continental Divide from the Glacier Park on the north to the state line on the south.

From the best estimates available, elk are found in the following territories and in the following numbers:

Northern Yellowstone — 12,000 head (largely summer in the Yellowstone National Park).

Beaverhead National Forest—500 head (mostly in Beaverhead county).

Bitter Root National Forest—580 head (Ravalli county).

Cabinet National Forest — 300 head (Sanders county).

Deer Lodge National Forest — 1,000 head (Powell, Deer Lodge, Silver Bow, and Jefferson counties).

Flathead National Forest—1,500 head (Flathead and Powell counties).

Gallatin National Forest—300 head, summer; 2,500 to 3,000 drift from the Yellowstone Park and winter on the Gallatin National Forest in Gallatin county.

Helena National Forest — 500 head (largely in Broadwater county).

Jefferson National Forest—200 head (largely in Judith Basin county).

Lewis and Clark National Forest—4,200 head (Lewis and Clark and Teton counties).

Madison National Forest — 400 head (Gallatin and Madison counties).

Lolo National Forest—200 head (Missoula county).

Missoula National Forest—800 head (largely in Powell and Missoula counties).

There are a few additional scattered elk, from 10 to 50 head, in the following counties: Glacier, Pondera, Chouteau, Meagher, Sweet Grass, Stillwater, Granite, Mineral, and Lincoln.

From the foregoing it will be noted that elk are pretty well scattered over a large portion of the western half of Montana with about 11,000 to 12,000 head which summer and winter in Montana and are, therefore, Montana elk. In severe winters there may be as many as eight to nine thousand head drift out of the Yellowstone National Park in Park, Gallatin, and Madison counties. Many of these scattered herds are the result of artificial stocking from the Northern Yellowstone herd or the National Bison Range herd west of Missoula, Montana.

Space will not permit a discussion of each of the several herds and it seems, therefore, advisable to confine this article to the two main herds, the Northern Yellowstone and the Sun River.

The Northern Yellowstone herd comprises that portion of the great Yellowstone Park herd which summers in the Yellowstone National Park and drifts north and west out of the park in varying numbers, depending upon the severity of the winters and depth of snow. That portion which annually migrates to the south is generally known as the Jackson Hole herd.

Here we have one of the largest herds of animals and the largest remaining area of public land suited to the perpetuation of a great number of elk in their natural haunts. The mountains at the headwaters of the Yellowstone and Snake rivers have long been the resort of a great number of elk. In the region now comprising the Yellowstone National Park and the surrounding national forests, the elk early found an ideal summer home. In the fall before the advent of settlement they drifted out of the mountains ahead of the storms and snow, scattering over the bordering open valleys and plains where the snowfall was light and where nourishing, cured grasses were plentiful. At this season they often worked their way from 100 to more than 200 miles from their summer feeding grounds. In the spring they followed the melting snow back to the high mountains, above the zone of annoying flies, where the climate was cool and refreshing, and where fresh and succulent feed abounded. The forest offered grateful cover.

Then came the settlers with the activities of civilization which are, in many ways, so disturbing to wild life. Their fields occupied lands formerly the winter home of the elk, their fences obstructing free movement, especially in the fall and spring migrations, and the introduction of domestic stock consumed the winter feed. In addition, thousands of animals were killed each year. Elk were never so wantonly slaughtered as the buffalo, but the settlers used their meat and hides, they were sought by sportsmen from near and far, and hundreds and thousands were sacrificed by irresponsible market and tooth hunters. With the increase of livestock on the ranges, a growing conflict resulted between the interests of the elk and those of the livestock. As a result, the elk were steadily reduced in numbers and the winter home of the survivors more and more narrowly restricted.

The diminishing herds were crowded farther back into the mountains. Instead of descending to the plains in winter, they remained in the remote valleys and on the lower snow-swept ridges. They were thus restricted to what was naturally their spring and fall range and, in some cases, to even what formerly would have been largely a summer range. Farther and farther the settlement advanced into the mountain regions. More and more restricted became the area in which the elk could spend the winter months, until now there is scarcely enough winter range in public ownership to take care of the remaining limited numbers during the average winter season, and, in severe winters, the loss by starvation has in the past been extensive.

The elk situation has reached a crisis. The steps already taken to provide for the remaining elk in the Yellowstone region are not adequate.

A definite plan has at last been formulated and is based upon the following facts:

The elk problem is a land problem. Because an elk is a grazing animal, it must have grass and herbage to sup-

Single file, Indian style—that's the way the Montana elk line up when they start moving. This picture shows a band of elk starting toward greener pastures in their grazing ground near Polson, Mont.

port it. It is a gregarious animal, running in bunches and herds, particularly in the spring, fall, and winter. It, therefore, requires feed in considerable quantities. Owing to its wandering and migratory habits, the elk moves over a wide territory during the year, with special needs for forage during each of the four seasons. The elk is not like mountain sheep, moose, or whitetailed deer, able to find feed in the mountains and forest to maintain it during the winter. It needs, during much of the year, the same kind of feeding grounds as domestic stock. We have, therefore, the problem of furnishing to the elk herds of the Yellowstone region enough land on which they can, during the different seasons, find adequate forage.

The key to the situation in this region is the Yellowstone National Park and the surrounding national forests. Here are lands owned and controlled by the public. Here exists a vast mountain region which, so far as the summer range of the elk is concerned, is adequate to support many more of them than now live there. Unfortunately, when these reservations were established, and during the early years of their existence, the needs of winter range for the elk were not given consideration. It was a question of land chiefly valuable for its scenic interest and for forest and water conservation.

From the foregoing it must be clear that, primarily, the elk problem is one of land control: first, to safeguard for elk the use of certain of the public reserved lands, and, second, to secure for their use such additional lands now privately owned as are essential to the life of these wild herds.

The first problem of the northern group of elk is to provide more winter range. Summer range is abundant, and spring and fall range is also plentiful. During the mild winters the animals fare well because they winter on what is naturally a spring and fall range, or even on portions of their summer range.

The key to this situation is the area comprising about 60,000 acres lying north of the Yellowstone National Park, 40,000 acres of which formerly lay between the boundaries of the Absaroka and Gallatin Forests, extending north 15 miles along the Yellowstone river from the town of Gardiner to Yankee Jim Canyon. This latter area is partly public and partly private land.

Through the efforts of the Montana Sportsmen's Association, local residents of Park county, the Fish and Game Commission, and other public-spirited men, the public lands in the above area were, by an act of congress, added to the Gallatin and Absaroka National Forests.

Careful investigation has demonstrated that the ownership and control of the private lands in this area by the public are essential to the future maintenance of the northern elk herd. Within this area now within the two national forests are some 21,000 acres of private lands, 1,350 acres of school lands belonging to the State of Montana, and over 4,000 acres of Northern Pacific railway land. The more important portions of the remaining private lands within the area must be purchased. To accomplish this, it will require approximately $300,000, and upon this depends the future of this magnificent herd. Horace Albright, superintendent of the Yellowstone National Park, has secured pledges of upward of $125,000 from wealthy sportsmen in the east with the understanding that public funds will be raised to match this amount; $40,000 of the above mentioned private funds, however, has already been expended in acquiring range land; the balance is being held pending the raising of public funds.

Congressmen Scott Leavitt and John M. Evans were successful in getting the legislation mentioned above but were unable to get the proposed appropriation of $150,000 needed to acquire the necessary lands and to match the private funds now available. These congressmen stand ready to vigorously push a bill to provide for the necessary funds and they need your support. There is now pending before congress an appropriation bill that, if enacted, will provide a part of the funds needed and make it possible to make real progress on this program.

It should, of course, be understood that, in laying out this program, the organizations sponsoring it do not favor any definite increase in the elk herd. They are simply working toward a plan of providing for an elk herd of sufficient size and ranging over a sufficient area to afford opportunity for legitimate hunting and the maintenance of the elk as one of the important game resources of Montana. It is thoroughly realized that, as a part of the program, a yearly kill under progressive and intelligent administration of the game laws of the state would be necessary to take care of the natural increase and hold the herd to the numbers which the winter range above mentioned.

The early history of the Sun river herd is not unlike that of the North Yellowstone. The encroachment of settlement on the natural range of the elk resulted in similar conditions to the Yellowstone situation with the exception that there was no Yellowstone Park to protect the animals during the greater part of the year. It was not until 1910 or thereabouts that any great interest was aroused in this fast vanishing herd of elk, at which time it was estimated that there were between two and three hundred head of elk left.

Largely through the efforts of Senator Tom Larson of Choteau the Sun River Game Preserve was created in 1912 and steps were taken by the Forest Service to adjust the grazing of livestock in that region to meet the need of the elk and other game animals in that general region. The Sun River Game Preserve embraces approximately 200,000 acres of rough, mountainous, more or less timbered land with a bountiful summer range but in view of the fact that it lies at an altitude of from eight to ten thousand feet above sea level and extends along the eastern slope of the Continental Divide where snows fall early and lie late in the spring, it has been found that the main difficulty in maintaining a very extensive herd in this region is the matter of winter range.

From the best information available there is suitable range in public ownership to maintain a herd of 2,500 to 3,000 head of elk under the severe winter conditions that may occur in this region. This herd, however, has increased beyond the winter feeding capacity of the publicly owned range and during the winter of 1927-28 was forced out of the mountains on to the private pasture lands in the foothills. This herd now numbers in the neighborhood of between 4,000 and 4,200 head. The increase in this herd of animals during the last sixteen years has been very gratifying and at the present time it is estimated that the annual increase is around 800 head.

The annual legal kill has averaged about 150 head for the past ten years. It is clear, therefore, that some measures must be taken to increase the annual utilization of this herd or suffer gruesome losses by starvation during a severe winter. The sensible thing to do is to provide for a longer hunting season adjacent to the Sun River Game Preserve and thus increase the opportunity for hunters to hold in check the increase by legal kill. It would seem that a hunting season from October 15 to December 15 with authority invested in the Fish and Game Commission to close the season on five days' notice would be in line with proper management of this herd.

WHETHER in forest or desert sands
My camp would be mine alone
For there I would clear me a piece of ground
And there I would have my home.

Photo by the United States Forest Service showing elk on the winter range in one of the national forests.

Montana State Fish and Game Department

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H. C. Sailor, Absarokee
Frank Beller, Gardiner
J. F. Goldsby, Polson
Thomas Danaher, West Yellowstone

State Hatchery Employees

Big Timber Hatchery—Iver S. Hoglund, Foreman; Ed. Gunderson, Assistant

Great Falls Hatchery—A. G. Stubblefield, Foreman; S. A. Hamann, Assistant, and Rex E. Hawn, Assistant

Anaconda Hatchery—Kenneth MacDonald, Foreman; E. A. Allen, Assistant

Emigrant Hatchery—Oren L. Hathaway, Foreman

Lake Ronan Hatchery—Leo Gilroy, Foreman

Somers Hatchery—M. L. Matzick, Foreman; Elmer Phillips, Fish Culturist

Missoula Hatchery—O. E. Johnston, Foreman; T. E. Day, Assistant

Hamilton Hatchery—J. P. Sheehan, Foreman; Margaret Sheehan, Assistant

Station Creek Hatchery—Eli Melton, Foreman

WHERE THE BIG UNS STRIKE
In BEAVER CREEK

HILL COUNTY.